(1)

LIBER 1 PAGE 1

HARFORD COUNTY
BUILDING CODE ORDINANCE NO. 21

An ORDINANCE passed under and by virtue of the power and authority of Article 25, Section 3 (S) (2) of the Annotated Code of Maryland, 1957 Edition, as amended, to be known as Harford County Building Code Ordinance.

WHEREAS, the County Commissioners of Harford County, in the performance of their duties, are dedicated to the following:

1. The promotion of public safety;
2. The elimination of hazards to life and health incident to the construction and use of buildings;
3. The establishment of requirements to prevent the occurrence and spread of fire;
4. The relief of the public and industry from confusion and uncertainty concerning building regulations; and
5. The furtherance of civic pride and community well being.

Now, therefore, the County Commissioners of Harford County hereby adopt, for the purpose of controlling all matters concerning the construction, alteration, addition, repair, removal, demolition, use, location, occupancy and maintenance of all buildings and structures and their service equipment, that certain building code known as "BOCA Basic Building Code", Fourth Edition, 1965, and Accumulative Supplements, adopted by the Building Officials Conference of America, Inc., of which not less than one (1) copy has been and is filed in the office of the Director of Administration and the same is hereby adopted and incorporated as fully as if set out at length herein with the below listed changes, amendments, revisions, deletions, substitutions and

additions, and from the date on which this Ordinance shall take effect, the provisions thereof shall be controlling for the purposes mentioned above.

I. GENERAL REVISIONS

A. Substitute "Harford County" for the phrase "name of municipality" wherever it appears in the Building Code.

B. Substitute "County Commissioners of Harford County" for the phrases "appointing authority", "chief appointing authority" and "chief authority" wherever they appear in the Building Code.

C. Substitute "Director of Public Works" for the term "Building Official" wherever it appears in the Building Code.

II. SPECIFIC CHANGES

A. Article 1, Section 107.0, Department of Building Inspection, is revised as follows:

1. Subsection 107.2, Appointment, delete entire subsection.

2. Subsection 107.5, Qualifications of Building Official, delete entire subsection.

B. Article 1, Section 113.0, Application for Permit, subsection 113.5, Plans and Specifications; add the following:

Provided, however, that for a period of one year after adoption of the Code, builders of one and two family dwellings shall not be required to submit detail specifications, but shall have the option to refer to model names and numbers when submitting subdivision plans. In addition, for one year after adoption of the code, it shall be sufficient for a builder of one and two family dwellings to submit a plan showing wall sections, floor plan and elevation drawn to scale.

C. Article 1, Section 114.0, Permits, subsection 114.5, Approved Plans, is hereby amended to read as follows: The Building Official shall stamp or endorse in writing both sets of corrected plans "Approved", and one set of such approved plans shall be retained by him and the other set shall be kept at the building site, or be kept readily accessible, open to inspection of the Building Official or his authorized representative at all reasonable times.

D. Article 1, Section 114.0, Permits, subsection 114.9, Notice to Start, is hereby revised in its entirety to read as follows: Within twenty-four (24) hours after the start of construction, the building official shall be so notified by the builder's representative. However, no foundation or structural work shall be performed prior to such notification.

E. Article 1, Section 118.0, Fees , delete entire Section and supplement applicable fees to be indicated in Harford County Fees Ordinance No. 22.

F. Article 1, Section 119.0, Volume Computation, is hereby deleted from Building Code.

G. Article 1, Section 123.0, Violations, subsection 123.3, Violation Penalties, the penalty referred to in this subsection is hereby established at One Hundred Dollars ($100.00)

H. Article 2, Definitions and Classifications, Section 200.0, Scope, add to the end of this subsection the following sentence: Where the provisions of this Building Code are in conflict with the Harford County Zoning Ordinance, the said zoning ordinance shall be controlling on all questions.

C. Article 1, Section 114.0, Permits, subsection 114.5, Approved Plans, is hereby amended to read as follows: The Building Official shall stamp or endorse in writing both sets of corrected plans "Approved", and one set of such approved plans shall be retained by him and the other set shall be kept at the building site, or be kept readily accessible, open to inspection of the Building Official or his authorized representative at all reasonable times.

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E. Article 1, Section 118.0, Fees , delete entire Section and supplement applicable fees to be indicated in Harford County Fees Ordinance No. 22.

F. Article 1, Section 119.0, Volume Computation, is hereby deleted from Building Code.

G. Article 1, Section 123.0, Violations, subsection 123.3, Violation Penalties, subsection 124.2 Unlawful Continuance, the penalty referred to in this subsection is hereby established at One Hundred Dollars ($100.00)

H. Article 2, Definitions and Classifications, Section 200.0, Scope, add to the end of this subsection the following sentence: Where the provisions of this Building Code are in conflict with the Harford County Zoning Ordinance and/or Plumbing Ordinance, the said zoning ordinance and/or Plumbing Ordinance shall be controlling on all questions.

I. Article 4, Section 425.0, Mobile Dwelling Units, subsection 425.31, Enclosures of Parks, is hereby amended to read as follows: Transient and mobile homes parks shall be enclosed with an approved fence or planted hedge, not less than five (5) feet in height, or other suitable and/or acceptable screening, with no openings to adjoining property other than required entrances and exits to streets or public spaces.

J. Article 6, Section 618.0, Interior Stairways, subsection 618.41, Minimum Dimensions: The "Minimum Tread" requirements for one and two family dwelling (Use Group L-3) are hereby revised to read as follows:

USE GROUP	MINIMUM TREAD
One and two family dwellings (Use Group L-3) All stairs with closed risers	Std 10" tread, including nosing (not to exceed 1-1/4")
Basement service stairs with open risers	Std 10" tread, including nosing

K. Article 6, Section 618.0, Interior Stairways, subsection 618.5, Handrails, as applied to one and two family dwellings described in Article 2, Section 210, subsection 210.3, Use Group L-3 Structures, shall be provided on minimum of one side of all stairways.

L. Article 7, Section 725.0, Bearing Value of Soils: Builders of one and two family dwellings as described in Article 2, Section 210, subsection 210.3, Use Group L-3 Structures, are exempt from the provisions of the preamble.

M. Article 8, Section 807.0, Brick Units, is hereby revised in its entirety to read as follows: The selection and use of brick shall be in accordance with the following

specifications:

Face Brick ASTM Specifications C 216;
Common Brick ASTM Specifications C 62;
Sewer Brick ASTM Specifications C 32.

N. Article 8, Section 825.0, Plywood, subsection 825.31, Plywood Sub-flooring, is revised as follows: Under Group 1, Sheathing Grade, Western Softwood Plywood, following Plywood Thickness and Maximum Support Spacing (a) add the following: 3/8 inch plywood construction deck may be installed under 25/32 inch wood strip flooring. Maximum joist spacing, 16 inches on center included under residential 40 P.S.F.

O. Article 11, Section 1102.0, Plans and Specifications: This Section shall not be mandatory with respect to one and two family dwellings, as described in Article 2, Section 210, subsection 210.3, Use Group L-3 Structures, until one year after adoption of this Code.

This Ordinance shall take effect ~~January~~ MARCH 1, 1968.

PASSED THIS 5th DAY OF DECEMBER, 1967

G. Howlett Cobourn, Chairman

John H. O'Neill, Vice-Chairman

Fred B. Baldwin, Sr., Member

ATTEST:

William O. Whiteford
Director of Administration

BASIC
BUILDING
CODE

LIBER 2 1 PAGE 6

ISSUED EVERY FIVE YEARS
FOURTH EDITION 1965
kept up-to-date by Annual Supplements

BUILDING CODE

Building Officials Conference of America, Inc.

1965

BUILDING OFFICIALS
CONFERENCE of AMERICA, Inc.

FOUNDED 1915

About the Organization

The Building Officials Conference of America is a national non-profit municipal service organization of public officials who regulate construction through building codes. The purpose of the Conference is to promote the improvement of building regulations and the administrative organization, techniques and methods of their enforcement by local governments. It seeks to make possible the use by the public of new materials and construction techniques that have been proven safe, and to increase the knowledge and understanding of its members in their proper application.

To accomplish this, the organization publishes building codes which can be adopted by local communities without obligation. These codes are kept abreast of industry research and development by the systematic review of requirements which provides thorough study, public hearing and open discussion of proposed changes before final approval. Recommended changes are published annually in convenient form for local adoption.

In connection with this, the organization maintains close contact with recognized standards authorities so that the public may benefit from the standardization of products throughout the industry. The adoption by local governments of the BOCA Building Codes produces congruity of regulations in neighboring communities with further benefits to the public.

To assist local officials in recognizing new materials and identifying their proper installation, reports of detail data and tests of construction products are reviewed to evaluate the acceptability of the performance of the products under the requirements of the codes. Reports of this review are distributed to building officials after approval by a committee.

Consultation and advisory services are available at nominal fees to assist local communities in establishing or executing programs of building code reform or adopting a new code. Examination of plans for compliance with requirements of the codes and information on specific problems are also provided.

The organization collects, maintains and disseminates information on a variety of subjects related to the field of building regulation, and through close cooperation with other government service organizations, furnishes many additional services.

BOCA *Basic*
BUILDING CODE

Adopted by

FOURTH EDITION

1965

Issued every five years. Kept up-to-date by Annual Supplements

BUILDING OFFICIALS CONFERENCE OF AMERICA, INC.
1313 East 60th Street, Chicago, Illinois 60637

FOUNDED 1915

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The program and work of the

BUILDING OFFICIALS CONFERENCE OF AMERICA, INC.

is dedicated to . . . .

the promotion of public safety against the hazards to life and health incident to the construction and use of buildings;

the advancement of sound methods of building construction;

the establishment of requirements for prevention of the incidence and spread of fire;

the relief of the public and industry from the confusion and uncertainty of conflicting building laws;

the encouragement, enlightenment, and advancement of building officials;

the furtherance of civic pride and community well being; and

the substantial growth of every municipality in America.

* * *

Many communities lack adequate building regulations because of the time and the cost involved in the preparation of a building code and the effort required to keep it up-to-date. As a public service, the Building Officials Conference of America, Inc., has prepared an ABRIDGED BUILDING CODE designed for the needs of those communities which are predominantly residential in character, and a BASIC BUILDING CODE which is adapted to the needs of larger communities. These codes are offered to any community without royalty or charge for their use or the use of subsequent changes. Assistance is also available to any community in organizing a program to secure the benefits resulting from the adoption of these modern, comprehensive, workable codes.

PREFACE

to fourth edition

1965

This fourth edition of the BASIC BUILDING CODE of the Building Officials Conference of America, Inc., represents the Code as originally issued with changes which have been approved since the first edition was published in 1950. It is the same as the 1960 edition with the 1964 Accumulative and 1965 Annual Supplements previously available, except for some editorial corrections noted herein.

This Code states regulations in terms of measured performance rather than in rigid specification of materials and methods. In this way it makes possible the acceptance of new materials and methods of construction which can be evaluated by accepted standards, without the necessity of adopting cumbersome amendments for each variable condition.

By presenting the purposes to be accomplished rather than the method to be followed, the BASIC BUILDING CODE affords the designer all possible freedom and does not hamper development. It accepts nationally recognized standards as the criteria for evaluation of minimum safe practice or for determining the performance of materials or systems of construction. The application of these standards is stated in the text of the code requirements, but the standards are listed and identified in the appendixes of the code. This makes it practicable and convenient to update any standard as it is revised or reissued by the sponsoring agency.

This Code is kept up-to-date through the review of changes proposed by Building Officials, the technical staff of the organization, industry or other interested persons or organizations. Proposed changes are carefully reviewed by committees, discussed in a public hearing and acted upon by public officials in an open meeting of the organization. Approved changes are published annually in supplements to the code in convenient form for adoption by local governments. A new edition of the code, containing all approved changes since the previous edition, is issued every five years.

The Basic Code regulations are supplemented by a Material Approval service, which assists the Building Official in evaluating new materials and techniques and enables manufacturers of building products to standardize the presentation of data relating to their products to both Building Officials and builders or contractors.

Material Approvals are issued only after a thorough analysis of reports of tests made under standard procedures establishes that the product will perform satisfactorily under conditions of actual use.

The Building Officials Conference of America, Inc., further assists the Building Official and the community through plan examination services for the review of complicated plans and by consultation and advisory services to assist in determining the application of the Basic Code to local conditions.

ACKNOWLEDGEMENT

The BASIC BUILDING CODE, issued by the Building Officials Conference of America, Inc., is dedicated to the more than ninety Building Officials from all parts of the United States and Canada, and the Engineers, Architects, Technicians, representatives of Builders, Contractors, Material Producers, Trade Associations and others who collaborated in its preparation; and to the members of the Code Changes Committee and Subcommittees who have participated in the important work of keeping the code abreast of new developments in construction technology.

These men have given unstintingly of their time and effort to produce and maintain this performance type Building Code which has been widely recognized and adopted by many communities.

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EDITORIAL NOTE

In preparing this fourth edition of the Basic Building Code certain editorial changes have been made to maintain the sequence of the code, correct obvious errors and update the reference to standards. To this extent the text of this edition differs from that published in the previous edition and the supplements thereto. These editorial changes can be classified in the following general categories:

Renumbering of section and subsections where there had been deletions without substitution;

Correction of calculations in table 6 for several occupancy-construction combinations;

Updating of standards listed in the several appendixes;

Correction of errors previously listed.

In view of these changes and to avoid any question of validity, it is recommended that communities which adopted the earlier editions of the Basic Building Code and Supplements thereto, amend the adopting ordinance to include direct reference to the

BASIC BUILDING CODE

FOURTH EDITION — 1965

as published by

BUILDING OFFICIALS CONFERENCE OF AMERICA

For those who may be interested a list of the editorial changes can be supplied at nominal cost.

EDITORIAL CHANGES—SECOND PRINTING

Page 43 Note "K" inserted in table 6, L-2 Use Group, Types 2B-3B

Page 217 Section 903.5, 929 changed to 928

Page 392 National Plumbing Code, Standard changed to ASA A 40.8—1955

Page 393 NFPA 101—1960, Date changed to 1963

EDITORIAL CHANGES—THIRD PRINTING

Page 179 Section 828.2
Deleted—No Requirements

Page 180 Sections 828.4 and 828.41
Deleted—No Requirements

Page 449 Grounding Metal Roofs, changed to 928.6 and 928.61

BOCA BASIC BUILDING CODE

ARTICLE 1

ADMINISTRATION AND ENFORCEMENT

SECTION 100.0. SCOPE

100.1. Title.—These regulations shall be known as the Building Code of [*name of municipality*] hereinafter referred to as the Basic Code. They shall control all matters concerning the construction, alteration, addition, repair, removal, demolition, use, location, occupancy and maintenance of all buildings and structures and their service equipment as herein defined and shall apply to existing or proposed buildings and structures in the [*name of municipality*]; except as such matters are otherwise provided for in the local municipal charter, or other ordinances or statutes, or in the rules and regulations authorized for promulgation under the provisions of the Basic Code.

100.2. Application of References.—Unless otherwise specifically provided in the Basic Code, all references to article or section numbers, or to provisions not specifically identified by number, shall be construed to refer to such article, section or provision of the Basic Code.

100.3. Code Remedial.—The Basic Code shall be construed to secure its expressed intent and insure public safety, health and welfare insofar as they are affected by building construction, through structural strength, adequate egress facilities, sanitary equipment, light and ventilation and fire safety; and in general, to secure safety to life and property from all hazards incident to the design, erection, repair, removal, demolition or use and occupancy of buildings, structures or premises.

SECTION 101.0. MATTER COVERED

The provisions of the Basic Code shall apply to all buildings and structures and their appurtenant constructions, including vaults, area and street projections, and accessory additions; and shall apply with equal force to municipal, county, state and private buildings; except where such buildings are otherwise specifically provided for by statute.

101.1. Exemptions.—No building or structure shall be constructed, extended, repaired, removed or altered in violation of these provisions, except for ordinary repairs as defined in section 102, and except further that the raising or lowering or moving of a building or structure as a unit necessitated by a change in legal grade or widening of a street shall be permitted, provided the building is not otherwise altered or its use or occupancy changed.

101.2. Matters Not Provided For.—Any requirement essential for structural, fire or sanitary safety of an existing or proposed building or structure or essential for the safety of the occupants thereof and which is not specifically covered by the Basic Code, shall be determined by the building official.

101.3. Continuation of Unlawful Use.—The continuation of occupancy or use of a building or structure, or of a part thereof, contrary to the provisions of the Basic Code, shall be deemed a violation and subject to the penalties prescribed in section 123.

101.4. Zoning Restrictions.—When the provisions herein specified for structural, fire and sanitary safety are more restrictive than the zoning law, the Basic Code shall control the erection or alteration of buildings in respect to location, use, permissible area and height; but in any case, the most rigid requirements of either the building code or the zoning law shall apply whenever they may be in conflict.

SECTION 102.0. ORDINARY REPAIRS

Ordinary repairs to buildings may be made without application or notice to the building official; but such repairs shall not include the cutting away of any wall, partition or portion thereof, the removal or cutting of any structural beam or bearing support, or the removal or change of any required means of egress, or rearrangement of parts of a structure affecting the exit requirements; nor shall ordinary repairs include addition to, alteration of, replacement or relocation of any standpipe, water supply, sewer, drainage, drain leader, gas, soil, waste, vent or similar piping, electric wiring or mechanical or other work affecting public health or general safety.

SECTION 103.0. INSTALLATION OF SERVICE EQUIPMENT

When the installation, extension, alteration or repair of an elevator, moving stairway, mechanical equipment, refrigerating, air conditioning or ventilating apparatus, plumbing, gas piping, electric wiring, heating system or any other equipment is specifically controlled by the provisions of the Basic Code or the approved rules, it shall be unlawful to use such equipment until a certificate of approval has been issued therefor by the building official or other municipal agency having jurisdiction.

SECTION 104.0. MAINTENANCE

All buildings and structures and all parts thereof, both existing and new, shall be maintained in a safe and sanitary condition. All service equipment, means of egress, devices and safeguards which are required by the Basic Code in a building, or which were required by a previous statute in a building when erected, altered or repaired, shall be maintained in good working order.

104.1. Owner Responsibility.—The owner or his designated agent shall be responsible for the safe and sanitary maintenance of the building or structure and its exit facilities at all times.

SECTION 105.0. CHANGE IN EXISTING USE

105.1. Continuation of Existing Use.—The legal use and occupancy of any structure existing on [*date of adoption of this code*] or for which it had been heretofore approved, may be continued without change, except as

may be specifically covered in the Basic Code or as may be deemed necessary by the building official for the general safety and welfare of the occupants and the public.

105.2. Change in Use.—It shall be unlawful to make any change in the use or occupancy of any structure which would subject it to any special provision of the Basic Code without approval of the building official and his certification that such structure meets the intent of the provisions of law governing building construction for the proposed new use and occupancy and that such change does not result in any greater hazard to public safety or welfare.

SECTION 106.0. EXISTING BUILDINGS

Except as provided in this section, existing buildings when altered or repaired as herein specified shall be made to conform to the full requirements of the Basic Code for new buildings:

106.1. Alterations Exceeding Fifty Per Cent.—If alterations or repairs are made within any period of twelve (12) months, costing in excess of fifty (50) per cent of the physical value of the building; or

106.2. Damages Exceeding Fifty Per Cent.—If the building is damaged by fire or any other cause to an extent in excess of fifty (50) per cent of the physical value of the building before the damage was incurred.

106.3. Alterations Under Fifty Per Cent.—If the cost of alterations or repairs described herein is between twenty-five (25) and fifty (50) per cent of the physical value of the building, the building official shall determine to what degree the portions so altered or repaired shall be made to conform to the requirements for new buildings;

106.4. Alterations Under Twenty-five Per Cent.—If the cost of alterations or repairs described herein is twenty-five (25) per cent or less of the physical value of the building, the building official shall permit the restoration of the building to its condition previous to damage or deterioration with the same kind of materials as those of which the building was constructed; provided that such construction does not endanger the general safety and public welfare and complies with the provisions of section 929 in respect to existing roofs.

106.5. Increase in Size.—If the building is increased in floor area or number of stories, the entire building shall be made to conform with the requirements of the Basic Code in respect to means of egress, fire safety, light and ventilation.

106.6. Part Change in Use.—If a portion of the building is changed in occupancy or to a new use group and that portion is separated from the remainder of the building with the required vertical and horizontal fire divisions complying with the fire grading in table 16, then the construction involved in the change shall be made to conform to the requirements for the new use and occupancy and the existing portion shall be made to comply with the exit requirements of the Basic Code.

106.7. Physical Value.—In applying the provisions of this section, the physical value of the building shall be determined by the building official based on current replacement costs.

SECTION 107.0. DEPARTMENT OF BUILDING INSPECTION

107.1. Building Official.—The department of building inspection of [*name of municipality*] is hereby created and the executive official in charge thereof shall be known as the building official.

107.2. Appointment.—The building official shall be appointed by the chief appointing authority of the municipality; and he shall not be removed from office except for cause and after full opportunity has been granted him to be heard on specific and relevant charges by and before the appointing authority.

107.3. Organization.—The building official shall appoint such number of officers, technical assistants, inspectors and other employees as shall be necessary for the administration of the Basic Code and as authorized by the appointing authority.

107.4. Deputy.—The building official may designate an employee as his deputy who shall exercise all the powers of the building official during the temporary absence or disability of the building official.

107.5. Qualifications of Building Official.—To be eligible for appointment, the building official shall have had at least five (5) years' building experience as a licensed professional engineer or architect, building inspector, contractor or superintendent of building construction, for three (3) years of which experience he shall have been in responsible charge of work; and he shall be generally informed on good engineering practice in respect to the design and construction of buildings, the basic principles of fire prevention, the accepted requirements for means of egress and the installation of elevators and other service equipment necessary for the health, safety and general welfare of the occupants.

107.6. Qualifications of Assistants.—No person shall be appointed as a technical assistant unless he has had at least three (3) years' practical experience in the technical work which he is appointed to supervise, or in responsible charge of building construction, or as a skilled worker. No person shall be appointed as inspector of construction who has had less than three (3) years' experience in general building construction.

107.7. Restriction on Employees.—No official or employee connected with the department of building inspection, except one whose only connection is that of a member of the board of survey or of the board of appeals established under the provisions of sections 127 and 128, shall be engaged in or directly or indirectly connected with the furnishing of labor, materials or appliances for the construction, alteration or maintenance of a building, or the preparation of plans or of specifications therefor, unless he is the owner of the building; nor shall such officer or employee engage in any work which conflicts with his official duties or with the interests of the department.

107.8. Relief From Personal Responsibility.—The building official, officer or employee charged with the enforcement of the Basic Code, while acting for the municipality, shall not thereby render himself liable personally, and he is hereby relieved from all personal liability for any damage that may accrue to persons or property as a result of any act required or permitted in the discharge of his official duties. Any suit instituted against any officer or employee because of an act performed by him in the lawful

discharge of his duties and under the provisions of the Basic Code shall be defended by the legal representative of the municipality until the final termination of the proceedings. In no case shall the building official or any of his subordinates be liable for costs in any action, suit or proceeding that may be instituted in pursuance of the provisions of the Basic Code; and any officer of the department of building inspection, acting in good faith and without malice, shall be free from liability for acts performed under any of its provisions or by reason of any act or omission in the performance of his official duties in connection therewith.

107.9. Official Records.—An official record shall be kept of all business and activities of the department specified in the provisions of the Basic Code, and all such records shall be open to public inspection at all appropriate times.

SECTION 108.0. DUTIES AND POWERS OF BUILDING OFFICIAL

The building official shall enforce all the provisions of the Basic Code and shall act on any question relative to the mode or manner of construction and the materials to be used in the erection, addition to, alteration, repair, removal, demolition, installation of service equipment, and the location, use, occupancy, and maintenance of all buildings and structures, except as may otherwise be specifically provided for by statutory requirements or as herein provided:

108.1. Applications and Permits.—He shall receive applications and issue permits for the erection and alteration of buildings and structures, and examine the premises for which such permits have been issued and enforce compliance with the Basic Code provisions;

108.2. Building Notices and Orders.—He shall issue all necessary notices or orders to remove illegal or unsafe conditions, to require the necessary safeguards during construction, to require adequate exit facilities in existing buildings and structures, and to insure compliance with all the code requirements for the safety, health and general welfare of the public;

108.3. Inspections.—He shall make all the required inspections, or he may accept reports of inspection of authoritative and recognized services or individuals; and all reports of such inspections shall be in writing and certified by a responsible officer of such authoritative service or by the responsible individual; or he may engage such expert opinion as he may deem necessary to report upon unusual technical issues that may arise, subject to the approval of the appointing authority;

108.4. Research and Investigations.—He shall make or cause to be made investigations of new developments in the building industry. Subject to local climatic or other conditions, he shall accredit tests meeting the functional requirements of the Basic Code conducted by accredited authoritative agencies listed in appendix A; or he may accept duly authenticated reports from the Building Officials Conference of America, or from recognized authoritative sources of all new materials and methods of construction proposed for use which are not specifically provided for in the Basic Code. The costs of all tests or other investigations required under these provisions shall be paid by the applicant.

108.5. New Rules.—He shall promulgate rules under the procedure provided in section 109, establishing the conditions for use of new materials consistent with the provisions of the Basic Code and with minimum requirements based on accepted engineering practice;

108.6. Department Records.—He shall keep official records of applications received, permits and certificates issued, fees collected, reports of inspections, and notices and orders issued. File copies of all papers in connection with building operations shall be retained in the official records so long as the building or structure to which they relate remains in existence; and

108.7. Annual Report.—At least annually, he shall submit to the chief authority of the municipality a written statement of all permits and certificates issued, orders promulgated and materials approved.

SECTION 109.0. RULES AND REGULATIONS

109.1. Rule Making Authority.—The building official shall have power as may be necessary in the interest of public safety, health and general welfare, to adopt and promulgate rules and regulations to interpret and implement the provisions of the Basic Code to secure the intent thereof and to designate requirements applicable because of local climatic or other conditions; but no such rules shall have the effect of waiving working stresses or fireresistive requirements specifically provided in the Basic Code or of violating accepted engineering practice involving public safety.

109.2. Accepted Engineering Practice.—In the absence of approved rules, the regulations, specifications and standards listed in appendix A—Accredited Authoritative Agencies, appendix B—Accepted Engineering Practice, and appendix C—Accredited Material Standards, shall be deemed to represent accepted engineering practice in respect to the material, equipment, system or method of construction therein specified.

109.3. Promulgation of Rules.—No rule or regulation shall become effective until four weeks after the intention to adopt such rules shall have been published in accordance with local statutes in an official paper or public newspaper with general circulation in the municipality, and only after a public hearing shall have been held on the rule.

109.4. Amendment of Rules.—All rules adopted by the procedure herein established shall have the same effect as provisions of the Basic Code; but such rules may be amended or repealed at any time by the same procedure herein prescribed for their adoption.

SECTION 110.0. MODIFICATIONS

110.1. Variations.—When there are practical difficulties involved in carrying out structural or mechanical provisions of the Basic Code or of an approved rule, the building official may vary or modify such provision upon application of the owner or his representative, provided that the spirit and intent of the law shall be observed and public welfare and safety be assured.

110.2. Written Modification.—The application for modification and the final decision of the building official shall be in writing and shall be officially recorded with the application for the permit in the permanent records of the department of building inspection.

SECTION 111.0. INSPECTION

111.1. Preliminary Inspection.—Before issuing a permit, the building official shall examine or cause to be examined all buildings, structures and sites for which an application has been filed for a permit to construct, enlarge, alter, repair, remove, demolish or change the use thereof; and he shall conduct such inspections from time to time during and upon completion of the work for which he has issued a permit; and he shall maintain a record of all such examinations and inspections and of all violations of the Basic Code.

111.2. Accredited Inspection Services.—He may accept reports of his own inspectors or of approved inspection services which satisfy his requirements as to qualifications and reliability.

111.3. Plant Inspection.—When required by the provisions of the Basic Code or by the approved rules, materials or assemblies shall be inspected at the point of manufacture or fabrication.

111.4. Inspection Reports.—All inspection reports shall be in writing and shall be certified by the licensed authority, or responsible officer of the service, or the individual when expert inspection services are accepted. A label or mark of approval permanently fixed to the product indicating that factory inspection has been made shall be accepted in lieu of the aforesaid report in writing.

111.5. Final Inspection.—Upon completion of the building or structure, and before issuance of the certificate of use and occupancy required in section 121, a final inspection shall be made and all violations of the approved plans and permit shall be noted and the holder of the permit shall be notified of the discrepancies.

SECTION 112.0. RIGHT OF ENTRY

In the discharge of his duties, the building official or his authorized representative shall have the authority to enter at any reasonable hour any building, structure or premises in the municipality to enforce the provisions of the Basic Code.

112.1. Official Badge.—He may adopt a badge of office for himself and assistants which shall be displayed for the purpose of identification.

112.2. Municipal Cooperation.—The assistance and cooperation of the police, fire, and health departments and all other municipal officials shall be available to him as required in the performance of his duties. (See section 404.)

SECTION 113.0. APPLICATION FOR PERMIT

113.1. When Permit is Required.—It shall be unlawful to construct, enlarge, alter, remove or demolish, or change the occupancy of a building from one use group to another requiring greater strength, exit or sanitary provisions; or to change to a prohibited use; or to install or alter any equipment for which provision is made or the installation of which is regulated by the Basic Code, without first filing an application with the

building official in writing and obtaining the required permit therefor; except that ordinary repairs as defined in section 102 which do not involve any violation of the Basic Code shall be exempt from this provision.

113.2. Form of Application.—The application for a permit shall be submitted in such form as the building official may prescribe and shall be accompanied by the required fee as prescribed in section 118.

113.3. By Whom Application is Made.—Application for a permit shall be made by the owner or lessee of the building or structure, or agent of either, or by the licensed engineer or architect employed in connection with the proposed work. If the application is made by a person other than the owner in fee, it shall be accompanied by a duly verified affidavit of the owner or the qualified person making the application that the proposed work is authorized by the owner in fee and that the applicant is authorized to make such application. The full names and addresses of the owner, lessee, applicant, and of the responsible officers, if the owner or lessee is a corporate body, shall be stated in the application.

113.4. Description of Work.—The application shall contain a general description of the proposed work, its location, the use and occupancy of all parts of the building or structure and of all portions of the site or lot not covered by the building, and such additional information as may be required by the building official.

113.5. Plans and Specifications.—The application for the permit shall be accompanied by not less than two (2) copies of specifications and of plans drawn to scale, with sufficient clarity and detail dimensions to show the nature and character of the work to be performed. When quality of materials is essential for conformity to the Basic Code, specific information shall be given to establish such quality; and in no case shall the code be cited or the term "legal" or its equivalent be used as a substitute for specific information. The building official may waive the requirement for filing plans when the work involved is of a minor nature.

113.6. Plot Diagram.—There shall also be filed a plot plan showing to scale the size and location of all the new construction and all existing structures on the site, distances from lot lines and the established street grades; and it shall be drawn in accordance with an accurate boundary line survey. In the case of demolition, the plot plan shall show all construction to be demolished and the location and size of all existing buildings and construction that are to remain on the site or plot.

113.7. Engineering Details.—The building official may require adequate details of structural, mechanical and electrical work including computations, stress diagrams and other essential technical data to be filed. All engineering plans and computations shall bear the signature of the engineer or architect responsible for the design.

113.8. Amendments to Application.—Subject to the limitations of section 113.9 amendments to a plan, application or other records accompanying the same may be filed at any time before completion of the work for which the permit is sought or issued; and such amendments shall be deemed part of the original application and shall be filed therewith.

113.9. Time Limitation of Application.—An application for a permit for any proposed work shall be deemed to have been abandoned six (6)

months after date of filing, unless such application has been diligently prosecuted or a permit shall have been issued; except that for reasonable cause, the building official may grant one or more extensions of time for additional periods not exceeding ninety (90) days each.

SECTION 114.0. PERMITS

114.1. Action on Application.—The building official shall examine or cause to be examined all applications for permits and amendments thereto within a reasonable time after filing. If the application or the plans do not conform to the requirements of all pertinent laws, he shall reject such application in writing stating the reasons therefor. If he is satisfied that the proposed work conforms to the requirements of the Basic Code and all laws and ordinances applicable thereto, he shall issue a permit therefor as soon as practicable.

114.2. Suspension of Permit.—Any permit issued shall become invalid if the authorized work is suspended or abandoned for a period of six (6) months after the time of commencing the work.

114.3. Previous Approvals.—Nothing in the Basic Code shall require changes in the plans, construction or designated use of a building for which a lawful permit has been heretofore issued or otherwise lawfully authorized, and the construction of which shall have been actively prosecuted within ninety (90) days after the effective date of this ordinance; and the entire building shall be completed as authorized within two (2) years after the date of approval of the application.

114.4. Signature to Permit.—The building official shall attach his signature to every permit; or he may authorize a subordinate to affix such signature thereto.

114.5. Approved Plans.—The building official shall stamp or endorse in writing both sets of corrected plans "Approved", and one set of such approved plans shall be retained by him and the other set shall be kept at the building site, open to inspection of the building official or his authorized representative at all reasonable times.

114.6. Revocation of Permits.—The building official may revoke a permit or approval issued under the provisions of the Basic Code in case of any false statement or misrepresentation of fact in the application or on the plans on which the permit or approval was based.

114.7. Approval in Part.—The building official may issue a permit for the construction of foundations or any other part of a building or structure before the entire plans and specifications for the whole building have been submitted, provided adequate information and detailed statements have been filed complying with all the pertinent requirements of the Basic Code. The holder of such permit for the foundations or other part of a building or structure shall proceed at his own risk with the building operation and without assurance that a permit for the entire structure will be granted.

114.8. Posting of Permit and Site Plans.—A true copy of the building permit shall be kept on the site of operations open to public inspection during the entire time of prosecution of the work and until the completion of the same.

114.9. Notice of Start.—At least twenty-four (24) hours' notice of start of work under a building permit shall be given to the building official.

SECTION 115.0. CONDITIONS OF PERMIT

115.1. Payment of Fees.—No permit shall be issued until the fees prescribed in section 118 have been paid.

115.2. Compliance with Code.—The permit shall be a license to proceed with the work and shall not be construed as authority to violate, cancel or set aside any of the provisions of the Basic Code, except as specifically stipulated by modification or legally granted variation as described in the application.

115.3. Compliance with Permit.—All work shall conform to the approved application and plans for which the permit has been issued and any approved amendments thereto.

115.4. Compliance with Plot Plan.—All new work shall be located strictly in accordance with the approved plot plan.

115.5. Change in Plot Plan.—No lot or plot shall be changed, increased or diminished in area from that shown on the official plot plan, unless a revised diagram showing such changes accompanied by the necessary affidavit of owner or applicant shall have been filed and approved; except that such revised plot plan will not be required if the change is caused by reason of an official street opening, street widening or other public improvement.

SECTION 116.0. DEMOLITION OF BUILDINGS

116.1. Service Connections.—Before a building can be demolished or removed, the owner or agent shall notify all utilities having service connections within the building such as water, electric, gas, sewer and other connections. A permit to demolish or remove a building shall not be issued until a release is obtained from the utilities, stating that their respective service connections and appurtenant equipment, such as meters and regulators, have been removed or sealed and plugged in a safe manner.

SECTION 117.0. REMOVAL OF BUILDINGS

117.1. Notice to Adjoining Owners.—Only when written notice has been given by the applicant to the owners of adjoining lots and to the owners of wired or other facilities, of which the temporary removal may be necessitated by the proposed work, shall a permit be granted for the removal of a building or structure.

117.2. Lot Regulation.—Whenever a building is demolished or removed, the premises shall be maintained free from all unsafe or hazardous conditions by the proper regulation of the lot, restoration of established grades and the erection of the necessary retaining walls and fences in accordance with the provisions of article 13.

SECTION 118.0. FEES

No permit to begin work for new construction, alteration, removal,

demolition or other building operation shall be issued until the fees prescribed in this section shall have been paid to the building official or other authorized municipal agency, nor shall an amendment to a permit necessitating an additional fee because of an increase in the estimated cost of the work involved be approved until the additional fee shall have been paid.

118.1. Special Fees.—The payment of the fee for the construction, alteration, removal or demolition and for all work done in connection with or concurrently with the work contemplated by a building permit shall not relieve the applicant or holder of the permit from the payment of other fees that may be prescribed by law or ordinance for water taps, sewer connections, electrical permits, erection of signs and display structures, marquees or other appurtenant structures, or fees for inspections, certificates of use and occupancy or other privileges or requirements, both within and without the jurisdiction of the department of building inspection.

118.2. New Construction and Alterations.—The fee for a building permit shall be based on the volume of the structure, or as otherwise prescribed in the local ordinances, and the building official is authorized to establish by approved rules a schedule of cubic foot rates for buildings and structures of all use groups and types of construction as classified and defined in article 2.

118.3. Moving of Buildings.—The fee for a building permit for the removal of a building or structure from one lot to another or to a new location on the same lot shall be at the rate of —— per hundred (100) dollars of the estimated cost of moving plus the cost of new foundations and all work necessary to place the building or structure in its completed condition in the new location.

118.4. Demolition.—The fee for a permit for the demolition of a building or structure shall be at the rate of —— for each —— cubic foot of volume of building or structure.

118.5. Signs.—The fee for signs, billboards and other display structures for which permits are required under the provisions of the Basic Code shall be in accordance with the local laws or regulations.

118.6. Accounting.—The building official shall keep an accurate account of all fees collected for building permits; and such fees collected by him shall be deposited monthly in the municipal treasury, or otherwise disposed of as required by law.

118.7. Refunds.—In the case of a revocation of a permit or abandonment or discontinuance of a building project, the volume of the work actually completed shall be computed and any excess fee for the incompleted work shall be returned to the permit holder; except that all penalties that may have been imposed on the permit holder under the requirements of the Basic Code shall first be collected.

SECTION 119.0. VOLUME COMPUTATION

For the determination of the permit fees, the volume of the structure shall be computed as herein provided:

119.1. Structures with Basements.—The volume of the building shall include all enclosed dormers, porches, penthouses and other enclosed portions of the structure extending from the basement or cellar floor to the mean height of a pitched roof, or the average height to the top of the roof beams of a flat roof.

119.2. Structures without Basements.—For buildings without basements or cellars, the volume shall be based on the height measured to a level located one-fifth (1/5) the distance from the first floor level to the bottom of the footings, but not to exceed two and one-half (2½) feet below the first floor level.

119.3. Open Sheds.—For open sheds and structures of a similar character, the volume shall be measured within the perimeter of the roof for a height from the grade line to the mean roof level.

SECTION 120.0. INDEMNITY BONDS

120.1. Sign Bonds.—The sign contractor, the erector or the owner of every sign or billboard for which a permit is required shall be bonded in an amount not less than —— dollars, for the erection and maintenance of all such signs or billboards in accordance with the provisions of section 1408.

SECTION 121.0. CERTIFICATE OF USE AND OCCUPANCY

121.1. New Buildings.—No building hereafter erected shall be used or occupied in whole or in part until the certificate of use and occupancy shall have been issued by the building official.

121.2. Buildings Hereafter Altered.—No building hereafter enlarged, extended or altered to change from one use group to another, in whole or in part, and no building hereafter altered for which a certificate of use and occupancy has not been heretofore issued, shall be occupied or used until the certificate shall have been issued by the building official, certifying that the work has been completed in accordance with the provisions of the approved permit; except that any use or occupancy, which was not discontinued during the work of alteration, shall be discontinued within thirty (30) days after the completion of the alteration unless the required certificate is secured from the building official.

121.3. Existing Buildings.—Upon written request from the owner of an existing building, the building official shall issue a certificate of use and occupancy, provided there are no violations of law or orders of the building official pending, and it is established after inspection and investigation that the alleged use of the building has heretofore existed. Nothing in the Basic Code shall require the removal, alteration or abandonment of, or prevent the continuance of the use and occupancy of a lawfully existing building, unless such use is deemed to endanger public safety and welfare.

121.4. Changes in Use and Occupancy.—After a change of use has been made in a building, the reestablishment of a prior use that would not have been legal in a new building of the same type of construction is prohibited unless all the applicable provisions of the Basic Code are complied with.

A change from one prohibited use, for which a permit has been granted, to another prohibited use shall be deemed a violation of the Basic Code.

121.5. Temporary Occupancy.—Upon the request of a holder of a permit, the building official may issue a temporary certificate of occupancy for a building or structure, or part thereof, before the entire work covered by the permit shall have been completed, provided such portion or portions may be occupied safely prior to full completion of the building without endangering life or public welfare.

121.6. Contents of Certificate.—When a building or structure is entitled thereto, the building official shall issue a certificate of use and occupancy within ten (10) days after written applications. The certificate shall certify compliance with the provisions of the Basic Code and the purpose for which the building or structure may be used in its several parts. The certificate of use and occupancy shall specify: the use group, in accordance with the provision of article 2, the fire grading as defined in article 2 and table 16, the maximum live load on all floors as prescribed in article 7, the occupancy load in the building and all parts thereof as defined in article 2 and article 6, and any special stipulations and conditions of the building permit.

SECTION 122.0. POSTING BUILDINGS

122.1. Posted Use and Occupancy.—Every building and structure and part thereof designed for high hazard, storage, mercantile, industrial or business use (use groups A, B, C, D, and E) as defined in article 2, shall be posted on all floors by the owner with a suitably designed placard in a form designated by the building official, which shall be securely fastened to the structure in a readily visible place, stating: the use group, the fire grading, the live load and the occupancy load.

122.2. Posted Occupancy Load.—Every building and structure and part thereof designed for use as a place of public assembly or as an institutional building for harboring people for penal, correctional, educational, medical or other care or treatment (use Groups F and H) shall be posted with an approved placard designating the maximum occupancy load.

122.3. Replacement of Posted Signs.—All posting signs shall be furnished by the owner and shall be of permanent design, shall not be removed or defaced and, if lost, removed or defaced, they shall be immediately replaced.

122.4. Periodic Inspection.—The building official may periodically inspect all existing buildings and structures except one- and two-family dwellings, for compliance with the law in respect to posting; or he may accept the report of such inspection from an authorized licensed professional engineer or architect; and such inspection and report shall specify any violation of the requirements of the Basic Code in respect to the posting of floor load, fire grading, occupancy load and use group of the building.

SECTION 123.0. VIOLATIONS

123.1. Notice of Violation.—The building official shall serve a notice of

violation or order on the person responsible for the erection, construction, alteration, extension, repair, use or occupancy of a building or structure in violation of the provisions of the Basic Code, or in violation of a detail statement or a plan approved thereunder, or in violation of a permit or certificate issued under the provisions of the Basic Code; and such order shall direct the discontinuance of the illegal action or condition and the abatement of the violation.

123.2. Prosecution of Violation.—If the notice of violation is not complied with promptly, the building official shall request the legal counsel of the municipality to institute the appropriate proceeding at law or in equity to restrain, correct or abate such violation or to require the removal or termination of the unlawful use of the building or structure in violation of the provisions of the Basic Code or of the order or direction made pursuant thereto.

123.3. Violation Penalties.—Any person who shall violate a provision of the Basic Code or shall fail to comply with any of the requirements thereof or who shall erect, construct, alter or repair a building or structure in violation of an approved plan or directive of the building official, or of a permit or certificate issued under the provisions of the Basic Code, shall be guilty of a misdemeanor, punishable by a fine of not more than —— dollars or by imprisonment not exceeding one (1) year, or both such fine and imprisonment. Each day that a violation continues shall be deemed a separate offense.

123.4. Abatement of Violation.—The imposition of the penalties herein prescribed shall not preclude the legal officer of the municipality from instituting appropriate action to prevent unlawful construction or to restrain, correct or abate a violation, or to prevent illegal occupancy of a building, structure or premises or to stop an illegal act, conduct, business or use of a building or structure in or about any premises.

SECTION 124.0. STOP-WORK ORDER

124.1. Notice to owner.—Upon notice from the building official that work on any building or structure is being prosecuted contrary to the provisions of the Basic Code or in an unsafe and dangerous manner, such work shall be immediately stopped. The stop-work order shall be in writing and shall be given to the owner of the property involved, or to the owner's agent, or to the person doing the work; and shall state the conditions under which work may be resumed.

124.2. Unlawful Continuance.—Any person who shall continue any work in or about the building after having been served with a stop order, except such work as he is directed to perform to remove a violation or unsafe conditions, shall be liable to a fine of not less than —— dollars or more than —— dollars.

SECTION 125.0. UNSAFE BUILDINGS

125.1. Right of Condemnation.—All buildings or structures that are or hereafter shall become unsafe, unsanitary, or deficient in adequate exit

facilities, or which constitute a fire hazard, or are otherwise dangerous to human life or the public welfare, or which by reason of illegal or improper use, occupancy or maintenance, shall be deemed unsafe buildings or structures. All unsafe buildings shall be taken down and removed or made safe and secure, as the building official may deem necessary and as provided in this section. A vacant building, unguarded or open at door or window, shall be deemed a fire hazard and unsafe within the meaning of the Basic Code.

125.2. Examination and Record of Damaged Building.—The building official shall examine every building or structure reported as dangerous, unsafe structurally or constituting a fire hazard; and he shall cause the report to be filed in a docket of unsafe structures and premises, stating the use of the building, the nature and estimated amount of damages, if any, caused by collapse or failure.

125.3. Notice of Unsafe Building.—If an unsafe condition is found in a building or structure, the building official shall serve on the owner, agent or person in control of the building or structure a written notice describing the building or structure deemed unsafe and specifying the required repairs or improvements to be made to render the building or structure safe and secure, or requiring the unsafe building or structure or portion thereof to be demolished within a stipulated time. Such notice shall require the person thus notified to immediately declare to the building official his acceptance or rejection of the terms of the order.

125.4. Restoration of Unsafe Building.—A building or structure condemned by the building official may be restored to safe condition provided no change of use or occupancy is contemplated or compelled by reason of such reconstruction or restoration; except that if the damage or cost of reconstruction or restoration is in excess of fifty (50) per cent of its replacement value, exclusive of foundations, such building shall be made to comply in all respects with the requirements for materials and methods of construction of buildings hereafter erected.

125.5. Posting Unsafe Notice.—If the person addressed with an unsafe notice cannot be found within the city after diligent search, then such notice shall be sent by registered mail to the last known address of such person; and a copy of the unsafe notice shall be posted in a conspicuous place on the premises; and such procedure shall be deemed the equivalent of personal notice.

125.6. Disregard of Unsafe Notice.—Upon refusal or neglect of the person served with an unsafe notice to comply with the requirements of the order to abate the unsafe condition, the proper legal official of the municipality shall be advised of all the facts and he shall institute the appropriate action to compel compliance.

SECTION 126.0. EMERGENCY MEASURES

126.1. Vacating Buildings.—When, in the opinion of the building official, there is actual and immediate danger of failure or collapse of a building or structure or any part thereof which would endanger life, or when any structure or part of a structure has fallen and life is endangered

by the occupation of the building, the building official is hereby authorized and empowered to order and require the inmates and occupants to vacate the same forthwith. He shall cause to be posted at each entrance to such building a notice reading as follows:

"This Building Is Unsafe and Its Use or Occupancy Has Been Prohibited by the Building Official"

and it shall be unlawful for any person to enter such building or structure except for the purpose of making the required repairs or of demolishing the same.

126.2. Temporary Safeguards.—When, in the opinion of the building official, there is actual and immediate danger of collapse or failure of a building or structure or any part thereof which would endanger life, he shall cause the necessary work to be done to render such building or structure or part thereof temporarily safe, whether or not the legal procedure herein described has been instituted.

126.3. Closing Streets.—When necessary for the public safety, the building official may temporarily close sidewalks, streets, buildings and structures and places adjacent to such unsafe buildings, and prohibit the same from being used.

126.4. Emergency Repairs.—For the purposes of this section the building official shall employ the necessary labor and materials to perform the required work as expeditiously as possible.

126.5. Costs of Emergency Repairs.—Costs incurred in the performance of emergency work shall be paid from the municipal treasury on certificate of the building official; and the legal authority of the municipality shall institute appropriate action against the owner of the premises where the unsafe building or structure was located for the recovery of such costs.

SECTION 127.0. BOARD OF SURVEY

127.1. Application for Survey.—The owner of a building or structure or his duly authorized representative who has been served with an unsafe order and notice to make such structure safe, secure or habitable or to take down and remove such structure shall have the right, except in cases of emergency, to demand the appointment of a board of survey if he deems such order to be unnecessary, improper or unreasonable. Such demand shall be in writing with a statement of the reasons therefor.

127.2. Constitution of Board of Survey.—The board of survey shall consist of three persons, one of whom shall be the building official or an assistant designated by him; another shall be the owner or his legal representative, or a licensed professional engineer or architect, or a qualified builder designated by the owner; and the third shall be a licensed professional engineer or architect chosen jointly by the other two members, or designated by a justice of the court of record in case of failure of agreement.

127.3. Compensation of Board of Survey.—The third member of the board shall receive for his services a fee of —— dollars to be paid by the appellant.

127.4. Survey Procedure.—The powers and duty of the board of survey shall be:

127.41. Inspection of Structure.—To inspect the building or structure and to confirm, modify or revoke the order of the building official as may seem just and proper in the interest of public safety and welfare; and

127.42. Determination of Repair Cost.—To determine the suitable cost of reconstruction, restoration or rehabilitation in the repair of an unsafe building or structure, in case of disagreement or dispute.

127.5. Survey Findings.

127.51. Report.—The board of survey shall determine its findings, and submit a report in writing affirming or modifying the order of the building official in whole or in part and recommending the remedial steps to be taken to render the building or structure safe.

127.52. Method of Decision.—The findings and determinations of any two members of the board shall be deemed conclusive, and certified copies of the report shall be filed with the building official and with the owner or his representative and shall be binding upon the building official and all parties in interest.

SECTION 128.0. BOARD OF APPEALS

128.1. Application for Appeal.—The owner of a building or structure or any other person may appeal from a decision of the building official refusing to grant a modification of the provisions of the Basic Code covering the manner of construction or materials to be used in the erection, alteration or repair of a building or structure to the board of appeals. Application for appeal may be made when it is claimed that: the true intent of the Basic Code or the rules legally adopted thereunder have been incorrectly interpreted, the provisions of the Basic Code do not fully apply, or an equally good or better form of construction can be used.

128.2. Constitution of Board of Appeals.

128.21. Membership of Board.—The board of appeals shall consist of five (5) members appointed by the chief appointing authority of the municipality, one member to be appointed for five (5) years, one for four (4) years, one for three (3) years, one for two (2) years, and one to serve one (1) year; and thereafter each new member to serve for five (5) years or until his successor has been appointed.

128.22. Qualifications of Board Members.—Each member shall be a licensed professional engineer or architect, or a builder or superintendent of building construction, each of at least ten (10) years' experience, for five (5) years of which he shall have been in responsible charge of work; and at no time shall there be more than two (2) members of the board selected from the same profession or business; and at least one of the professional engineers shall be a licensed structural or civil engineer of architectural engineering experience.

128.23. Absence of Members.—During absence of a member by reason of disability or disqualification, the appointing officer shall designate a qualified substitute.

128.24. Chairman of Board.—The board shall select one of its members to serve as chairman, and the building official shall designate a clerk from the department to serve as secretary to the board, who shall keep a detailed record of all proceedings on file in the department of building inspection.

128.25. Exemption of Members.—No member of the board shall pass on any question in which he is engaged as contractor or material dealer, or in the preparation of plans or specifications, or in which he has any personal interest.

128.3. Compensation of Board of Appeals.—Compensation of appointed members of the board shall be determined by the proper authority of the municipality.

128.4. Appeals Procedure.

128.41. Notice of Meeting.—The board shall meet upon notice of the chairman within ten (10) days of the filing of an appeal or at stated periodic meetings if warranted by the volume of work;

128.42. Public Hearing.—All hearings shall be public; and the appellant, his representative, the official of the municipality and any other person whose interests may be affected by the matter on appeal, shall be given an opportunity to be heard;

128.43. Adjourned Meeting.—When five (5) qualified members are not present to consider a specific appeal, either the appellant, the building official or their representatives may request a postponement of the hearing.

128.5. Decisions of Board of Appeals.

128.51. Action of Board.—The board shall affirm, modify or reverse the decision of the building official by a concurring vote of three (3) members;

128.52. Resolutions of Board.—Every action of the board shall be by resolution and certified copies shall be furnished to the appellant and to the building official;

128.53. Determining Vote.—Failure to secure three (3) concurring votes shall be deemed a confirmation of the decision of the building official, except that the appellant shall be entitled to further hearing before a full board if there were not five (5) qualified members present when the vote was taken;

128.54. Enforcement of Decision.—The building official shall take immediate action in accordance with the decision of the board.

128.6. Court Review.—Any person aggrieved by a decision of the board of appeals, whether or not a previous party to the decision, or any municipal officer or official board of the municipality, may apply to the appropriate court for a writ of certiorari to correct errors of law in such decisions. Application for review shall be made to the proper court of jurisdiction within fifteen (15) days after the filing of the board's decision in the office of the building official.

SECTION 129.0. CONTROLLED MATERIALS PROCEDURE

129.1. Waiver of Examination and Inspection.

129.11. Under Direct Supervision.—When plans for the erection or alteration of a building are prepared by a licensed professional engineer or registered architect, which contemplate structural work or structural changes involving public safety or health and such plans are accompanied by an affidavit of the applicant that he has supervised the preparation of the architectural, structural and mechanical design plans and that he will supervise or check all working drawings and shop details for the construction, and that the structure will be built under his field supervision and in accordance with the approved plans, and that such plans conform to all the provisions of the Basic Code and the legal rules adopted under its provisions, and that all the material used in the construction will be controlled materials as defined in sections 701 and 722, the building official may waive examination of the plans and field inspection of the construction and may issue a permit for the performance of the work.

129.12. Qualified Supervisor.—The licensed professional engineer or architect shall be qualified by experience and training in the particular field of construction involved in the building project under consideration.

129.13. Verified Report.—Before the issuance of the certificate of use and occupancy for such building, the licensed professional engineer or architect who prepared and filed the original plans and who supervised the erection of the building shall file a verified report that the structure has been erected in accordance with the approved plans; and as erected, the building complies in all respects with the Basic Code and all other laws governing building construction except as to the specific variations legally authorized under the provisions of the Basic Code and as specifically noted in the verified report and cited in the certificate of use and occupancy.

129.2. Special Technical Services.—When applications for unusual designs of magnitude of construction are filed, the building official may refer such plans and specifications to the Building Officials Conference for advice and recommendations as to their safety of design and compliance with the Basic Code; or he may, in his discretion, retain a properly qualified licensed engineer or registered architect to examine such application for a specific building operation with respect to safety and conformance to statutory requirements. Such employed licensed engineer or registered architect shall supervise the construction in the field to secure compliance with the approved plans and permit; and upon completion of the work, he and the builder shall file with the building official a verified report to the effect that the building has been erected in accordance with accepted engineering practice and in conformity to all the statutory provisions governing building construction for the designated use group classification of the building or structure in respect to use, fire grading, floor and occupancy loads.

SECTION 130.0. VALIDITY

130.1. Partial Invalidity.—In the event any part or provision of the Basic Code is held to be illegal or void, this shall not have the effect of making void or illegal any of the other parts or provisions thereof, which may or shall be determined to be legal; and it shall be presumed that the Basic Code would have been passed without such illegal or invalid parts or provisions.

130.2. Segregation of Invalid Provisions.—Any invalid part of the Basic Code shall be segregated from the remainder of the code by the court holding such part invalid, and the remainder shall remain effective.

130.3. Decisions Involving Existing Buildings.—The invalidity of any provision in any section of the Basic Code as applied to existing buildings and structures shall not be held to affect the validity of such section in its application to buildings and structures hereafter erected.

ARTICLE 2

DEFINITIONS AND CLASSIFICATIONS

SECTION 200.0. SCOPE

The provisions of this article shall control the classification of all buildings as to use group and type of construction; and the definition of all terms relating thereto in [*name of municipality*].

200.1. Application of Terms—The terms herein defined shall be used to interpret all the applicable provisions of the Basic Code. Definitions of technical terms relating to specific structural and egress requirements and to the installation of mechanical, electrical and service equipment are included in the respective articles.

200.2. Application of Other Laws.—Nothing herein contained shall be deemed to nullify any provisions of the zoning law or any other statute of [*name of municipality*] pertaining to the location, use or type of construction of buildings, except as may be specifically required by the provisions of the Basic Code.

SECTION 201.0. GENERAL DEFINITIONS

Unless otherwise expressly stated, the following terms shall, for the purpose of the Basic Code, have the meaning indicated in this section.

201.1. Tense, Gender and Number.—Words used in the present tense include the future; words used in the masculine gender include the feminine and neuter; the singular number includes the plural and the plural the singular.

201.2. Terms Not Defined.—Where terms are not defined, they shall have their ordinarily accepted meanings or such as the context may imply.

ABC. The Abridged Building Code promulgated by the Building Officials Conference of America, Inc.

accepted engineering practice. That which conforms to accepted principles, tests or standards of nationally recognized technical or scientific authorities.

accessory structure. A building the use of which is incidental to that of the main building and which is located on the same lot.

accessory use. A use incidental to the principal use of a building as defined or limited by the provisions of the local zoning laws.

accredited authoritative agencies. (See appendix A).

addition. An extension or increase in floor area or height of a building or structure.

air conditioning. (See section 1801.0.)

air duct. (See section 1801.0.)

airplane hangar. (See section 401.0.)

alley. A secondary thoroughfare less than thirty (30) feet in width dedicated for the public use of vehicles and pedestrians affording access to abutting property.

alteration. As applied to a building or structure means a change or rearrangement in the structural parts or in the exit facilities; or an enlargement, whether by extending on a side or by increasing in height; or the moving from one location or position to another.

amusement device. A device or structure, open to the public, by which individuals are conveyed or moved in an unusual manner for diversion.

apartment. One or more rooms comprising a dwelling unit or serving as the home or residence of an individual, or a family or a household.

approved. Approved by the building official or other authority having jurisdiction.

approved combustible plastic. (See section 1401.0.)

approved plastic. (See section 2001.0.)

approved material, equipment and methods. Approved by the building official or by a recognized authoritative agency.

approved rules. The legally adopted rules of the building official or of a recognized authoritative agency.

appurtenant structure. A device or structure attached to the exterior or erected on the roof of a building designed to support service equipment or used in connection therewith, or for advertising or display purposes, or other similar uses.

architectural terra cotta. (See section 801.0.)

area (building). The maximum horizontal projected area of the building at or above grade, including all enclosed extensions.

area (floor surface measurement). The horizontal projected floor area inside of exterior enclosure walls or between exterior walls and fire walls.

areaway. (Form of construction). An uncovered subsurface space adjacent to a building.

ashlar facing. (See section 801.0.)

ashlar masonry. (See section 801.0.)

attic. The space between the ceiling beams of the top habitable story and the roof rafters.

—habitable attic. A habitable attic is an attic which has a stairway as a means of access and egress and in which the ceiling area at a height of seven and one-third (7⅓) feet above the attic floor is not more than one-third (⅓) the area of the floor next below.

automatic. As applied to a door, window or other protection for an opening shall mean that such door, window or other protection is so constructed and arranged that if open it will close when subjected to a predetermined temperature or rate of temperature rise.

automatic fire door. (See section 901.0.)

automatic revolving door. (See section 601.0.)

automatic water supply source. (See section 1201.0.)

automatic sprinkler head. (See section 1201.0.)

automatic sprinkler system. An arrangement of piping and sprinklers designed to operate automatically by the heat of fire and to discharge water upon the fire.

basement. A portion of the building partly underground, but having less than half its clear height below the average grade of the adjoining ground. (See cellar.)

BBC. The Basic Building Code promulgated by the Building Officials Conference of America, Inc., or the local building code in the application of these provisions.

bay. (Part of a structure). The space between two (2) adjacent piers or mullions or between two (2) adjacent lines of columns.

bay window. A window projecting beyond the wall line of the building and extending down to the foundations.

billboard. (See section 1401.0.)

brick. (See section 801.0.)

building. (See structure.) A structure enclosed within exterior walls or fire walls, built, erected and framed of component structural parts, designed for the housing, shelter, enclosure and support of individuals, animals or property of any kind.

building line. The line established by law, beyond which a building shall not extend, except as specifically provided by law.

building official. The officer or other designated authority charged with the administration and enforcement of the Basic Code, or his duly authorized representative.

building service equipment. The mechanical, electrical and elevator equipment, including piping, wiring, fixtures and other accessories, which provide sanitation, lighting, heating, ventilation, fire-fighting and transportation facilities essential for the habitable occupancy of the building or structure for its designated use and occupancy.

building site. The area occupied by a building or structure, including the yards and courts required for light and ventilation, and such areas that are prescribed for access to the street.

buttress. (See section 801.0.)

cellar. The portion of the building partly underground, having half or more than half of its clear height below the average grade of the adjoining ground.

ceramic surface unit. (See section 801.0.)

certificate of use and occupancy. The certificate issued by the building official which permits the use of a building in accordance with the approved plans and specifications and which certifies compliance with the provisions of law for the use and occupancy of the building in its several parts together with any special stipulations or conditions of the building permit.

change of use. An alteration by change of use in a building heretofore existing to a new use group which imposes other special provisions of law governing building construction, equipment or exits.

chimney. (See section 1001.0.)

clay masonry unit. (See section 801.0.)

closed sign. (See section 1401.0.)

combustible. (See section 901.0.)

concrete. (See section 801.0.)

concrete masonry unit. (See section 801.0.)

conflagration hazard. (See section 901.0.)
construction equipment. (See section 1301.0.)
construction operation. (See section 1301.0.)
controlled materials. (See sections 701.0 and 722.0.)
controlled materials procedure. (See section 129.0.)
corridor. (See passageway, section 601.0.)
court. (See section 501.0.)
curb level. The elevation of the street curb as established in accordance with law.
—building or wall height. The elevation of the street grade opposite the center of the wall nearest to and facing the street lot line.
—excavations. The elevation of the street grade nearest to the point of excavation.
display sign. (See section 1401.0.)
duct. (See section 1001.0.)
dumbwaiter. (See section 1601.0.)
dwellings.
—one-family dwelling. A building containing one (1) dwelling unit with not more than five (5) lodgers or boarders.
—two-family dwelling. A building containing two (2) dwelling units with not more than five (5) lodgers or boarders per family but not more than twenty (20) individuals.
—multi-family—apartment house. A building containing more than two (2) dwelling units.
—boarding house, lodging house, tourist house. A building arranged or used for lodging, with or without meals, for compensation, more than five (5) and not more than twenty (20) individuals.
—dormitory. A building arranged or used for lodging six (6) but not more than twenty (20) individuals and having common toilet and bathroom facilities.
—hotel. A building arranged or used for sheltering, sleeping, or feeding, for compensation, of more than twenty (20) individuals.
dwelling unit. One or more rooms arranged for the use of (1) or more individuals living together as a single housekeeping unit, with cooking, living, sanitary and sleeping facilities.
electric service equipment. (See section 1501.0.)
elevator. (See section 1601.0.)
existing building. A building erected prior to the adoption of the Basic Code, or one for which a legal building permit has been issued.
exitways. (See section 601.0.)
exterior masonry wall construction. (See section 217.0.)
fire area. The floor area enclosed and bounded by fire walls or exterior walls of a building to restrict the spread of fire.
fire damper. (See section 1801.0.)
fire districts The territories defined and limited by the provisions of the Basic Code for the restriction of types of construction.
fire division. (See section 901.0.)
fire door. (See section 901.0.)
fire door assembly. (See section 901.0.)

fire drill. (See section 1201.0.)
fire grading. (See section 202, 902 and table 16.)
fire hazard. (See section 901.0.)
fire limits. (See section 301.0.)
fire partition. (See section 901.0.)
fireproof construction. (See section 215.0.)
fire prevention. (See section 901.0.)
fire protection. (See section 901.0.)
fireresistance. (See section 901.0.)
fireresistance rating. (See section 901.0.)
fireresistive partition. (See section 901.0.)
fireretardent construction. (See section 901.0.)
fireretardent lumber. (See section 901.0.)
fire safety. (See section 901.0.)
fire separation. (See section 901.0.)
fire tower. (Smokeproof tower. See section 601.0.)
fire wall. (See section 901.0.)
fire window. (See section 901.0.)
flameresistance. (See section 901.0.)
flameresistant plastic (check test). (See section 2001.0.)
flamespread. (See section 901.0.)
flamespread rating. (See section 901.0.)
flammable. (See section 401.0.)
flammable film. (See section 401.0.)
floor fill. (See section 801.0.)
floor filling. (See section 801.0.)
floor finish. (See section 801.0.)
floor furnace. (See section 1101.0.)
flue. (See section 1001.0.)
formed steel. (See section 701.0.)
foundation. (See section 701.0.)
foyer. (See section 401.0.)
frame construction. (See section 218.0.)
fuel oil. (See section 401.0.)
garage. (See section 401.0.)
grade. (1) For buildings adjoining one street only, the elevation of the established curb at the center of the wall adjoining the street. (2) For buildings adjoining more than one street, the average of the elevations of the established curbs at the center of all walls adjoining streets. (3) For buildings having no wall adjoining the street, the average level of the ground adjacent to the exterior walls of the building. All walls approximately parallel to and not more than fifteen (15) feet from a street line are to be considered as adjoining a street.
grade hallway. (See section 601.0.)
ground sign. (See section 1401.0.)
habitable room. (See section 501.0.)
hallway, grade. (See section 601.0—grade hallway.)
hallway, public. (See section 601.0—public hallway.)
hazard. (Low, moderate, high. See section 901.0.)

heating appliances. (See section 1101.0.)
height, building. The vertical distance from the grade to the top of the highest roof beams of a flat roof, or to the mean level of the highest gable or slope of a hip roof. When a building faces on more than one street the height shall be measured from the average of the grades at the center of each street front.
—court. The vertical distance from the lowest level of the court to the mean height of the top of the enclosing walls.
—story. The vertical distance from top to top of two (2) successive tiers of beams or finished floor surfaces; and, for the topmost story, from the top of the floor finish to the top of the ceiling joists, or, where there is no ceiling, to the top of the roof rafters.
—wall. The vertical distance from the foundation wall or other immediate support of such wall to the top of the wall.
hereafter. After the time that the Basic Code becomes effective.
heretofore. Before the time that the Basic Code became effective.
high hazard use. (See section 203.0.)
hoistway enclosure. (See section 1601.0.)
hood. (See section 1001.0.)
horizontal exit. (See section 601.0.)
horizontal fire line. (See section 1201.0.)
inflammable. (See flammable. Section 401.0.)
interior lot line. Any lot line other than one adjoining a street or public space.
kerosene. (See section 401.0.)
light gauge steel construction. (See section 701.0.)
limit control. (See section 1801.0.)
load. (See section 701.0.)
lobby. (See section 401.0.)
lot. A portion or parcel of land considered as a unit.
—corner lot. One with two (2) adjacent sides abutting upon streets or other public spaces.
—interior lot. One which faces on one street or with opposite sides on two (2) streets.
lot line. A line dividing one lot from another, or from a street or any public place.
low hazard use. (See section 204.2.)
manual fire-alarm system. (See section 1201.0.)
marquee sign. (See section 1401.0.)
masonry. (See section 801.0.)
mechanical ventilation. (See section 1801.0.)
mezzanine. An intermediate floor between the floor and ceiling of any story, and covering less than thirty-three and one-third (33⅓) per cent of the floor area immediately below.
minimum habitable room height. (See section 501.0.)
minimum habitable room size. (See section 501.0.)
mobile homes. (See section 401.0.)
moderate hazard use. (See section 204.1.)
mortar. (See section 801.0.)

motor fuel service station. (Oil selling station. Gasoline service station. See section 401.0.)
motor vehicle repair shop. (See section 401.0.)
moving stairway. (See section 1601.0.)
municipality. The government unit which has adopted the Basic Code under due legislative authority.
nominal dimension. (See section 801.0.)
non-automatic sprinkler system. (See section 1201.0.)
noncombustible. (incombustible) (See section 901.0.)
noncombustible construction. (See section 216.0.)
occupancy load. The number of individuals normally occupying the building or part thereof, or for which the exit facilities have been designed.
occupiable room. (See section 501.0.)
occupied. As applied to a building, shall be construed as though followed by the words "or intended, arranged or designed to be occupied."
one-source system. (See section 1201.0.)
open sign. (See section 1401.0.)
ordinary materials. (See section 701.0 and 722.0.)
oriel window. A window projected beyond and suspended from the wall of the building or cantilevered therefrom.
owner. Includes his duly authorized agent or attorney, a purchaser, devisee, fiduciary, and an individual having a vested or contingent interest in the property in question.
panel. (Part of a structure). The section of a floor or wall comprised between the supporting frame of two (2) adjacent rows of columns and girders or column bands of floor construction.
panel wall. (See wall-skeleton or panel.)
party wall. (See section 901.0.)
passageway. (See section 601.0—grade hallway.)
penthouse. An enclosed structure above the roof of a building, other than a roof structure, extending not more than twelve (12) feet above the roof, and occupying not more than thirty-three and one-third (33⅓) percent of the roof area.
person. Includes corporation and copartnership as well as individual.
place of assembly. A room or space accommodating one hundred (100) or more individuals for religious, recreational, educational, political, social or amusement purposes or for the consumption of food and drink, including all connected rooms or spaces with a common means of entrance and exit.
place of outdoor assembly. Premises used or intended to be used for public gatherings of two hundred (200) or more individuals in other than buildings.
plenum chamber. (See section 1801.0.)
pole signs. (See section 1401.0.)
posted use and occupancy. The posted classification of a building in respect to use, fire grading, floor load and occupancy load.
posted sign. The tablet, card, or plate which defines the use, occupancy, fire grading and floor loads of each story, floor or parts thereof for which the building or part thereof has been approved.

poster panel. (See section 1401.0.)
prefabricated. Fabricated prior to erection or installation in a building.
prefabricated building. (See section 1901.0.)
prefabricated sub-assembly. (See section 1901.0.)
prefabricated unit. (See section 1901.0.)
prefabricated unit service equipment. (See section 1901.0.)
preservative treated wood. (See section 801.0.)
primary member. (See section 701.0.)
professional engineer or architect. An individual technically and legally qualified to practice the profession of engineering or architecture.
projecting sign. (See section 1401.0.)
protected construction. That in which all structural members are constructed, chemically treated, covered or protected so that the individual unit or the combined assemblage of all such units has the required fire-resistance rating specified for its particular use or application in table 5, and includes protected-frame, protected-ordinary and protected-noncombustible construction.
public corridor. An enclosed public passageway with access to and from individual apartments, offices or rooms leading to a public hallway or to the exitways.
public hallway. A public corridor or space separately enclosed which provides common access to all the exitways of the building in any story.
public parking decks. (See section 401.0.)
public space. A plot or area of land outside of the building dedicated or devoted to public use by legal mapping or by any other lawful procedure.
pyroxylin plastic. (See section 401.0.)
rated load. (See section 1601.0.)
rated speed. (See section 1601.0.)
refrigerant. (See section 1801.0.)
refrigeration. (See section 1801.0.)
reinforced concrete. (See section 801.0.)
reinforced thermosetting plastic. (See section 2001.0.)
repair. The replacement of existing work with the same kind of materials for the purpose of its maintenance, but not including additional work that would affect safety, or affect required exit facilities, or a vital element of an elevator, plumbing, gas piping, wiring, ventilating or heating installation, or any work that would be in violation of a provision of the Basic Code or any other law governing building construction.
required. Shall be construed to be mandatory by provisions of the Basic Code.
roof. The roof slab or deck with its supporting members, not including vertical supports.
roof covering. The covering applied to the roof for weather resistance, fireresistance or appearance.
roof sign. (See section 1401.0.)
roof structure. A structure above the roof of any part of a building enclosing a stairway, tank, elevator machinery or ventilating apparatus, or such part of a shaft as extends above the roof.

rubble masonry. (See section 801.0.)
runway. (See section 1301.0.)
rupture member. (See section 1801.0.)
scaffold. (See section 1301.0.)
secondary member. (See section 701.0.)
self-closing. (See section 601.0.)
shall. The term when used in the Basic Code shall be construed as mandatory.
shaft. (See section 901.0).
slidescape. (See section 601.0.)
slow-burning plastic (check test). (See section 2001.0.)
smoke detector. (See section 1801.0.)
smokepipe. (See section 1001.0.)
smokeproof tower. (Fire tower. See section 601.0.)
smokestack. (See section 1001.0.)
solid masonry. (See section 801.0.)
space heater. (See section 1101.0.)
special hoisting and conveying equipment. (See section 1601.0.)
sprinklered. (See section 1201.0.)
sprinkler system. (See section 1201.0.)
stage. (See section 401.0.)
stairway. (See section 601.0.)
standard fire test. (See section 901.0.)
standpipe. (See section 1201.0.)
steel joist. (See section 701.0.)
story. That part of a building comprised between a floor and the floor or roof next above. (See also mezzanine.)
street. A primary thoroughfare or highway thirty (30) feet or more in width as dedicated or devoted to public use by legal mapping use, or other lawful means.
street lot line. The lot line dividing a lot from a street or other public space.
structure. An assembly of materials forming a construction for occupancy or use including among others, buildings, stadiums, gospel and circus tents, reviewing stands, platforms, stagings, observation towers, radio towers, water tanks, trestles, piers, wharves, open sheds, coal bins, shelters, fences and display signs.
structural clay tile. (See section 801.0.)
temporary sign. (See section 1401.0.)
thermoplastic material. (See section 2001.0.)
thermosetting material. (See section 2001.0.)
tile. (See section 801.0.)
ton of refrigeration. (See section 1801.0.)
travel trailers. (See section 401.0.)
two-source system. (See section 1201.0.)
unfired pressure vessel. (See section 1101.0.)
unit heater. (See section 1101.0.)

use group. The classification of a building or structure based on the purpose for which it is used.

use-used. The purpose for which the building or structure is designed, used or intended to be used.

vent. (See section 1001.0.)

vent duct. (See section 1801.0.)

ventilation. (See section 1801.0.)

vent pipe (gas). (See section 1001.0.)

volatile flammable. (See section 401.0.)

wall. (See also section 801.0 and section 901.0.)

—apron wall. That portion of a skeleton wall below the sill of a window.

—bearing wall. A wall which supports any vertical load in addition to its own weight.

—curtain wall. A non-bearing enclosure wall not supported at each story.

—division wall. A wall used to divide the floor area of a building or structure into separate parts for fire protection, for different uses, for restricted occupancy, or other purposes specified in the Basic Code.

—non-bearing wall. A wall which supports no vertical load other than its own weight.

—parapet wall. That part of any wall entirely above the roof line.

—retaining wall. A wall designed to resist lateral pressure.

—skeleton or panel wall. A nonbearing wall supported at each story on a skeleton frame.

—spandrel wall. That portion of a skeleton wall above the head of a window or door.

wall heater. (See section 1101.0.)

wall sign. (See section 1401.0.)

water curtain (See section 1201.0.)

writing. The term shall be construed to include handwriting, typewriting, printing, photo-offset or any other form of reproduction in legible symbols or characters.

written notice. A notification in writing delivered in person to the individual or to the parties intended or delivered at or sent by registered mail to the last business address known to the party giving the notice.

yard. (See section 501.0.)

zoning. The reservation of certain specified areas within a community or city for building and structures, or use of land, for certain purposes with other limitations such as height, lot coverage and other stipulated requirements.

SECTION 202.0. USE GROUP CLASSIFICATION

All buildings and structures shall be classified with respect to use in one of the following use groups: group A, high hazard; group B, storage; group C, mercantile; group D, industrial; group E, business; group F, assembly; group H, institutional; group L, residential; and group M, miscellaneous buildings.

202.1. Fire Grading of Buildings.—All buildings and structures shall be graded in accordance with the degree of fire hazard of their use in terms of hours and fractions of an hour and as regulated by table 16, section 902.

202.2. New Uses.—The building official shall establish by approved rules the degree of hazard involved and the fire grading of any use not specifically provided for in the Basic Code.

SECTION 203.0. USE GROUP A. HIGH HAZARD BUILDINGS

All buildings and structures or parts thereof shall be classified in the high hazard use group which are used for the storage, manufacture or processing of highly combustible or explosive products or materials which are likely to burn with extreme rapidity or which may produce poisonous fumes or explosions; for storage or manufacturing which involves highly corrosive, toxic or noxious alkalies, acids or other liquids or chemicals producing flame, fume, explosive, poisonous, irritant or corrosive gases; and for the storage or processing of any materials producing explosive mixtures of dust or which result in the division of matter into fine particles subject to spontaneous ignition.

203.1. List of High Hazard Uses. The processes, materials and manufactures listed in table 1 are indicative of and shall be included among high hazard uses.

TABLE 1.—USE GROUP A, HIGH HAZARD USES

Acetylene gas and gases under pressure of fifteen (15) pounds or more and in quantities of greater than twenty-five hundred (2500) cubic feet; including hydrogen, illuminating, natural, ammonia, chlorine, phosgene, sulphur dioxide, carbon dioxide, methyl oxide and all gases subject to explosion, fume or toxic hazard

Artificial flowers and synthetic leather manufacture

Ammunition, explosives and fireworks manufacture

Celluloid and celluloid products

Cereal, feed, flour and grist mills

Cotton batting and cotton waste processes

Cotton dressmaking

Dry cleaning establishments using or storing more than three (3) gallons of gasoline or other hazardous liquids with a flash point under seventy-five (75) degrees F., or more than sixty (60) gallons of volatile flammable liquids with flash point between seventy-five (75) and one hundred and forty (140) degrees F., in a closed-up tester

Feather renovating

Fruit ripening processes

Grain elevators

Hydrogenation processes

Industries employing solids or substances which ignite or produce flammable

gases on contact with water
Kerosene, fuel, lubricating, or any oil storage with a flash point under two hundred (200) degrees F.
Match manufacture or storage
Metal enameling or japanning
Nitro-cellulose film exchanges and laboratories
Paint and varnish manufacture
Paint spraying or dipping, except as specified in sections 213.2 and 302.3
Petroleum manufacture
Processing of paper or cardboard in loose form
Pyroxylin products manufacture and storage
Rag sorting and storage
Refrigerating systems using high hazard refrigerants as defined in article 18
Shoddy mills
Shoe polish manufacture
Smoke houses (industrial)
Straw goods manufacture or broom corn storage
Sugar and starch pulverizing mills
Tar, pitch or resin processing
Tanneries with enameling or japanning
Waste paper sorting, shredding, storage or baling

SECTION 204.0. USE GROUP B, STORAGE BUILDINGS

All buildings and structures or parts thereof shall be classified in the storage use group which are used primarily for the storage of goods, wares or merchandise, except those that involve highly combustible or explosive products or materials; including among others, warehouses, storehouses and freight depots.

204.1. List of Moderate Hazard Uses.—Buildings used for the storage of moderate hazard contents which are likely to burn with moderate rapidity but which do not produce either poisonous gases, fumes or explosives, including among others the materials listed in table 2, shall be classified in the group B-1 storage use group.

TABLE 2.—USE GROUP B-1, STORAGE USES—MODERATE HAZARD

Bags, cloth, burlap and paper
Bamboo and rattan
Baskets
Belting, canvas and leather
Books and paper in rolls or packs
Boots and shoes
Buttons, including cloth-covered, pearl or bone
Cardboard and cardboard boxes
Clothing, woolen wearing apparel
Cordage
Furniture
Furs
Glue, mucilage, paste and size
Horn and combs, other than celluloid
Leather enamcling or japanning
Linoleum
Livestock shelters
Lumber yards
Motor vehicle repair shops
Petroleum warehouses for storage of lubricating oils with a flash point of three hundred (300) degrees F. or higher. (See section 905.3.)
Photo-engraving
Public garages and stables
Silk
Soap
Sugar
Tobacco, cigars, cigarettes and snuff
Upholstering and mattress manufacturing
Wax candles

204.2. List of Low Hazard Uses.—Buildings used for the storage of noncombustible materials, and of low hazard wares that do not ordinarily

burn rapidly, shall be classified in the B-2 storage use group unless herein otherwise classified, including among others the materials listed in table 3.

TABLE 3.—USE GROUP B-2, STORAGE USES—LOW HAZARD

Asbestos
Chalk and crayons
Food products
Glass
Ivory
Metals
Porcelain and pottery
Talc and soapstones

SECTION 205.0. USE GROUP C, MERCANTILE BUILDINGS

All buildings and structures or parts thereof shall be classified in the mercantile use group which are used for display and sales purposes involving stocks of goods, wares or merchandise incidental to such purposes and accessible to the public; including among others retail stores, shops and salesrooms and markets. Highly combustible goods, such as merchandise made of pyroxylin products, shall be limited to small quantities that do not constitute a high hazard; and if not so limited, the construction shall comply with the requirements of the high hazard use group as required by the provisions of article 4 and tables 5 and 6.

SECTION 206.0. USE GROUP D, INDUSTRIAL BUILDINGS

All buildings and structures or parts thereof in which occupants are engaged in performing work or labor in fabricating, assembling or processing of products or materials shall be classified in the industrial use group; including among others factories, assembling plants, industrial laboratories and all other industrial and manufacturing uses, except those involving highly combustible, flammable or explosive products and materials of the high hazard use group (use group A).

206.1. List of Industrial Uses.—The processes and manufactures listed in table 4 shall be indicative of and include the uses permitted in use group D buildings.

TABLE 4.—USE GROUP D, INDUSTRIAL USES

Bakeries
Boiler works
Breweries
Canneries, including food products
Condensed and powdered milk manufacture
Dry cleaning using other than volatile flammable liquids in cleaning or dyeing operations or other than classified in table 1
Electric light plants and power houses
Electrolytic reducing works
Glass plants
Ice plants
Leather and tanneries, excluding enameling or japanning
Millwork and woodworking
Sugar refineries
Tenant factories, excluding ladies' dresses and other high hazard uses.
Textile mills, including canvas, cotton cloth, bagging, burlap, carpets and rags
Upholstery and manufacturing shops
Water-pumping plants

206.2. Special Industrial Uses.—All buildings and structures designed to house low hazard industrial processes, including among others the production and distribution of electric, gas or steam power and rolling mills and foundries, requiring large areas and unusual heights to accommodate craneways or special machinery and equipment shall be exempt from the height and area limitations of table 6.

206.21. Construction.—Buildings and structures for such special industrial uses shall comply with the requirements of section 309.0 except as to height and when constructed of noncombustible (type 2-C) construction may have balconies and mezzanine floors which do not exceed two-thirds (⅔) the area of the main floor in any one tier.

206.22. Enclosure Walls.—The enclosure walls of buildings of such low hazard industrial uses shall be constructed of approved noncombustible and weather resisting materials and when located with a fire separation of less than thirty (30) feet from interior lot lines of any other building shall be protected or constructed to provide a fireresistance rating of not less than two (2) hours.

206.23. Firefighting and Extinguishing Equipment.—Special use industrial buildings as herein defined shall comply with the requirements of article 12 for auxiliary fire extinguishing equipment; except that the provisions of section 309.0 for automatic sprinkler equipment in unlimited area buildings may be waived by the building official when such installations would be detrimental or dangerous to the specific use and occupancy.

SECTION 207.0. USE GROUP E, BUSINESS BUILDINGS

All buildings and structures or parts thereof shall be classified in the business use group which are used for the transaction of business, for the rendering of professional services or for other services that involve stocks of goods, wares or merchandise in limited quantities for use incidental to office uses or sample purposes; including among others offices, banks, civic administration activities, professional services, testing and research laboratories, radio stations, telephone exchanges, motor fuel service stations and similar establishments.

SECTION 208.0. USE GROUP F, ASSEMBLY BUILDINGS

All buildings and structures or parts thereof shall be classified in the assembly use group which are used or designed for places of assembly as defined in the Basic Code.

208.1. Use Group F-1—Theatres.

208.11. Use Group F-1-A Structures shall include all theatres and other buildings used primarily for theatrical or operatic performances and exhibitions, arranged with a raised stage, proscenium curtain, fixed or portable scenery or scenery loft, lights, motion picture booth, mechanical appliances or other theatrical accessories and equipment and provided with fixed seats.

208.12. Use Group F-1-B Structures shall include all theatres without a stage and equipped with fixed seats used for motion picture performances.

208.2. Use Group F-2 Structures shall include all buildings and places of public assembly, without theatrical stage accessories, designed for use as dance halls, night clubs and for similar purposes including all rooms, lobbies and other spaces connected thereto with a common means of entrance and exit.

208.3. Use Group F-3 Structures shall include all buildings with or without an auditorium in which persons assemble for amusement, entertainment or recreation, and incidental motion picture, dramatic, theatrical or educational presentations, lectures, or other similar purposes, without theatrical stage other than a raised platform; and principally used without permanent seating facilities, including art galleries, museums, lecture halls, libraries, restaurants other than night clubs and recreation centers; and buildings designed for other similar assembly purposes including passenger terminals.

208.4. Use Group F-4 Structures shall include all buildings used as churches, schools, colleges and for similar educational and religious purposes.

208.5. Use Group F-5 Structures shall include grandstands, bleachers, coliseums, stadiums, drive-in theatres, tents and similar structures for outdoor assembly use and shall comply with the provisions of the Basic Code for special uses and occupancies. (See article 4.)

SECTION 209.0. USE GROUP H. INSTITUTIONAL BUILDINGS

All buildings and structures or parts thereof shall be classified in the institutional use group in which people suffering from physical limitations because of health or age are harbored for medical or other care or treatment, or in which people are detained for penal or correctional purposes, or in which the liberty of the inmates is restricted.

209.1. Use Group H-1 shall include all buildings designed for the detention of people under restraint including among others jails, prisons, reformatories, insane asylums and similar uses.

209.2. Use Group H-2 shall include all buildings used for housing people suffering from physical limitations because of health or age, including among others day nurseries, hospitals, sanitariums, clinics, infirmaries, orphanages, homes for aged and infirm; and buildings designed for prosecuting public or civic services and activities of emergency character, including among others fire houses, police stations and similar uses.

SECTION 210.0 USE GROUP L, RESIDENTIAL BUILDINGS

All buildings and structures or parts thereof shall be classified in the residential use group, in which families or households live or in which sleeping accommodations are provided for individuals with or without dining facilities, excluding those that are classified as institutional buildings.

210.1. Use Group L-1 Structures shall include all buildings arranged for the shelter and sleeping accommodation of more than twenty (20) individuals, including hotels, lodging houses, boarding houses and dormitories.

210.2. Use Group L-2 Structures shall include all multiple-family dwellings and all dormitories, boarding and lodging houses arranged for sheltering or feeding less than twenty (20) individuals.

210.3. Use Group L-3 Structures shall include all buildings arranged for the use of one- or two-family dwelling units including not more than five (5) lodgers or boarders per family.

Mobile homes may be used as single-family dwellings when complying with the requirements of section 425.0.

SECTION 211.0. USE GROUP M, MISCELLANEOUS USES

Structures and buildings of a temporary character and miscellaneous structures not classified in any specific use group shall be constructed, equipped and maintained to meet the requirements of the Basic Code commensurate with the fire and life hazard incidental to their use. Miscellaneous uses shall include all accessory buildings and structures used as private garages, sheds, fences and similar purposes.

SECTION 212.0. DOUBTFUL USE CLASSIFICATION

When a building or structure is proposed for a use not specifically provided for in the Basic Code or the classification of which is doubtful, such building or structure shall be included in the use group which it most nearly resembles in respect to the existing or proposed life and fire hazard and it shall be so classified by the building official.

SECTION 213.0. MIXED USE AND OCCUPANCY

213.1. Two or More Uses.—In case a building is occupied for two (2) or more uses not included in the same use group, the provisions of the Basic Code applying to each use shall apply to such parts of the building as come within that group; and if there are conflicting provisions, the requirements securing the greater public safety shall apply.

213.2. Incidental Uses.—Where the higher hazard use is supplemental to the main use of the building and the area devoted to such use is constructed and segregated by fireresistive construction as required in article 4, the building shall be classified according to the main use.

213.3. Fire Divisions.—When mixed uses are completely separated horizontally and vertically from adjoining occupancies by fire divisions of the highest fire grading prescribed in table 16 for the separated uses, each part of the building shall be separately classified as to use.

SECTION 214.0. CONSTRUCTION CLASSIFICATION

All buildings and structures erected or to be erected, altered or extended in height or area shall be classified in any one or in a combination of the four (4) construction types herein defined: Type 1, Fireproof Construction; Type 2, Noncombustible Construction; Type 3, Exterior Masonry Wall Construction; and Type 4, Frame Construction.

214.1. False Designation.—No building shall be designated a given type of construction unless it conforms to the minimum requirements for that type; and it shall be unlawful to post, or use, or designate, or advertise

a building as of a given type of construction unless it complies with the minimum Basic Code requirements for that type.

214.2. Minimum Requirements.—When a superior type of construction is used than the minimum herein required for any specified use, height and area of the building, nothing in theBasic Code shall be construed to require full compliance with the specifications for the higher type; but the designated construction classification of the building shall be that of the lesser requirement, unless all the requirements for the higher type are fulfilled.

SECTION 215.0. TYPE 1, FIREPROOF CONSTRUCTION

Buildings and structures of fireproof construction are those in which the walls, partitions, structural elements, floors, ceilings, and roofs, and the exitways are constructed and protected with noncombustible materials to afford the fireresistance specified in table 5, except as otherwise specifically regulated by the provisions of article 9. Fireproof buildings shall be further classified as types 1-A and 1-B.

Fire-retardant treated wood may be used as specified in table 5 and section 903.8.

SECTION 216.0. TYPE 2, NONCOMBUSTIBLE CONSTRUCTION

Buildings and structures of noncombustible construction are those in which the walls, partitions, structural elements, floors, ceilings and roofs, and the exitways are constructed of approved noncombustible materials meeting the fireresistive requirements specified in table 5, except as modified by the fire district limitations of article 3, and as further regulated in article 9. Noncombustible buildings shall be further classified as types 2-A, 2-B, and 2-C.

Fire-retardant treated wood may be as specified in table 5 and section 903.8.

SECTION 217.0. TYPE 3, EXTERIOR MASONRY WALL CONSTRUCTION

Buildings and structures of exterior masonry wall construction are those in which the exterior, fire and party walls are constructed of masonry or other approved noncombustible materials, of the required fireresistance and structural properties; and the floors, roofs and interior framing are wholly or partly of wood or of metal or other approved construction; the fire and party walls are ground supported; except that girders and their supports carrying walls of masonry shall be protected to afford the same degree of fireresistance as the walls supported thereon; and all structural elements have the required fireresistance rating specified in table 5.

217.1. Type 3A—Buildings and structures of heavy timber construction are those in which fire resistance is attained by placing limitations on the minimum sizes of wood structural members and on minimum thickness and composition of wood floors and roofs; by the avoidance, or by the proper protection by fire-stopping or other acceptable means, of concealed spaces under floors and roofs; by the use of approved fastenings, construction details, and adhesives for structural members; and by providing the required degree of fire resistance in exterior and interior walls. (See section 854.0 for construction details.)

Columns.—Wood columns may be sawn or glued laminated and shall be not less than eight (8) inches, nominal, in any dimension when supporting floor loads and not less than six (6) inches, nominal, in width and not less than eight (8) inches, nominal, in depth when supporting roof and ceiling loads only.

Floor framing.—Beams and girders of wood may be sawn or glued laminated and shall be not less than six (6) inches, nominal, in width and not less than ten (10) inches, nominal, in depth. Framed or glued laminated arches which spring from the floor line and support floor loads shall be not less than eight (8) inches, nominal, in any dimension. Framed timber trusses supporting floor loads shall have members of not less than eight (8) inches, nominal, in any dimension.

Roof framing.—Framed or glued laminated arches for roof construction which spring from the floor line or from grade and do not support floor loads shall have members not less than six (6) inches, nominal, in width and not less than eight (8) inches, nominal, in depth for the lower half of the height and not less than six (6) inches, nominal, in depth for the upper half. Framed or glued laminated arches for roof construction which spring from the top of walls or wall abutments, framed timber trusses, and other roof framing which do not support floor loads, shall have members not less than four (4) inches, nominal, in width and not less than six (6) inches, nominal, in depth. Spaced members may be composed of two or more pieces not less than three (3) inches, nominal, in thickness when blocked solidly throughout their intervening spaces or when such spaces are tightly closed by a continuous wood cover plate of not less than two (2) inches, nominal, in thickness, secured to the underside of the members. Splice plates shall be no less than three (3) inches, nominal, in thickness. When protected by approved automatic sprinklers under the roof deck, framing members shall be not less than three (3) inches, nominal, in width.

Flooring.—Floors shall be without concealed spaces and shall be of sawn or glued laminated plank, splined, or tongue-and-groove, of not less than three (3) inches, nominal, in thickness covered with one (1) inch, nominal, dimension tongue-and-groove flooring, laid crosswise or diagonally, or of planks not less than four (4) inches, nominal, in width set on edge close together and well spiked, and covered with one (1) inch, nominal, dimension flooring.

Roof decking.—Roofs shall be without concealed spaces and roof decks shall be sawn or glued laminated, splined or tongue-and-groove plank, not

less than two (2) inches, nominal, in thickness, or of planks not less than three (3) inches, nominal, in width, set on edge close together and laid as required for floors. Other types of decking may be used if providing equivalent fire resistance and structural properties.

Bearing walls.—Bearing portions of exterior and interior walls shall be of approved noncombustible material and shall have a fireresistance rating of not less than two (2) hours.

Non-bearing walls.—Non-bearing portions of exterior walls shall be of approved noncombustible materials except as otherwise noted and; where a horizontal separation of less than twenty (20) feet is provided, non-bearing exterior walls shall have a fireresistance rating of not less than two (2) hours. Where a horizontal separation of twenty (20) feet to thirty (30) feet is provided, non-bearing exterior walls shall have a fireresistance rating of not less than one (1) hour. Where a horizontal separation of thirty (30) feet or more is provided, no fireresistance rating is required. Where a horizontal separation of twenty (20) feet or more is provided wood columns and arches conforming to heavy timber sizes may be used externally.

217.2. Type 3-B.—Structures of type 3-B (ordinary protected) shall include all exterior masonry wall buildings in which the interior structural elements are wholly or partly of fire-protected wood of not less than two (2) inch nominal thickness, or of other approved protected combustible materials, or of metal protected and insulated to afford three-quarter (¾) hour fireresistance where specified in table 5.

217.3. Type 3-C.—Structures of type 3-C (ordinary unprotected) construction shall include all exterior masonry wall buildings in which the interior structural members are of wood of not less than two (2) inch nominal thickness or consist of other combustible or noncombustible materials with protection of less than three-quarter (¾) hour fireresistance rating.

SECTION 218.0. TYPE 4, FRAME CONSTRUCTION

Buildings and structures of frame construction are those in which the exterior walls, bearing walls, partitions, floor and roof construction are constructed wholly or partly of wood stud and joist assemblies with a minimum nominal dimension of two (2) inches, or of other approved combustible materials; with firestopping at all vertical and horizontal draft openings as regulated in section 877, and in which the structural elements have the required fireresistance ratings specified in table 5. Frame buildings shall be further classified as types 4-A and 4-B.

SECTION 219.0. SUBDIVISION OF ATTIC SPACES

The attic spaces of all buildings, except where the roof and attic are of noncombustible or fireproof construction, shall be subdivided into areas not exceeding three thousand (3,000) square feet by means of approved fire stops. When doors or other openings are provided in such subdividing

partitions, they shall be of noncombustible or similarly protected materials and the construction shall be tightly fitted around all ducts or other assemblies piercing such partitions.

SECTION 220.0 TEMPORARY STRUCTURES

Pursuant to a variance granted by the board of appeals under the provisions of section 128, the building official may issue a permit for temporary construction as approved by the board of appeals. Such permits shall be limited as to time of service, but in no case shall such temporary construction be permitted for more than one year.

220.1. Special Approval.—All temporary construction shall conform to structural strength, fire safety, egress facilities, light, ventilation and sanitary requirements of the Basic Code necessary to insure the public health, safety and general welfare.

220.2 Termination of Approval.—The building official is hereby authorized to terminate such special approval and to order the demolition of any such construction at his discretion, or as directed by the decision of the board of appeals.

TABLE 5.—FIRE-RESISTANCE RATINGS OF STRUCTURAL ELEMENTS IN HOURS

	STRUCTURAL ELEMENT		TYPE OF CONSTRUCTION																	
			TYPE 1		TYPE 2				TYPE 3						TYPE 4					
			FIREPROOF		NONCOMBUSTIBLE				EXTERIOR MASONRY WALLS						FRAME					
					PROTECTED			Unprotected Note b	Heavy Timbers (Mill)	ORDINARY					Protected		Unprotected			
			1A	1B	2A	2B		2C	3A	3B		3C			4A		4B			
	EXTERIOR WALLS	Note e								Protected		Unprotected								
1	On Street Lot Lines or with Fire Separation of 30' or More from Interior Lot Lines or Any Building	Bearing	4	3	2	¾		0	2	2		2			½		0			
		Non-Bearing	0	0	0	0		0	0	0		0			½		0			
	On Interior Lot Lines or Less Than 6' Therefrom or From Any Building	Bearing	4	3	2	1½		¾ Note c	2	2		2			¾		¾			
		Non-Bearing	2	2	1½	¾		¾ Note c	2	2		2			¾		¾			
	6' or More But Less Than 11'	Bearing	4	3	2	¾		0	2	2		2			½		0			
		Non-Bearing	2	2	1½	¾		0	2	2		2			¾		0			
	11' or More But Less Than 30'	Bearing	4	3	2	¾		0	2	2		2			½		0			
		Non-Bearing	1½	1½	¾	¾		0	See Sec. 217	1½		1½			½		0			
2	Interior Bearing Walls and Partitions		4	3	2 Noncombustible			0	2	¾		0			½		0			
3	Fire Walls		4	3	2 In No Case Less Than Fire Grading of Use Group—(See Table 16)			2	2	2		2			2		2			
4	Fire Divisions		Fire Resistance Rating Corresponding to Fire Grading of Use Group—(See Table 16)														Note d			
5	Fire Enclosure of Exitways, Elevator Hoistways, Public Hallways and Stairways	Note e	2	2	2	2		2 Noncombustible	2	2		2			¾		¾			
6	Shafts Other Than Stairways		2	2	2	2		2 Noncombustible	2	2		2			¾		¾			
7	Corridor Partitions & Vertical Separation of Tenant Spaces		¾	¾	¾ Noncombustible		¾	0 NOTE J	¾	¾		0			½		0			
	Other Non-Bearing Partitions (See Art. 9)		Noncombustible NOTE J						0	0		0			0		0			
8	Columns, Girders, Trusses, (Other Than Roof Trusses) and Framing	Supporting One Floor	3	2	1½	¾		0	See Sec. 217	¾		0			½		0			
		Supporting More Than One Floor	4	3	2	¾		0	See Sec. 217	¾		0			¾		0			
9	Structural Members Supporting Wall		Required Fire Resistance of Wall Supported But Not Less Than Fire Resistance Rating for Type of Construction																	
10	Floor Construction Including Beams	Note i	3	2	1½	¾		0	See Sec. 217	¾		0			½		0			
11	Roof Construction Including Beams—15' or Less in Height	Note i	2	1½	¾	¾ NOTE J		0	See Sec. 217	¾		0			½		0			
12	Roof Trusses and Framing Including Arches and Roof Deck Note f	More than 15' But Less Than 20' in Height to Lowest Member	¾	¾	¾ NOTE J		0	0	See Sec. 217	0		0			½		0			
		20' or More in Height to Lowest Member	0	0	0 NOTE J		0	0	See Sec. 217	0		0			0		0			

Note a.—The fire separation or fire exposure in feet as herein limited applies to the distance from other buildings on the site, or from an interior lot line or from the opposite side of a street or other public space not less than thirty (30) feet wide to the building wall. (See *Definitions*, section 901.)

Note b.—Protected exteriors shall be required within the fire limits in type 2 construction as follows: high hazard uses, 2-hour fire resistance with fire separation up to 11 feet.

Note c.—One-story buildings of type 2-C construction which do not exceed three thousand (3000) square feet in area in all use groups except high hazard, assembly and institutional shall be exempt from the protected exterior wall requirements of table 5. (See section 302.4.)

Note d.—Party walls in type 4 buildings shall be as follows: 1- and 2-family dwellings, ¾-hour fire resistance. (See section 907.3.) Other uses 2 hours, but not less than the fire grading of the use group. (See table 16.)

Note e.—Stair enclosures in all buildings, other than 1- and 2-family dwellings, which do not exceed three (3) stories or forty (40) feet in height with an occupancy load of less than forty (40) below and less than seventy-five (75) above the grade floor shall be of not less than ¾-hour fire resistance. In buildings of types 3 and 4 construction, such ¾-hour enclosures may be of combustible construction as provided in section 618.93.

Note f.—In all buildings in which the roof framing may be unprotected, roof slabs and decking may be noncombustible without fire-resistance rating except that in buildings not more than five (5) stories in height, roof decking may be of mill type construction or of any other materials providing equivalent fire-resistant and structural properties. (See sections 217 and 915.)

Note g.—Deleted. No requirements.

Note h.—For special high hazard uses involving a higher degree of fire severity and higher concentration of combustible contents, the fire-resistance requirements for structural elements shall be increased accordingly. (See section 400.)

Note i.—In Type 3A construction members which are of material other than heavy timber shall have a fire resistance rating of not less than ¾ hour.

Note j.—Fire-Retardant Treated Wood, complying with section 903.72, may be used as provided in section 903.8.

TABLE 6.—GENERAL HEIGHT AND AREA LIMITATIONS OF ONE-STORY BUILDINGS FACING ON ONE STREET OR PUBLIC SPACE NOT LESS THAN 30 FEET WIDE

Notes a, d and 1

Areas in square feet; heights in number of stories and feet

N.P. — NOT PERMITTED

☒ UNLIMITED

USE GROUP			TYPE OF CONSTRUCTION																	
			TYPE 1		TYPE 2				TYPE 3					TYPE 4						
			Fireproof		Noncombustible				Exterior Masonry Walls					Frame						
					Protected			Unprotected	(H.T.) Mill	Ordinary Joisted				Protected		Unprotected				
										Protected	Unprotected									
			1A	1B	2A	2B		2C	3A	3B	3C			4A		4B				
A	HIGH HAZARD	Notes h. and m.	5St.65' 16,800	3St.40' 14,400	3St.40' 11,400	2St.30' 7,500		1St.20' 4,800	2St.30' 7,200	2St.30' 6,600	1St.20' 4,800			1St.20' 5,100		N.P.				
B-1	STORAGE—Moderate	Notes b, d, e, f, i, and j.			5St.65' 19,950	4St.50' 13,125		2St.30' 8,400	4St.50' 12,600	3St.40' 11,550	2St.30' 8,400			2St.30' 8,925		1St.20' 4,200				
B-2	STORAGE—Low	Notes b, d, e, and f.			7St.85' 34,200	5St.65' 22,500		3St.40' 14,400	5St.65' 21,600	4St.50' 19,800	3St.40' 14,400			3St.40' 15,300		2St.30' 7,200				
C	MERCANTILE	Notes b, d, e, and f.			6St.75' 22,800	4St.50' 15,000		2St.30' 9,600	4St.50' 14,400	3St.40' 13,200	2St.30' 9,600			2St.30' 10,200		1St.20' 4,800				
D	INDUSTRIAL	Notes b, d, e, and f.			6St.75' 22,800	4St.50' 15,000		2St.30' 9,600	4St.50' 14,400	3St.40' 13,200	2St.30' 9,600			2St.30' 10,200		1St.20' 4,800				
E	BUSINESS	Notes b, d, e, and f.			7St.85' 34,200	5St.65' 22,500		3St.40' 14,400	5St.65' 21,600	4St.50' 19,800	3St.40' 14,400			3St.40' 15,300		2St.30' 7,200				
F-1-A	ASSEMBLY THEATRES	With stage and scenery		6St.75' 14,400	4St.50' 11,400	2St.30' 7,500		1St.20' 4,800	2St.30' 7,200	2St.30' 6,600	1St.20' 4,800			1St.20' 5,100		N.P.				
F-1-B		Without stage (Motion Picture Theatres)		5St.65' 19,950	3St.65' 19,950	3St.40' 13,125		2St.30' 8,400	3St.40' 12,600	3St.40' 11,550	2St.30' 8,400			1St.20' 8,925		1St.20' 4,200				
F-2	ASSEMBLY—Night Clubs and similar uses			4St.50' 7,200	3St.40' 5,700	2St.30' 3,750		1St.20' 2,400	2St.30' 3,600	2St.30' 3,300	1St.20' 2,400			1St.20' 2,550		1St.20' 1,200				
F-3	ASSEMBLY—Lecture Halls, Recreation Centers, Terminals—Restaurants other than Night Clubs Note e				5St.65' 19,950	3St.40' 13,125		2St.30' 8,400	3St.40' 12,600	3St.40' 11,550	2St.30' 8,400			1St.20' 8,925		1St.20' 4,200				
F-4	ASSEMBLY—Churches—Schools Note n and o				3St.65' 34,200	3St.40' 22,500		2St.30' 14,400	3St.40' 21,600 Note g	3St.40' 19,800	2St.30' 14,400			1St.20' 15,300 Note g		1St.20' 7,200 Note g				
H-1	INSTITUTIONAL—Restrained			6St.75' 18,000	4St.50' 14,250	2St.30' 9,375		1St.20' 6,000	2St.30' 9,000	2St.30' 8,250	1St.20' 6,000			1St.20' 6,375		N.P.				
H-2	INSTITUTIONAL—Incapacitated			8St.90' 21,600	4St.50' 17,100	2St.30' 11,250		1St.20' 7,200	2St.30' 10,800	2St.30' 9,900	1St.20' 7,200			1St.20' 7,650		N.P.				
L-1	RESIDENTIAL—Hotels				9St.100' 22,800	4St.50' 15,000		3St.40' 9,600	4St.50' 14,400	4St.50' 13,200	3St.40' 9,600			3St.40' 10,200		2½St.35' 4,800				
L-2	RESIDENTIAL—Multi-Family				9St.100' 22,800	4St.50' 15,000 Note k		3St.40' 9,600	4St.50' 14,400	4St.50' 13,200 Note k	3St.40' 9,600			3St.40' 10,200		2½St.35' 4,800				
L-3	RESIDENTIAL—1 & 2 Family				4St.50' 22,800	4St.50' 15,000		3St.40' 9,600	4St.50' 14,400	4St.50' 13,200	3St.40' 9,600			St.40' 10,200		2½St.35' 4,800				
M	MISCELLANEOUS & TEMPORARY																			

Note a.—For all buildings with frontages of more than twenty-five (25) per cent of the building perimeter on one or more streets or other accessible public space not less than thirty (30) feet wide, the tabular area may be increased two (2) per cent for each one (1) per cent of such excess. (See section 308.)

Note b.—In use groups B-1, B-2, C, D and E, the tabular areas may be increased two hundred (200) per cent for one (1) story buildings and one hundred (100) per cent for buildings over one (1) story in height when such buildings are equipped with automatic sprinkler systems not specifically required by law. (See section 308.)

Note c.—Eliminated.

Note d.—The maximum total floor area shall not exceed three and one-half (3½) times the tabular value. (See section 308.3.)

Note e.—In use groups B, C, D, E and F-3, isolated buildings of other than frame construction may be of unlimited areas outside of the fire limits when not more than one (1) story or eighty-five (85) feet in height when complying with specific provisions of the Basic Building Code. See section 309.)

Note f.—In use groups B-1, B-2, C, D and E, types 1, 2 and 3 construction may be increased one (1) story but not more than twenty (20) additional feet in height when equipped with automatic sprinkler systems not specifically required by law. (See section 310.2.)

Note g.—Church auditoriums of type 3-A construction may be erected to sixty-five (65) feet in height and of type 4 construction to forty-five (45) feet in height.

Note h.—For exceptions to height and area limitations of high hazard use buildings, see article 4 governing the specific use. For other special fire-resistive requirements governing specific uses, see section 905.

Note i.—For height and area exceptions covering public parking decks, see section 905.2.

Note j.—For height and area exceptions covering petroleum bulk-storage buildings, see section 905.3.

Note k.—For exceptions to height of multi-family dwellings of types 2-B and 3-B construction, see section 905.6.

Note l.—In multi-story buildings, the limiting areas specified in table 6 shall be reduced as regulated by section 307.3.

Note m.—For one-story combustible fibre warehouses, see section 410.17.

Note n.—The tabular area of one-story school buildings of use group F-4 may be increased two hundred (200) per cent provided every classroom has at least one door opening directly to the exterior of the building. Not less than one-half (½) of the required exits from any assembly room included in such buildings shall also open directly to the exterior of the building.

Note o.—For exception to area limitations for one-story school buildings of type 2, 3A, and 3B construction, see section 309.11.

ARTICLE 3

GENERAL BUILDING LIMITATIONS

SECTION 300.0. SCOPE

The provisions of this article shall control the division of the municipality of [*name of municipality*] into fire districts and the general limitations of height and area of all buildings hereafter erected, and extensions to existing buildings hereafter altered or enlarged as affected by the fire and life hazard incident to type of construction, use group, density of development, exterior exposure and accessibility of buildings and structures to fire-fighting facilities and equipment.

SECTION 301.0. FIRE DISTRICT SUBDIVISIONS

For the purpose of control of use and construction of buildings, the building official shall establish limiting districts designated Fire District No. 1, Fire District No. 2 and Outside Fire Limits under the legal procedure of the municipality for creating and establishing fire districts.

Note A: Number of Fire Districts.—The number of fire districts to be established will depend upon the prevailing character of construction and typical development of the specific locality. In large cities, two (2) fire districts are generally desirable while in cities of moderate size and in small political subdivisions, one fire district may be adequate to provide for the fire hazard inherent in concentrated commercial and manufacturing occupancies. The fire district should include all those areas of the municipality in which buildings of business, mercantile, industrial, storage and other use groups of similar fire and conflagration hazard are concentrated. If provision is made for only one fire district, the restrictions herein prescribed for Fire District No. 1 will be applicable to such district.

301.1. Fire District No. 1.—Fire District No. 1 shall comprise the areas housing highly congested business, commercial, manufacturing and industrial uses or in which such uses are developing. The limits of such areas are described as bounded by ——

301.2. Fire District No. 2.—Fire District No. 2 shall comprise the areas housing residential uses (use groups L-1 and L-2), together with retail stores, business and amusement centers, or in which such uses are developing; and the limits of such areas are described as bounded by ——.

301.3. Outside Fire Limits.—All other areas not included in Fire District Nos. 1 and 2 shall be designated as Outside Fire Limits.

SECTION 302.0. GENERAL FIRE DISTRICT PROVISIONS

302.1. Changes in Districts.—Any changes in the boundaries of fire districts or changes of designation of any area from one fire district to another fire district shall be established by the same procedure prescribed for the promulgation of new rules, or by the promulgation of a new ordinance.

302.2. Overlapping Districts.—A building or structure located in more than one fire district shall be deemed to be in that one of the three districts which contains the major part of the building area; and in the event of equal distribution in two or more districts, the limitations of the most restricted district shall apply.

302.3. High Hazard Uses.—Except as specifically approved by the municipal authorities, all buildings of high hazard use (use group A) shall be prohibited from location in Fire District No. 1. Paint spray, drying rooms and rooms for similar incidental uses not exceeding one thousand (1000) square feet in area in industrial buildings shall be permitted when enclosed in fireresistive construction as specified in article 4 for special uses and occupancies and when suggested by fire divisions of the required fireresistance specified in table 16.

302.31. Protected Exteriors.—All buildings of type 2 construction for high hazard uses (use group A) within the fire districts shall be constructed with walls of two (2) hours fireresistance when located within eleven (11) feet of interior lot lines or any buildings on the same lot.

302.4. Noncombustible Construction Exemptions.—One (1) story buildings of type 2-C construction which do not exceed three thousand (3000) square feet in area in all use groups except high hazard, assembly and institutional shall be exempt from all protected exterior wall requirements.

302.5. Frame Construction.—No building of frame construction (type 4) shall be erected within the fire districts nor shall such building or structure be moved from without to within, or from one lot to another within the fire districts, except as provided in sections 303 and 304; and no building of otherwise lawful construction shall be extended in height or area within the fire districts by frame construction; except that one- and two-family frame dwellings may be extended in area by not more than three hundred (300) square feet and to a height of not more than two and one-half (2½) stories nor more than thirty-five (35) feet.

302.6. Roof Coverings.—All roof coverings shall be constructed of class 1, class 2 or class 3 roofings, complying with the provisions of article 9.

SECTION 303.0. RESTRICTIONS OF FIRE DISTRICT NO. 1

All buildings and structures, and all additions to existing buildings and structures, hereafter erected within the boundaries of Fire District No. 1 shall be of fireproof (type 1), protected noncombustible (type 2-A and 2-B), heavy timber (type 3-A), or ordinary protected (type 3-B) construction as defined in article 2 and regulated in table 5; and shall be constructed within the height and area limitations of table 6; except as herein provided.

303.1. Fences.—Fences not over six (6) feet in height may be erected of frame (type 4) construction.

303.2. Storm Enclosures.—Storm enclosures may be erected of frame construction not more than ten (10) feet in height and not more than three (3) feet wider than the entrance doors which they serve; provided they do not project more than six (6) feet beyond the building line.

303.3. Accessory Buildings.

303.31. Outbuildings and Parking Lot Offices.—Outbuildings and parking lot offices not more than ten (10) feet in height and one hundred (100) square feet in area may be erected of frame (type 4) construction when accessory to one- or two-family dwelling on the same lot or accessory to a lot approved for motor vehicle parking, when located not less than six (6) feet from the lot line or any building.

303.32. Greenhouses.—Greenhouses and similar accessory structures may be erected of frame (type 4) construction when accessory to a one- or two-family dwelling on the same lot and when located not less than six (6) feet from interior lot lines or any building.

303.4. Sheds.—Sheds open on the long side not more than fifteen (15) feet in height nor more than five hundred (500) square feet in area may be erected of frame (type 4) construction when located not less than six (6) feet from lot lines.

303.5. Builders' Shanties and Reviewing Stands.—Temporary builders' shanties erected in connection with approved building operations, platforms, reviewing stands, and other similar miscellaneous structures may be erected of frame (type 4) construction for a limited period of time as approved by the building official.

303.6. Private Garages.—Private garages not more than one (1) story nor more than fifteen (15) feet in height when accessory to a one- or two-family dwelling may be erected of protected frame (type 4-A) construction not more than seven hundred and fifty (750) square feet in area, or of frame (type 4-B) construction not more than five hundred (500) square feet in area, when located not less than six (6) feet from interior lot lines or any building.

303.7. Bins, Tanks, Towers and Roof Structures.

303.71. Timber Construction.—Coal and material bins, water towers, tank structures and trestles may be erected of mill type heavy timber construction with dimensions not less than required for type 3-A construction, not over thirty-five (35) feet in height, when located thirty (30) feet from the interior lot lines or any building, except when located on lot lines along a railroad right of way or waterfront.

303.72. Erection on Buildings.—Aerial supports not more than twelve (12) feet in height, water tanks and flag poles may be erected of wood on buildings not more than three (3) stories nor more than forty (40) feet in height, and drip bars in cooling towers may be constructed of wood.

303.8. Motor Fuel Service Stations.—Gasoline service stations, and structures of similar business uses, not including high hazard uses, may be erected of unprotected noncombustible (type 2-C) construction within the height and area limits of use group E of table 6, provided they are located not less than eleven (11) feet from the lot line or any building.

303.9. Bus and Passenger Terminals.—Roofs over parking lots, bus and passenger terminals may be erected one story and not over twenty (20) feet in height and not more than eleven thousand (11,000) square feet in area of noncombustible (type 2-C) construction or of heavy timber mill (type 3-A) construction.

SECTION 304.0. RESTRICTIONS OF FIRE DISTRICT NO. 2

All buildings and structures hereafter erected within the boundaries of Fire District No. 2 shall be fireproof (type 1), noncombustible (type 2) or exterior masonry wall (type 3) construction as regulated by table 5 and shall be constructed within the height and area limitations of table 6; except that all the variations permitted in Fire District No. 1 shall apply to permissible construction in Fire District No. 2 with the following additional exceptions:

304.1. Dwellings.—One- and two-family dwellings (use group L-3) may be erected of protected frame (type 4-A) construction when not less than three (3) feet from interior lot lines and of unprotected frame (type 4-B) construction when not less than six (6) feet from interior lot lines within the height and area limitations of table 6. Roof coverings shall be of class 1, 2 or 3 roofings complying with the provisions of article 9.

304.2. Verandas.—Verandas, balconies, entrance porticoes and similar appurtenant structures on dwellings, not exceeding ten (10) feet in depth nor projecting more than two (2) feet above the second story floor beams may be erected of frame (type 4-B) construction provided they do not extend nearer than five (5) feet to the lot line. When connected to a similar structure of an adjoining building, they shall be separated therefrom by walls of two (2) hour fireresistance.

304.3. Boat Houses.—Boat houses not more than two (2) stories nor more than thirty (30) feet in height nor more than one thousand (1000) square feet in area may be erected of frame (type 4-B) construction.

304.4. Exterior Trim.—Wood cornices and half timbering may be erected on residence (use group L) and business (use group C, D and E) buildings; and existing openings in exterior walls of masonry enclosed buildings (type 3-A, 3-B and 3-C) which are not required for ventilation or access purposes, may be filled in with wood studs, metal lath and stucco or other approved construction of equal fireresistance.

SECTION 305.0. RESTRICTIONS OUTSIDE FIRE LIMITS

Outside the fire limits, all types of construction except as herein specifically prohibited, or for which special approval is required in connection with high hazard uses and occupancies in article 4, shall be permitted within the height and area limitations of table 6.

305.1. Lot Line Separation.—In frame construction an exterior wall erected less than six (6) feet from its adjacent lot line shall be of three-quarter (¾) hour fireresistive construction, including opening protectives except store front and window and door openings in one- and two-family dwellings, but in no case shall such wall be located less than three (3) feet from interior lot lines.

305.2. Roof Coverings.—Roof coverings shall conform to the fireresistive requirements for class 1, 2, 3 or 4 roofings complying with the provisions of sections 903 and 928.

SECTION 306.0. EXISTING BUILDINGS

306.1. Alterations.

306.11. Limitations.—Nothing in these provisions shall be deemed to prohibit alterations within the limitations of section 106 provided no unlawful change of use is involved.

306.12. Minor Changes.—Changes, alterations or repairs to the interior of a building and to the front facing a street or other public space may be permitted provided such changes in the opinion of the building official do not increase the size, or the fire hazard of the building, or endanger the public safety and are not specifically prohibited by the Basic Code.

306.13. Existing Projections.—No change or enlargement shall be made to an existing part of a building now projecting beyond the street lot line or building line where such is established by law, except in conformity to the provisions of section 312 governing new construction.

306.2. Increase in Height and Area.—It shall be unlawful to increase the height or area of an existing building or structure unless it is of a type of construction permitted for new buildings of the increased height and area and use group within the fire district in which it is located and as regulated by table 6.

306.3. Existing Excessive Area.—Any building heretofore lawfully approved which exceeds the maximum allowable area specified in table 6 may be extended if the addition is separated from the existing building by an approved fire wall or fire division meeting the requirements of article 9 and table 5 and the additional area does not exceed the limits of table 6 for the specific use group and type of construction.

SECTION 307.0. GENERAL AREA AND HEIGHT LIMITATIONS

The areas and heights of all buildings and structures between exterior walls or between exterior walls and fire walls shall be governed by the type of construction and the use group classification as defined in article 2 and shall not exceed the limits fixed in table 6 except as these may be specifically modified by other provisions of the Basic Code.

307.1. Area Limit.—The area limitations specified in table 6 shall apply to all buildings fronting on a street, or public space not less than thirty (30) feet in width accessible to a public street.

307.2. Height Limit.—The height in feet and number of stories specified in table 6 shall apply to all buildings and to all separate parts of a building enclosed within lawful fire walls complying with the provisions of article 9.

307.3. Multi-Story Buildings.—Buildings two (2) stories in height may be built to the same area limits provided in table 6 for one-story buildings. In buildings over two (2) stories in height, the area limits of table 6 for one-story buildings shall be reduced for each story of height over two (2) stories in all use groups as herein specified:

1½-hour protected noncombustible construction (Type 2-A)	1/20
All other types of construction (Types 2-B, 2-C, 3-A, 3-B, 3-C, 4-A and 4-B)	
3-story	1/5
Over 3-story	1/10

SECTION 308.0. AREA EXCEPTIONS

The provisions of this section shall modify the area limits of table 6 as herein specified.

308.1. Street Frontage Increase.—When a building or structure has more than twenty-five (25) per cent of the building perimeter fronting on a street or other accessible unoccupied space not less than thirty (30) feet in width leading to a street, the tabular areas may be increased two (2) per cent for each one (1) per cent of such excess frontage.

308.2. Sprinkler Increase.—When a building of low hazard or moderate hazard storage, or mercantile, industrial or business use group is equipped with an approved one-source automatic sprinkler system, unless such sprinkler system is required by the provisions of article 4 or article 12 for structures of special use and occupancy, the tabular areas may be increased by two hundred (200) per cent for one (1) story buildings and one hundred (100) per cent for buildings more than one (1) story in height.

308.3. Maximum Total Area.—The maximum total area under the combined provisions of sections 308.1 and 308.2 shall not exceed three and one-half (3½) times the tabular area in table 6.

SECTION 309.0. UNLIMITED AREAS

309.1. One-Story Buildings.—In other than frame construction, the area of all buildings of assembly (use group F-3), business, industrial, mercantile and storage use groups not including high hazard uses, which do not exceed one (1) story or eighty-five (85) feet in height shall not be limited outside the fire limits; provided the exit facilities comply with the provisions of section 604, an automatic sprinkler system is provided complying with the provisions of section 1213.19 and the building is isolated as specified in section 309.2, except that a sprinkler system shall not be required for buildings of type 2 or type 3A construction used exclusively for storage of noncombustible material not packed or crated in combustible material or as exempt by section 206.2 for special industrial uses.

309.11. School Buildings.—Outside the fire districts one-story school buildings of type 2, 3A, and 3B construction may be unlimited in area when a direct exit to the outside of the building is provided from each classroom and the building is equipped with an approved automatic sprinkler system throughout. A fire separation shall be provided on all sides of such buildings as specified in section 309.2.

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309.2. Fire Separation.—The minimum fire separation on all sides of one-story buildings of unlimited area shall be determined by the type of construction as herein specified:

Fireproof construction (types 1-A and 1-B)	30 feet
Noncombustible, 1½ hour protected (type 2-A)	30 feet
Noncombustible, ¾ hour protected (type 2-B)	40 feet
Noncombustible, unprotected (type 2-C)	50 feet
Exterior masonry, heavy timber (type 3-A)	40 feet
Exterior masonry, protected ordinary (type 3-B)	40 feet
Exterior masonry, unprotected ordinary (type 3-C)	50 feet

SECTION 310.0. HEIGHT EXCEPTIONS

310.1. Roof Structures.—In applying the provisions of the Basic Code governing height limits, the following appurtenant structures shall not be included in the height of the building: roof tanks and their supports; ventilating, air conditioning and similar building service equipment; roof structures other than penthouses; chimneys and parapet walls not exceeding four (4) feet in height; unless the aggregate area of such structures including penthouses, exceeds one-third (⅓) of the area of the roof of the building upon which they are erected.

310.2. Automatic Sprinklers.—Except in buildings where automatic sprinkler equipment is a requirement of article 4 or article 12 for special uses or occupancies, all structures of fireproof (type 1), noncombustible (type 2), and exterior masonry wall (type 3) construction, designed for business, industrial, mercantile, low or moderate hazard storage uses may be erected one (1) story or twenty (20) feet higher than specified in table 6 when equipped with an approved one-source automatic sprinkler system.

SECTION 311.0. STREET ENCROACHMENTS

Except as herein provided, no part of any building hereafter erected and no additions to an existing building heretofore erected shall project beyond the lot lines or beyond the building line when such line is established by the zoning law or any other statute controlling building construction.

311.1. Below Grade.—No part of a building hereafter erected below grade that is necessary for structural support of the building shall project beyond the lot lines except that the footings of street walls or their supports located at least eight (8) feet below grade may project not more than twelve (12) inches beyond the street lot line.

311.2. Above Grade.—All projections hereafter permitted beyond the street lot line or the building line above grade shall be so constructed as to be readily removable without endangering the safety of the building.

311.3. Projections Necessary for Safety.—In any specific applications, the building official may designate by approved rules such architectural features and accessories which are deemed desirable or necessary for the health or safety of the public and the extent to which they may project beyond the street lot line or the building line where such is established by statute, subject to all provisions and restrictions that may be otherwise prescribed by law, ordinance or rule of the authorities having jurisdiction over streets or public spaces.

311.4. Permit Revocable.—Any permit granted or permission expressed or implied in the provisions of the Basic Code to construct a building so as to project beyond the street lot line or building line shall be revocable by the municipality at will.

311.5. Existing Encroachments.—Parts of existing buildings and structures which already project beyond the street lot line or building line may be maintained as constructed until their removal is directed by the proper municipal authorities.

SECTION 312.0. PERMISSIBLE STREET PROJECTIONS

Subject to such provisions as may be otherwise prescribed by law or ordinance, or by rule of the municipal authorities having jurisdiction over streets, highways, and public spaces, the following projections shall be permitted beyond the street lot line or the building line, as the case may be:

312.1. Main cornices or roof eaves located at least twelve (12) feet above the curb level shall project not more than three (3) feet;

312.2. Belt courses, lintels, sills, architraves, pediments and similar architectural decorations shall project not more than four (4) inches when less than ten (10) feet above the curb level, and not more than ten (10) inches when ten (10) feet or more above the curb level;

312.3. Ornamental columns, or pilasters including the bases and moldings which emphasize the main entrance of the building shall project not more than twelve (12) inches;

312.4. Entrance steps shall project not more than twelve (12) inches and shall be guarded by cheek pieces not less than three (3) feet high or shall be located between ornamental columns or pilasters;

312.5. Oriel windows with the lowest portion at least ten (10) feet above the curb level shall project not more than two and one-half (2½) feet;

312.6. Balconies located at least ten (10) feet above the curb level shall project not more than three (3) feet except that when the balcony is required in connection with a fire escape or exterior stairway as a means of egress, the projection may be increased, but not to exceed four (4) feet.

312.7. Awnings and Marquees.

312.71. Awnings.—Retractable or fixed awnings shall have clearances above the grade, and shall be installed in accordance with the requirments of section 315.

312.72. Marquees.—For the purpose of this section a marquee shall include any object or decoration attached to or a part of said marquee.

1 — Projection and Clearance.—The horizontal clearance between a marquee and the curb line shall be not less than two (2) feet. A marquee projecting more than two-thirds (⅔) of the distance from the property line to the curb line shall be not less than ten (10) feet above the ground or pavement below.

2 — Thickness.—The maximum height or thickness of a marquee measured vertically from its lowest to its highest point shall not exceed three (3) feet when the marquee projects more than two-thirds (⅔) of the distance from the property line to the curb line and shall not exceed nine (9) feet when the marquee is less than two-thirds (⅔) of the distance from the property line to the curb line.

3 — Roof Construction.—The roof or any part thereof may be a skylight of approved plastics, or wired glass not less than one-fourth (¼) inch thick with no single pane more than eighteen (18) inches wide. Every roof and skylight of a marquee shall be sloped to downspouts which shall conduct any drainage from the marquee in a manner not to spill over the sidewalk.

4 — Location Prohibited.—Every marquee shall be so located as not to interfere with the operation of any exterior standpipe or to obstruct the clear passage of stairways or exits from the building or the installation or maintenance of street lighting.

5 — Construction.—A marquee shall be supported entirely from the building and constructed of noncombustible material. Marquees shall be designed and constructed to withstand wind or other lateral loads and live loads as required in article 7 of the Basic Code. Structural members shall be protected to prevent deterioration as required by article 8.

312.8. Awning covers or boxes located at least eight (8) feet above the curb level shall project not more than three (3) feet.

312.9. Vaults below the sidewalk level shall extend not closer than three (3) feet to the curb line; and the construction and use of such vaults shall be subject to the terms and conditions of the municipal authority or legislative body having jurisdiction.

312.91. Areaways.—Areaways shall not project beyond the street lot line more than four (4) feet; provided that every such areaway shall be covered over at the street grade by an approved grating of metal or other noncombustible material.

SECTION 313.0. PERMISSIBLE YARD AND COURT ENCROACHMENTS

No part of any building or structure shall extend into side courts, inner courts or yards required for light and ventilation of habitable and occupiable rooms by the provisions of article 5, or of the zoning law or other statutes controlling building construction, except as hereinafter provided; but in no case shall the encroachment exceed twenty (20) per cent of the legal area of yard or court required for light and ventilation purposes.

313.1. Roof eaves shall project not more than three (3) feet beyond the face of the wall.

313.2. Steps and Architectural Features.—Steps, window sills, belt courses and similar architectural features, rain leaders and chimneys shall project not more than two (2) feet beyond the face of the wall.

313.3. Exterior Stairways and Fire Escapes.—Outside stairways, fire tower balconies, fire escapes or other required means of egress shall project not more than four (4) feet beyond the face of the wall.

SECTION 314.0. SPECIAL AND TEMPORARY PROJECTIONS

314.1. Alley Projections.—The permissible projection beyond street lot lines shall apply in general to building projections into alleyways except as may be modified by the local administrative authority having jurisdiction or by special deed restriction.

314.2. Special Permits.—When authorized by special permit, vestibules and storm doors may be erected for periods of time not exceeding seven (7) months in any one year, and shall project not more than three (3) feet nor more than one-fourth (¼) the width of the sidewalk beyond the street lot line. Temporary entrance awnings may be erected with a minimum clearance of seven (7) feet to the lowest portion of the hood or awning when supported on removable steel or other approved noncombustible supports.

SECTION 315.0. AWNINGS AND CANOPIES

315.1. Permit.—A permit shall be obtained from the building official for the erection, repair or replacement of any fixed awning, canopy or hood except as provided in section 315.11, and for any retractable awning located at the first story level and extending over the public street or over any portion of a court or yard beside a building serving as a passage from a required exit to a public street.

315.11. Exemption from Permit.—No permit shall be required for the erection, repair or replacement of fixed or retractable awnings installed on one- and two-family dwellings, unless they project over public property, or for retractable awnings installed above the first story or where the awning does not project over the public street or over any court or yard serving as a passage from a required exit to a public street.

315.2. Installation of Awnings.

315.21. Retractable Awnings.—There shall be a minimum clearance of seven (7) feet from the sidewalk to the lowest part of the framework or any fixed portion of any retractable awning, except that the bottom of the valance of canvas awnings may extend to six (6) feet nine (9) inches above the sidewalk. Retractable awnings shall be securely fastened to the building and shall not extend closer than twelve (12) inches from the curb line. They shall be equipped with a mechanism or device for raising and holding the awning in a retracted or closed position against the face of the building.

315.22. Fixed or Permanent Awnings.—The clearance from the sidewalk to the lowest part of any fixed or permanent awning shall be the same as required in section 315.21 for retractable awnings. Fixed or permanent awnings installed above the first story shall not project more than four (4) feet.

315.3. Canopies.—Canopies shall be constructed of a metal framework, with an approved covering, attached to the building at the inner end and supported at the outer end by not more than two (2) stanchions with braces anchored in an approved manner and placed not less than two (2) feet in from the curb line. The horizontal portion of the framework shall be not less than eight (8) feet nor more than twelve (12) feet above the sidewalk and the clearance between the covering or valance and the sidewalk shall be not less than seven (7) feet. The width of canopies shall not exceed eight (8) feet.

315.4. Special Applications of Awnings.—Rigid awnings supported in whole or part by members resting on the ground and used for patio covers, car ports, summer houses or other similar uses shall comply with the requirements of section 315.5 for design and structure. Such structures shall be braced as required to provide rigidity.

315.5. Design and Construction.—Fixed awnings, canopies, and similar structures shall be designed and constructed to withstand wind or other lateral loads and live loads as required by article 7 of the Basic Code with due allowance for shape, open construction and similar features that relieve the pressures or loads. Structural members shall be protected to prevent deterioration.

ARTICLE 4

SPECIAL USE AND OCCUPANCY REQUIREMENTS

SECTION 400.0. SCOPE

In addition to the general requirements of the Basic Code governing the location, construction and equipment of all buildings and structures and the fireresistive, height and area limitations of tables 5 and 6, the provisions of this article shall control all buildings and structures designed for high hazard uses and occupancies which involve extreme fire, smoke, explosion or toxic gas risks, and places of assembly in which people congregate in large numbers and which are susceptible to panic incidental to crowds. Except as herein specifically provided, the applicable standards listed in appendix B shall be deemed to comply with the requirements of this article.

Chemical plants, packing plants, grain elevators, refineries, flour mills and other special structures may be constructed in accordance with the recognized practices and requirements of the specific industry. The building official may permit such variations from the requirements of the Basic Code which will secure reasonable and economical construction with the necessary fire, life and property safeguards. In granting such variations, due regard shall be given to the isolation of the structure and fire hazard from and to surrounding property.

400.1. Uses Involving Explosion Hazards.—The provisions of this article shall apply to all uses involving the storage, manufacture, handling or filling of flammable and volatile solids, liquids or gases which generate combustible and explosive air-vapor mixtures and toxic gases including nitrocellulose film; pyroxylin plastics; grain and other combustible dusts and pulverized fuels; combustible fibers; pyroxylin lacquer spraying operations; liquefied petroleum gases; alcohol, ether and gasoline; flammable dusts and residues resulting from fabrication, grinding and buffing operations, and all other explosion hazard risks.

400.2. Special High Hazards.—When necessary to resist a higher degree of fire severity than specified herein, for high concentrations of combustible contents and for buildings of high hazard uses which exceed five stories or sixty-five feet in height, the building official may exceed the requirements of table 5 governing the fireresistance ratings of types of construction and protection of structural elements.

400.3. Exit Facilities.—The exit facilities of buildings for hazardous uses and occupancies shall conform to the requirements of article 6, except as may be modified by more restrictive provisions of this article for specific uses.

400.4. Heating and Venting.—The requirements herein prescribed for the installation of heating and venting appliances and equipment for high hazard uses and occupancies shall be construed as supplemental to the provisions of article 5, 10, 11 and 18.

400.5. Light and Electric Wiring.—Wherever flash fires and explosion hazards are involved, all artificial lighting shall be restricted to

incandescent electric lights or other approved lighting with keyless sockets and dust-tight, vapor-proof globes protected against mechanical injury. All wiring in vaults or compartments for the storage of highly flammable materials shall be in metal or other approved conduit complying with the provisions of article 15 and the National Electrical Code.

400.6. Boiler and Hazardous Equipment Rooms.—Boilers and other equipment or devices, including breechings which involve flame or spark producing apparatus shall not be exposed to fire or explosive-hazard gases, vapors or volatile flammable liquids. Such rooms and equipment shall be segregated by construction of not less than two (2) hour fireresistance except as may be required for specific uses, without openings in the enclosure walls and with means of direct entrance and exit from the exterior, or such equipment shall be located in accessory structures segregated from the main building.

400.7. Fire-Fighting and Extinguishing Equipment.—All buildings designed for specific hazardous uses shall be protected with approved automatic sprinkler systems or such other fire-extinguishing and auxiliary equipment as herein provided and in accordance with the requirements of article 12.

400.8. Segregation of Storage Spaces.—All rooms and spaces used for the storage of volatile and flammable materials shall be separately enclosed and segregated with fireresistive construction as herein required for specific uses and occupancies.

400.9. Restricted Locations.—Except as otherwise specifically provided in section 302.3, no high hazard uses shall be located in Fire District No. 1 nor in a building of unprotected frame (type 4-B) construction, nor in any case within two hundred (200) feet of the nearest wall of a building classified in a public assembly or institutional use group.

SECTION 401.0. DEFINITIONS

airplane hangar, private. A hangar for the storage of four (4) or less single motor planes and in which no volatile or flammable oil is handled, stored or kept other than that contained in the fuel storage tank of the plane.

—public. A building for the storage, care or repair of private or commercial airplanes not included in the term *private airplane hangar.*

exit court. An exterior unoccupied space which is open to the sky for its entire area, located on the same lot with a theatre or other assembly building which it serves exclusively as an unobstructed exit to the street or other public space.

flammable. (volatile flammable). A liquid mixture or compound which will generate a flammable vapor at a temperature below seventy-five (75) degrees F. when tested in a standardized ASTM closed-cup tester, or below eighty (80) degrees F. with an ASTM open-cup tester.

foyer. The enclosed space surrounding or in the rear of the auditorium of a theatre or other place of assembly which is completely shut off from the auditorium and is used as an assembly or waiting space for the occupants.

fuel oil. A liquid mixture or compound derived from petroleum which does not emit flammable vapor below a temperature of one hundred and twenty-five (125) degrees F. in a Tag closed-cup tester.

garage, private. A garage for four (4) or less passenger motor vehicles with no provision for repairing or servicing such vehicles for profit.

garage, public. A building or structure for the storage, parking, care or repair of five (5) or more motor vehicles not included in the term garage, private. Public garages shall be classified according to their specific use in one (1) of the following groups:

—group 1. Buildings used for parking, storage, repair or painting of passenger or commercial vehicles, trucks or buses, including fleets of motor vehicles, operated by utilities, large businesses, mercantile or similar concerns; and in which gasoline, oil, and similar products may be dispensed for the servicing of such vehicles;

—group 2. Buildings used exclusively for the parking or storing of passenger vehicles that will accommodate not more than nine (9) passengers, and in which gasoline, oil and similar products may be dispensed for the servicing of such vehicles.

grandstand. Any structure, except movable seating and sectional benches, intended primarily to support individuals for the purposes of assembly, but shall not apply to the permanent seating in theatres, churches, auditoriums and similar buildings.

kerosene. An oil or liquid product of petroleum which does not emit a flammable vapor below a temperature of one hundred and fifteen (115) degrees F. when tested in a Tag closed-cup tester.

lobby. The enclosed vestibule between the principal entrance to the building and the doors to the main floor of the auditorium or assembly room of a theatre or place of assembly or to the main floor corridor of a business building.

mobile home. A one-family dwelling unit of vehicular, portable design built on a chassis and designed to be moved from one site to another and to be used without a permanent foundation.

motor fuel service station. A structure, building or premise or any portion thereof where a flammable fluid is stored, housed or sold for supply to motor vehicles.

motor vehicle repair shop. A building, structure or enclosure in which the general business of repairing motor vehicles is conducted including a public garage.

parking structure, open. A structure for the parking of passenger cars wherein two (2) or more sides of such structure are not less than fifty (50) per cent open on each floor or level for fifty (50) per cent of the distance from the floor to the ceiling and wherein no provision for the repairing of such vehicles is made. Such open parking structures are not classified as public garages, but shall comply with the requirements of section 905.2.

pyroxylin plastic. Any nitro-cellulose product or compound soluble in a volatile, flammable liquid, including such substances as celluloid, pyroxylin, fiberloid and other cellulose nitrates (other than nitrocellulose film) which are susceptible to explosion from rapid ignition of the gases emitted therefrom.

stage. A portion of a place of assembly or building which is used for presentation of plays and other entertainments, wherein scenery, drops or other effects may be installed or used, and where the distance between the top of the proscenium opening and the ceiling of the stage is more than five (5) feet.

travel trailer. A vehicular, portable structure built on a chassis and designed to be used for temporary occupancy for travel, recreational or vacation use; with the manufacturer's permanent identification "Travel Trailer" thereon; and when factory equipped for the road, being of any length provided its gross weight does not exceed forty-five hundred (4500) pounds, or being of any weight provided its overall length does not exceed twenty-eight (28) feet.

SECTION 402.0. EXPLOSION HAZARDS

Every structure, room or space occupied for uses involving explosion hazards shall be equipped and vented with explosion relief systems and devices arranged for automatic release under predetermined increase in pressure as herein provided for specific uses or in accordance with accepted engineering standards and practice.

402.1. Venting Devices.—Venting devices to relieve the pressure resulting from explosive air-vapor mixtures shall consist of windows, skylights, vent flues or releasing roof or wall panels which discharge directly to the open air or to a public place or other unoccupied space not less than twenty (20) feet in width on the same lot. Such releasing devices shall be so located that the discharge end shall be not less than ten (10) feet vertically and twenty (20) feet horizontally from window openings or exterior exit stairs or balconies in the same or adjoining buildings or structures. The exhaust shall always be in the direction of least exposure and never into the interior of the building.

402.2. Area of Vents.—The aggregate clear vent relief area shall be regulated by the type of construction of the building and shall be not less than herein prescribed:

Heavy reinforced concrete frame	1 square foot for 80 cubic feet of volume
Light structural steel frame and ordinary construction	1 square foot for 65 cubic feet of volume
Light wood frame construction	1 square foot for 50 cubic feet of volume

In no case shall the combined area of open windows, pivoted sash or wall panels arranged to open under internal pressure be less than ten (10) per cent of the area of the enclosure walls, with not less than fifty (50) per cent of the opening arranged for automatic release.

402.3. Construction of Vents.—All explosion relief devices shall be of an approved type constructed of light weight, noncombustible and corrosion-resistive materials, and the discharge end shall be protected with approved screens of not more than three-quarter (¾) inch mesh, arranged to blow out under relatively low pressures.

SECTION 403.0. VOLATILE FLAMMABLES

403.1. Process Storage.

403.11. Inside Storage.—Unless otherwise approved by the fire official inside storage in process rooms shall be limited to one day's supply in approved sealed containers of not more than five (5) gallon capacity or in approved steel barrels or drums of not more than fifty-five (55) gallon capacity.

403.12. Handling.—Discharge or filling operations shall be by pump through an approved system of securely attached and continuous piping or hose lines. In processes requiring the use of open vats or mixing tanks, an approved mechanical ventilating system shall be provided to remove the vapors or to produce a vapor mixture of not more than one (1) per cent concentration.

403.13. Construction of Enclosures.—Process rooms shall be separated from other uses and occupancies by walls, floors and ceilings of not less than two (2) hours fire-resistance with one and one-half (1½) hour fire doors or the approved labeled equivalent complying with article 9. The interior door openings shall be provided with noncombustible sills not less than six (6) inches high and the room shall be vented as required in section 402. Floors shall be waterproofed and drained to comply with section 874.

403.14. Fire Protection.—First aid fire appliances and automatic sprinklers or other extinguishing equipment shall be provided in accordance with article 12 and the standards listed in appendix I. Provision shall be made to prevent leaking flammable vapors from being exposed to open flames, fire or sparks.

403.2. Main Storage.—Main storage systems of volatile flammable liquids shall be constructed and installed in accordance with the applicable standards listed in appendix B. Such storage may be either outside underground, outside aboveground, inside underground, or outside storage house. No bulk storage tank shall be located less than three hundred (300) feet from any building of assembly (use group F) or institutional (use group H) uses.

403.21. Outside Underground System.—Outside tanks shall be buried underground below the basement level of adjacent buildings, with the top of the tanks not less than two (2) feet below grade or with a reinforced concrete or other approved structural cover not less than four (4) inches thick and a twelve (12) inch earth cover. The maximum capacity of such tanks shall be limited by their location in respect to adjacent buildings which are not an essential part of the installation and adjacent lot lines as provided in table 7-A.

TABLE 7-A.—CAPACITY OF OUTSIDE UNDERGROUND TANKS FOR VOLATILE FLAMMABLE LIQUIDS

Fire separation in feet	Quantity of storage in gallons
50	Unlimited
40	50,000
30	20,000
25	12,000
20	6,000
10	3,000

When within ten (10) feet of any building not an essential part of the installation, and the top of the tank is above the lowest floor of the building, the capacity of the tank shall be not more than five hundred and fifty (550) gallons.

The capacity of storage of combustible liquids other than volatile flammable as herein defined shall be restricted to five (5) times the values specified in table 7-A.

403.22. Outside Aboveground System.—Aboveground tanks shall be located only outside Fire District No. 1; and the capacity, location, construction and exposures shall be subject to special approvals of the building official and the fire official; but in no case shall the fire separation be less than specified in table 7-B.

TABLE 7-B.—CAPACITY OF OUTSIDE ABOVEGROUND TANKS FOR VOLATILE FLAMMABLE LIQUIDS

Fire separation in feet	Quantity of storage in gallons
50	50,000
40	30,000
30	24,000
20	12,000

403.23. Inside Underground System.—Inside underground tanks shall be located not less than two (2) feet below the level of the lowest floor of the building in which located or any other building within a radius of ten (10) feet of the tank. In no case shall such tanks be located under the sidewalk or beyond the building line. It shall be unlawful to cover any tanks from sight until after inspection and test and written approval of the building official. The maximum limit of individual tank capacity shall be not more than five hundred and fifty (550) gallons and the entire system shall be subject to special approval of the building and fire officials.

403.24. Outside Storage House.—All outside storage houses shall be constructed of noncombustible (type 2) construction or better. No opening shall be permitted in the enclosure walls within eleven (11) feet of adjoining property lines or with a fire exposure of less than eleven (11) feet from any building or structure not part of the installation.

403.25. Special Restrictions.—The building official may require greater fire separations or he may limit storage capacities under severe exposure hazard conditions when necessary for public safety.

SECTION 404.0. INSPECTION OF HAZARDOUS USES AND PLACES OF ASSEMBLY

404.1. Operation and Maintenance.—All buildings and structures involving the use and handling of flammable liquids and gases and other hazardous uses shall be inspected at intervals of not more than three (3) months by the fire official in respect to the operation, equipment, housekeeping and general fire safety conditions and to determine proper fire-fighting procedure in the event of fire. Such inspection shall be made to insure compliance with the provisions of the Basic Code exclusive of structural

requirements; and in respect to protection against fire and panic; maintenance of exitways and operation of fire door assemblies; first aid and fire-extinguishing devices; standpipes; hydrant and sprinkler systems; fire-alarm, signaling and central station alarm systems; conduct of fire drills and fire brigades; and all special fire-extinguishing equipment in accordance with the rules and regulations of the administrative official.

404.2. Housekeeping.—Periodic inspections of existing uses and occupancies shall be made to insure maintenance of good housekeeping conditions including the removal of waste and rubbish; safe arrangement and storage of merchandise and other contents; proper segregation of hazardous processes; handling of volatile flammables; avoidance of dangerous congestion and maintenance of required exitways clear of obstructions; and the safe operation of all places of public assembly in which combustible scenery and hazardous equipment are in use while open to the public.

404.3. Coordination of Inspections.—The building, fire, and health officials and other administrative agencies of the municipality to whom the authority is delegated to inspect buildings and structures in respect to the maintenance of safe conditions of use and occupancy shall immediately notify the respective official of any violation of the provisions of the Basic Code or the fire prevention and health rules and regulations.

SECTION 405.0. SPECIAL PERMITS AND CERTIFICATES OF FITNESS

405.1. Special Permits.—No hazardous or dangerous industry, trade, occupation or use which involves the transportation, storage or handling of explosive, flammable, combustible or other substance involving fire or life hazards shall be conducted without a permit from the fire official prescribing the conditions and requirements necessary to secure the public safety.

405.2. Certificate of Fitness.—Before any equipment involving fire or life hazard is placed in operation, the supervisor or operator shall secure a certificate of fitness from the administrative official certifying to the qualifications of the person to whom such certificate is issued. Certificates of fitness shall be required for the operation of boilers and unfired pressure vessels as specified in section 1105; the operation and care of standpipe, fire pump and other fire-protection equipment as specified in section 1205; and for the conduct of all high hazard uses involving the storage, use or handling of flammable volatile liquids, materials and mixtures, liquefied gases and compressed gases under a pressure of more than fifteen (15) pounds per square inch, and all acid and liquid chemicals of a combustible and explosive character. All certificates of fitness may be terminated for cause at any time, and shall be renewed at intervals of not more than one (1) year.

SECTION 406.0. EXISTING BUILDINGS

406.1. Special Permit for Existing Uses.—Any existing hazardous use which was heretofore authorized by a permit issued under the provisions of law or the regulations of the fire official may be continued by special permit provided the continuance of such use or occupancy does not endanger the public safety.

406.2. Existing Use Prohibited.—No existing building of frame (type 4) construction which is more than two (2) stories in height or more than five thousand (5000) square feet in area; or of nonfireproof (type 3) construction which is more than four (4) stories in height shall be continued in use or hereafter occupied for the manufacture of pyroxylin plastics or similar materials of high fire hazard and explosive characteristics.

406.3. Places of Assembly.

406.31. Change of Use.—No existing building or structure or part thereof shall be altered or converted into a place of assembly unless it complies with all provisions of the Basic Code applicable to places of public assembly hereafter erected.

406.32. Existing Use Altered.—When an existing building or structure heretofore used as a place of public assembly is altered and the cost of such alteration is more than fifty (50) per cent of the physical value of the building as defined in section 106.7, all provisions of the Basic Code relating to new places of public assembly shall be complied with. When the cost of such alteration is less than fifty (50) per cent of the physical value of the building, such alterations shall comply as nearly as is practicable with the provisions of the Basic Code which govern the arrangement and construction of seats, aisles, passageways, stage and appurtenant rooms, fire-fighting and extinguishing equipment and the adequacy of exits.

406.33. Increase in Occupancy Load.—Whenever the occupancy load of an existing place of public assembly is increased beyond the approved capacity of its exitways, the building or part thereof shall be made to comply with the requirements for a new building hereafter erected for such public assembly use.

406.4. Swimming Pools.

406.41. Change of Use.—No existing pool used for swimming or bathing or accessory equipment or part thereof shall be altered or converted for any other use unless it complies with all provisions of the Basic Code applicable to the use intended.

406.42. Continuation of Existing Use.—Existing swimming pools may be continued without change, provided the safety requirements of section 429.8 are observed where required by the building official.

SECTION 407.0. LIQUEFIED PETROLEUM GASES

The provisions of this section shall apply to the design, construction, location, installation and operation of propane, butane and other petroleum gases, normally stored in the liquid state under pressure for use in all buildings and structures. Refineries, tank farms and utility gas plants shall be subject to special approvals in accordance with accepted engineering practice as defined in appendix B.

407.1. Classification of Systems.—Systems for the storage and use of liquefied petroleum gases shall be classified as: cylinder or bottled gas systems; aboveground tank systems other than bottled gas; and underground tank systems.

407.2. Bottled Gas.—No container or cylinder of bottled gas for domestic or commercial use shall exceed twelve hundred (1200) gallon equivalent water capacity; and such container shall be tested and approved by an accredited testing authority and shall be identified in accordance with the Interstate Commerce Commission regulations. The cylinders shall be installed above ground, with valves, flexible connection, piping and safety devices in accordance with the approved rules; except that such containers when approved by the building official, may be installed for use inside buildings for industrial purposes or in connection with construction, repair, or alteration operations.

407.3. Aboveground Tank Systems Other Than Bottled Gas.—All aboveground tank systems other than cylinder or bottled gas shall be located with respect to lot lines and adjacent buildings on the same lot as specified in table 8-A. The tanks shall be constructed and tested in accordance with the regulations of section 1126 for unfired pressure vessels; and the installation, valves, accessories, piping, vaporizers and safety devices shall be in accordance with accepted engineering practice. No bulk storage shall be permitted within the fire districts.

TABLE 8-A.—CAPACITY OF ABOVEGROUND LIQUEFIED GAS CONTAINERS

Minimum fire separation in feet	Distance between tanks in feet	Maximum equivalent water capacity in gallons
Less than 10	Prohibited	125
10	3	500
25	3	1,200
50	5	30,000

407.31. Special Restrictions.—The building official may require greater fire separations or greater limitations of storage capacities when necessary for public safety.

407.4. Underground Tank Systems.—Underground tank systems shall be buried at least two (2) feet below grade. When required, such tanks shall be anchored or weighted to prevent floating. All containers shall be given an approved protective coating of hot dip galvanizing, red lead and asphalt, or other approved corrosion-resistive protection. The fire separation from lot lines and other buildings on the same lot shall comply with table 8-B.

TABLE 8-B.—CAPACITY OF UNDERGROUND LIQUEFIED GAS CONTAINERS

Minimum fire separation in feet	Maximum equivalent water capacity in gallons
Less than 10	125
10	500
25	1,200
30	30,000

407.5. Labeling.—All inlet and outlet connections except safety relief valves, level and pressure gages shall be labeled to designate whether they communicate with vapor or liquid space and the tanks shall be marked with a securely attached label and nameplate identifying the system, working pressure, vapor pressure of the contents and permissible liquid level in accordance with accepted engineering practice.

407.6. Instructions.—Complete installation, operation and maintenance instructions shall be supplied for the personnel responsible for the use of the system.

407.7. Electric Wiring.—All electric installations in vaporizer and pump houses, cylinder filling rooms and similar locations shall comply with article 15 and the National Electrical Code; and all aboveground tanks exceeding twelve hundred (1200) gallons equivalent water capacity shall be electrically grounded as therein provided.

SECTION 408.0. PYROXYLIN PLASTICS

The provisions of this section shall regulate all buildings, structures and parts thereof used for the storage, handling or fabrication of pyroxylin plastic whether in raw material, process, finished product or scrap.

408.1. Exceptions.—The provisions of this section shall not apply to the manufacture, use or storage of nitro-cellulose film or the incidental storage of articles manufactured from pyroxylin plastics offered for sale in mercantile buildings. (See section 205.)

408.2. Restrictions.—No permit for the storage or manufacture of pyroxylin plastics,, except as specified in section 408.1, shall be issued for a building or structure hereafter erected, altered or used which is occupied or located as follows:

408.21. Place of Assembly.—Within fifty (50) feet of the nearest wall of a school, theatre or other place of public assembly;

408.22. Residential Building.—As a residential building, use groups L-1, L-2 or L-3;

408.23. High Hazard Uses.—In quantities exceeding one thousand (1000) pounds in buildings where paints, varnishes or lacquers are manufactured, stored or kept for sale; or where matches, resin, oils, hemp, cotton or any explosives are stored or kept for sale;

408.24. Other Flammable Materials.—Where drygoods, garments or other materials of a highly flammable nature are manufactured in any portion of the building above that used for nitro-cellulose products;

408.25. Tenant Factory Building.—In quantities exceeding one hundred (100) pounds in any tenant factory building (use group D) in which more than five (5) people are employed or likely to congregate on one floor at any one time.

408.3. Inside Storage.—All pyroxylin raw material and products intended for use in further manufacture shall be stored as herein provided:

408.31.—Cabinets. Quantities of more than twenty-five (25) pounds and not more than five hundred (500) pounds shall be stored in approved cabinets constructed of noncombustible materials but in no case shall the total quantity of storage be more than one thousand (1000) pounds in any workroom or space enclosed in floors, walls and ceilings of not less than two (2) hours fireresistance;

408.32.—Vaults. Quantities of more than one thousand (1000) pounds and not more than ten thousand (10,000) pounds shall be stored in vaults

enclosed in floors, walls and ceilings of not less than four (4) hours fire-resistance. The interior storage volume of the vault shall be not more than fifteen hundred (1500) cubic feet and the vault shall be constructed vapor and gastight in accordance with the approved rules, with one and one-half (1½) hour vapor-tight fire doors or the approved labeled fire door assembly equivalent on each side of the door opening. The vault shall be drained and provided with scuppers;

408.33. Tote Boxes and Scrap Containers.—During manufacture, pyroxylin materials and products not stored in finished stock rooms, cabinets or vaults shall be kept in approved covered noncombustible tote boxes. Scrap and other refuse material shall be collected in approved noncombustible containers in quantities not greater than three hundred and fifty (350) pounds and removed at frequent intervals as directed by the fire official;

408.34. Ventilation.—Each separate compartment in storage vaults shall be vented directly to the outer air through flues complying with the requirements of article 10 for low temperature chimneys, or exterior metal smokestacks, or as otherwise provided in the approved rules. The vent shall discharge not less than four (4) feet above the roof of the building or on a street, court or other open space not less than fifty (50) feet distant from any other opening in adjoining walls which are not in the same plane, nor nearer than twenty-five (25) feet vertically or horizontally to an exterior exit stairway or fire escape. The area of the vent shall be not less than one (1) square inch for each seven (7) pounds of pyroxylin stored;

408.35. Structural Strength.—The floors, walls, roof and doors of all vaults, structures or buildings used for the storage or manufacture of pyroxylin materials and products shall be designed to resist an inside pressure load of not less than three hundred (300) pounds per square foot;

408.36. Fire Protection.—Vaults located within buildings for the storage of raw pyroxylin shall be protected with an approved automatic sprinkler system having not less than one (1) head to each twelve (12) square feet of protected area. When vaults are subdivided into two (2) or more sections, not less than one (1) head shall be provided in each section.

408.4. Isolated Storage Buildings.—Pyroxylin products in quantities greater than permitted for interior storage shall be housed in isolated storage buildings. Such buildings shall be used for no purpose other than packing, receiving, shipping and storage of pyroxylin plastics unless otherwise approved by the building official.

408.41. Capacity.—The maximum storage in any fire area enclosed in construction of four (4) hours fireresistance shall be not greater than one hundred thousand (100,000) pounds. The storage capacity of the building and its separation from lot lines and other buildings on the same lot shall be limited as provided in table 9. When equipped with an approved automatic sprinkler system complying with the provisions of article 12 and as herein modified, the exposure distances may be decreased fifty (50) per cent. Such systems shall be provided with not less than one (1) automatic sprinkler head for each thirty-two (32) square feet of protected area.

TABLE 9.—EXPOSURE DISTANCE FOR PYROXYLIN STORAGE BUILDINGS

Maximum quantity stored in pounds	Fire separation from lot line or other buildings in feet
1,000	40
2,000	50
3,000	60
4,000	70
5,000	80
10,000	100
20,000	125
30,000	150
40,000	160
50,000	180
75,000	200
100,000	225
150,000	250
300,000	300

408.5. Fire Protection.

408.51. Heating Equipment.—All radiators, heating coils, piping and heating apparatus shall be protected with approved noncombustible mesh to maintain a clearance of six (6) inches of all pyroxylin products from such equipment. All piping and risers within six (6) feet of the floor shall be insulated with approved noncombustible covering unless protected with wire guards.

408.52. Lighting Control.—All lighting shall comply with the provisions of section 400.5 and shall be controlled from panel boards located outside of storage compartments and vaults.

408.53. Standpipes.—First-aid standpipes shall be provided for each five thousand (5000) square feet of floor area equipped with one and one-half (1½) inch hose, complying with article 12.

408.54. Automatic Sprinklers.—All manufacturing and storage spaces and vaults where required shall be protected with an approved automatic sprinkler system as herein specified and with fire pails and portable fire extinguishers complying with article 12.

408.55. Special Protection.—Special chemical extinguishers and other first-aid fire appliances shall be provided around motors and other electrical equipment in accordance with the approved rules.

SECTION 409.0. USE AND STORAGE OF FLAMMABLE FILM

409.1. Permit Required.—No permit for handling, use, storage or recovery of flammable film shall be issued for any building located as specified in section 408.2; except that those restrictions shall not apply to the screening and projection rooms of theatres and other places of amusement or instruction. It shall be unlawful to store, stock or use any nitro-cellulose or other flammable film in quantities of more than two thousand (2000) feet in length or more than ten (10) pounds in weight unless approved by the fire official. All installations shall comply with the applicable standards listed in appendix B.

409.2. Storage.—Other than motion picture projection and rewind rooms, or as herein specifically exempted, all rooms in which flammable film is stored or handled shall be enclosed in not less than two (2) hour fireresistive construction complying with the provisions of article 9. All film, except when in process or use, shall be kept in approved closed containers.

409.21. Cabinets.—Flammable film in amounts of twenty-five (25) to one thousand (1000) pounds shall be stored in approved noncombustible cabinets constructed and vented in accordance with the approved rules. No one cabinet shall contain more than three hundred and seventy-five (375) pounds. All cabinets with a capacity of more than seventy-five (75) pounds shall be equipped with not less than one (1) automatic sprinkler head.

409.22. Vaults.—Flammable film in amounts greater than one thousand (1000) pounds shall be kept in vaults constructed as provided in section 408; except that the interior storage volume shall not exceed seven hundred and fifty (750) cubic feet.

409.23. Rooms.—Unexposed film may be stored in the original approved shipping cases complying with the rules of the Interstate Commerce Commission in rooms equipped with an approved one-source sprinkler system complying with the provisions of section 408.36.

409.24. Ventilation.—Storage rooms shall be ventilated as specified in section 408.34 with the vents arranged to open automatically in the event of fire, in accordance with the approved rules.

409.25. Lighting.—Artificial illumination shall comply with section 400.5 except that arc or other approved forms of lights may be used in film studios.

409.26. Heating.—All heating equipment and installations shall conform to the requirements of section 408.51. The duct systems of warm air heating and air conditioning systems shall comply with article 18, and shall be protected with automatic fire dampers to cut off all rooms in which film is handled from all other rooms and spaces in the building. The heating of film vaults shall be automatically controlled to a maximum temperature of seventy (70) degrees F.

409.27. Fire Protection.—Approved automatic sprinkler systems shall be provided in all buildings and structures and parts thereof in which flammable film is stored or handled in amounts of more than fifty (50) pounds and as herein specifically required, except in projection booths and rewind rooms conforming to the requirements of section 409.3 and 409.4. First-aid fire-extinguishing and auxiliary fire-fighting equipment shall be provided in accordance with article 12 and the approved rules adopted thereunder.

409.3. Projection Rooms.—Every room for the use and operation of motion picture projectors hereafter installed as an integral part of a building shall be enclosed in walls, floor and ceiling of approved noncombustible materials and construction, as herein provided.

409.31. Construction of Projection Rooms.—The size of the room shall be adequate to accommodate the apparatus and equipment and permit manual operation, but in no case less than forty-eight (48) square feet in area and seven (7) feet in height for one projector and twenty-four (24) square feet for each additional machine. The enclosure shall be constructed smoke and vapor tight of not less than three-quarter (¾) hour fireresistance. Observation and projector openings shall in no case exceed twelve (12) inches in any dimension and shall be equipped with automatic metal, or other approved noncombustible shutters capable of auxiliary manual operation from the outside.

409.32. Exits from Projection Rooms.—At least two (2) exits shall be provided, equipped with three-quarter (¾) hour self-closing fire doors, or their approved labeled equivalent, opening outwardly, not less than two and one-half (2½) feet by six (6) feet in size, unless otherwise approved by the building official.

409.33. Ventilation of Projection Rooms.—Ventilation shall be provided by an approved mechanical system of ventilation, exhausting either directly to the outdoors or through a noncombustible flue, which shall be used for no other purpose. The exhaust capacity shall be not less than fifteen (15) cubic feet nor more than fifty (50) cubic feet per minute for each arc lamp, plus two hundred (200) cubic feet per minute for the volume of the room. The ventilation system may be extended to serve rewind rooms associated therewith, but shall not be connected in any way with ventilating or air conditioning systems serving other portions of the building. All ventilating flues shall be constructed and installed to comply with article 18. All fresh air intakes other than direct open air supply shall be protected with fire shutters arranged to operate automatically with the port shutters.

409.34. Lighting Control.—Provision shall be made for control of the auditorium lighting and the emergency lighting systems of theatres from inside of the booth and from at least one other convenient point in the building as required in section 418.8.

409.35. Electrical Equipment.—Separate compartments of similar construction to the projection booth shall be provided for storage batteries and motor generators, respectively. Ventilation shall be provided for such compartments; ventilation for the motor compartment being independent of any other system. The duct from such compartments leading to outdoors shall be constructed of approved acid-resisting noncombustible material.

409.36. Film Capacity.—The film storage capacity of each projection or rewind room shall be not more than one hundred and twenty-five (125) pounds.

409.4. Rewind and Auxiliary Rooms.—Rewinding of film shall be done in the booth in accordance with the approved standards or in a special rewind room not less than eighty (80) square feet in area constructed as provided in this section for the projection room. Special auxiliary rooms may be provided for film storage of not more than one hundred and twenty-five (125) pounds capacity; but the total storage capacity of projection, rewind and auxiliary rooms shall be not more than two hundred and fifty (250) pounds.

409.5. Trial Exhibition Rooms.—Preview rooms shall provide a seating capacity of not more than one hundred (100) persons, with not less than two (2) approved exits complying with article 6. Such rooms shall be enclosed in three-quarter (¾) hour fireresistive partitions with self-closing fire doors or their approved labeled equivalent at the openings. All seats shall be permanently fixed in position and the arrangement shall comply with the requirements of section 418.3.

409.6. Temporary Motion Picture Installations.—Permits for portable and temporary booth construction for incidental amusement and educational purposes shall be secured from the fire official in accordance with the approved rules.

409.7. Motion Picture Studios.

409.71. Construction.—All buildings designed or used as motion picture studios shall be protected with an approved two-source automatic sprinkler system complying with the provisions of article 12; except that the building official may exempt rooms designed for housing electrical equipment from this requirement when constructed of fireproof (type 1) construction.

409.72. Special Rooms.—Rooms and spaces used as carpenter and repair shops, dressing rooms, costume and property stage rooms shall be enclosed in floors, walls and ceilings of not less than two (2) hour fireresistive construction.

409.73. Trim, Finish and Decorative Hangings.—All permanently attached acoustic, insulating and light reflecting materials and temporary hangings on walls and ceilings shall comply with the requirements of article 9.

409.74. Film Storage.—All film shall be stored as required in section 409.2 and no surplus film shall be kept on the studio stage except loaded magazines in the cameras and sound recording apparatus. All extra loaded magazines shall be stored in a separate magazine room enclosed in two (2) hour fireresistive construction.

409.8. Film Laboratories.—No film laboratories shall be conducted in other than fireproof (type 1-A) buildings or structures, equipped throughout with an approved automatic sprinkler system.

409.9. Film Exchanges.—All film exchanges and depots shall be housed in buildings and structures of fireproof (type 1-A) construction equipped throughout with an approved automatic sprinkler system. All flammable film other than that in process of receipt, delivery or distribution shall be stored in vaults complying with the requirements of section 408.32.

SECTION 410.0. USE AND STORAGE OF COMBUSTIBLE FIBERS

The provisions of this section shall apply to all buildings and structures involving the storage or use of finely divided combustible vegetable or animal fibers and thin sheets or flakes of such materials involving a flash fire hazard, including among others cotton, excelsior, hemp, sisal, jute, kapok and paper and cloth in the form of scraps and clippings in excess

of one thousand (1000) pounds. The provisions of the applicable standards listed in appendix B except as herein specifically provided shall be deemed to conform to the provisions of the Basic Code.

410.1. Construction Requirements.—All buildings designed for the storage of combustible fibers as herein described shall be constructed within the limits of height and area specified in table 6 for high hazard use (use group A) except as follows:

410.11. Special Limits.—No single storage room or space shall be more than five thousand (5000) square feet in area or more than fifty thousand (50,000) cubic feet in volume unless of protected noncombustible (type 2-B) or better construction;

410.12. Floor Loads.—The floors of all buildings designed for the storage of combustible fibers shall not be loaded in excess of one-half (½) the safe load capacity of the floor, nor shall such materials be piled to more than two thirds (⅔) of the clear story height;

410.13. Salvage Doors.—Every exterior wall shall be provided with a door to each storage compartment arranged for quick removal of the contents;

410.14. Wall Openings.—All openings in outside walls shall be equipped with approved fire doors and fire windows complying with article 9;

410.15. Roof Openings.—All skylights, monitors and other roof openings shall be protected with galvanized wire or other approved corrosion-resistive screens with not less than thirty-six (36) meshes to the square inch or with wired glass in stationary frames;

410.16. Boiler Rooms.—All power and heating boilers and furnaces shall be located in detached boiler houses or in a segregated boiler room enclosed in three (3) hour fireresistive construction with direct entrance from the outside, except that rooms containing gas-fired heating equipment may have openings into the warehouse protected with one and one-half (1½) hour fire doors or their approved labeled equivalent;

410.17. One-Story Warehouses.—Outside the fire limits, one-story combustible fiber warehouses may be constructed of frame construction with an area of not more than eighty-five thousand (85,000) square feet when separated not less than fifty (50) feet from interior lot lines or other buildings.

410.2. Fire Protection.—Fire-extinguishing equipment shall be provided complying with article 12 consisting of casks, pails and portable chemical extinguishers and standpipes. Where deemed necessary by the administrative authority, a system of outside hydrants and hose shall be provided.

410.3. Housekeeping.—No ashes, waste, rubbish or sweepings shall be kept in wood or other combustible receptacles and shall be removed from the premises daily. No grass or weeds shall be allowed to accumulate at any point on the premises.

410.4. Open Storage.—Only temporary open storage of combustible fibers shall be permitted on the same premises with a fiber warehouse and shall be kept covered on top and sides with tarpaulins secured in place. Not more than seven thousand two hundred (7200) cubic feet of fiber shall

be stored in the open; and fire-extinguishing equipment shall be provided as directed by the administrative official.

410.5. Special Treatments.—When combustible fibers are packed in special noncombustible containers or when packed in bales covered with wrappings to prevent ready ignition, or when treated by approved chemical dipping or spraying processes to eliminate the flash fire hazard, the restrictions governing combustible fibers shall not apply.

SECTION 411.0. COMBUSTIBLE DUSTS, GRAIN PROCESSING AND STORAGE

The provisions of this section shall apply to all buildings in which materials producing flammable dusts and particles which are readily ignitable and subject to explosion hazards are stored or handled, including among others, grain bleachers and elevators, malt houses, flour, feed or starch mills, wood flour manufacturing and manufacture and storage of pulverized fuel and similar uses. The applicable standards listed in appendix B, except as herein specifically required, shall be deemed to conform to the requirements of the Basic Code.

411.1. Construction Requirements.

411.11. Buildings.—All such buildings and structures, unless herein otherwise specifically provided, shall be of fireproof (type 1), noncombustible (type 2), or of laminated planks or lumber sizes qualified for heavy timber mill (type 3-A) construction, within the height and area limits of high hazard uses (use group A) of table 6; except that when erected of fireproof (type 1-A) construction, the height and area of grain elevators and similar structures shall be unlimited, and when of heavy timber (type 3-A) construction, the structure may be erected to a height of sixty-five (65) feet; and except further that in isolated areas, the height of type 3-A structures may be increased to eighty-five (85) feet.

411.12. Grinding Rooms.—Every room or space for grinding or other operations producing flammable dust shall be enclosed with floors and walls of not less than two (2) hour fireresistance when the area is not more than three thousand (3000) square feet and of not less than four (4) hour fireresistance when the area is greater than three thousand (3000) square feet.

411.13. Conveyors.—All conveyors, chutes, piping and similar equipment passing through the enclosures of such rooms or spaces shall be constructed dirt and vapor tight, of approved noncombustible materials complying with section 1620.

411.2. Explosion Relief.—Means for explosion relief shall be provided as specified in section 402, or such spaces shall be equipped with the equivalent mechanical ventilation complying with article 18.

411.3. Grain Elevators.—Grain elevators, malt houses and buildings for similar uses shall not be located within thirty (30) feet of interior lot lines or structures on the same lot, except when erected along a railroad right of way.

411.4. Coal Pockets.—Coal pockets located less than thirty (30) feet from interior lot lines or structures on the same lot shall be constructed of not less than protected noncombustible (type 2-A) construction. When more than thirty (30) feet from interior lot lines, or erected along a railroad right of way, such structures may be built of lumber sizes qualifying for heavy timber or laminated construction, provided they are not more than sixty-five (65) feet in height.

SECTION 412.0. PAINT SPRAYING AND SPRAY BOOTHS

The provisions of this section shall apply to the construction, installation and use of buildings and structures or parts thereof for the spraying of flammable paints, varnishes and lacquers or other flammable materials, mixtures or compounds used for painting, varnishing, staining or similar purposes. All such construction and equipment shall comply with the approved rules and the applicable standards listed in appendix B.

412.1. Location of Spraying Processes.—Such processes shall be conducted in a spraying space, spray booth, spray room or shall be isolated in a detached building or as otherwise approved by the building official in accordance with accepted engineering practice.

412.2. Construction.

412.21. Spray Spaces.—All spray spaces shall be ventilated with an approved exhaust system to prevent the accumulation of flammable mist or vapors. When such spaces are not separately enclosed, noncombustible spray curtains shall be provided to restrict the spread of fire.

412.22. Spray Booths.—All spray booths shall be constructed of approved noncombustible materials equipped with mechanical ventilating systems.

412.23. Spray Rooms.—All spray rooms shall be enclosed in partitions of not less than three-quarter (¾) hour fireresistance. Floors shall be waterproofed and drained in an approved manner. Floor drains to the building drainage system and the public sewer shall be prohibited.

412.24. Storage Rooms.—Spraying materials in quantities of not more than twenty (20) gallons may be stored in approved cabinets ventilated at top and bottom; when in quantities of more than twenty (20) gallons and not more than one hundred (100) gallons, they may be stored in approved double-walled noncombustible cabinets vented directly to the outer air; and all spraying materials in quantities of more than one hundred (100) gallons shall be stored in an enclosure of not less than two (2) hour fireresistance or in a separate exterior storage building. In no case shall such storage be in quantities of more than two hundred and fifty (250) gallons, except when stored in isolated storage buildings; and except further that not more than twenty-five (25) gallons of spraying material shall be stored in buildings in which pyroxylin products are manufactured or stored.

412.3. Ventilation of Spraying Processes.—The ventilation system shall comply with the provisions of section 402 and shall be adequate to exhaust

all vapors, fumes and residues of spraying material directly to the outer air. Fresh air shall be admitted to the spraying spaces in an amount equal to the capacity of the fan in such manner as to avoid short circuiting the path of air in the working space and to provide air movement with a velocity of not less than one hundred (100) feet per minute at the face of the spray booth. All ducts and vents shall be constructed and installed to comply with sections 1019 and 1119 and article 18. Unless equipped with approved explosion-proof motors with nonferrous blade fans, the mechanical exhaust equipment shall be located outside of spray spaces.

412.4. Electrical Equipment.—Artificial lighting and electric equipment shall comply with section 400.5.

412.5. Fire Protection.—Sprinkler heads shall be provided in all spray, dip and immersing spaces and storage rooms and shall be installed in accordance with accepted engineering practice and the standards listed in appendix B. Where buildings containing spray areas are not equipped with an approved automatic sprinkler system, the sprinkler heads in booths and other spray areas and storage rooms may be supplied from the building water supply when approved by the building official, to comply with the provisions of section 1214 for partial sprinkler systems.

SECTION 413.0. DRY CLEANING ESTABLISHMENTS

Before any dry cleaning plant is constructed or an existing plant is remodeled or altered, complete drawings shall be filed showing to scale the relative location of the dry cleaning area, the boiler room, finishing department, solvent storage tanks, pumps, washers, drying tumblers, extractors, filter traps, stills, piping and all other equipment involving the use of flammable liquid solvents. All dry cleaning by immersion and agitation shall be carried on in closed machines, installed and operated in accordance with the approved rules and the applicable standards listed in appendix B.

413.1. Classification.—For the purpose of the Basic Code, all dry cleaning and dry dyeing establishments shall be classified as follows:

413.11. High Hazard.—All such establishments shall be classified as high hazard which employ gasoline or other solvents having a flash point below seventy-five (75) degrees F. (Tag. closed-cup) in quantities of more than three (3) gallons, or more than sixty (60) gallons of flammable solvents with a flash point between seventy-five (75) and one hundred and forty (140) degrees F. (Tag. closed-cup).

413.12. Moderate Hazard.—All such establishments employing less than three (3) gallons of volatile flammables with a flash point of less than seventy-five (75) degrees F. or less than sixty (60) gallons of solvent with a flash point between seventy-five (75) and one hundred and forty (140) degrees F. (closed-cup) shall be classified as moderate hazard.

413.13. Low Hazard.—All such establishments using solvents of other than volatile flammable liquids or solvents with a flash point more than one hundred and forty (140) degrees F. (closed-cup) in cleaning and dyeing operations shall be classified as low hazard.

413.2. Construction of Dry Cleaning Plants.

413.21. High Hazard.—High hazard dry cleaning plants as herein defined shall be located in buildings or structures of fireproof (type 1-A) construction, not more than one (1) story in height with solid floors and roofs and without openings other than required for exit and ventilation purposes. No such building shall be used for any other purpose.

413.22. Moderate Hazard.—Moderate hazard dry cleaning plants as herein defined may be located in buildings or structures of any type of construction other than frame (type 4) buildings subject to the fire district limitations of article 3 and the height and area limitations for high hazard buildings (use group A) of table 6. The room or space in which such operations are conducted shall be enclosed in not less than two (2) hour fireresistive construction with not less than two (2) exits from each dry cleaning or dry dyeing room or space.

413.23. Low Hazard.—Low hazard dry cleaning plants shall not be restricted as to type of building construction within the height and area limitations for use group E of table 6; except that such uses shall not be located in basements nor in a building used for public assembly (use group F) or institutional (use group H) purposes.

413.24. Roof Construction of Dry Cleaning Plants.—The roof over high hazard dry cleaning plants shall be flat without attic or concealed spaces and shall be provided with a pivot type skylight or other approved vent complying with section 402, arranged to release outwardly under explosion pressures.

413.25. Floor Construction of Dry Cleaning Plants.—The floor finish in high hazard dry cleaning plants shall be constructed of water-resistant, noncombustible materials with nonsparking surface elevated above the adjoining grade and with door sills not less than ten (10) inches in height. There shall be no openings, vaults or pits below the floor.

413.26. Exterior Walls of Dry Cleaning Plants.—Exterior walls of high hazard dry cleaning plants having a fire separation of less than thirty (30) feet shall be solid masonry without openings, but in no case shall more than two (2) sides of the building be enclosed in blank walls. Opening protectives of exterior doors and windows shall have not less than three-quarter (¾) hour fireresistance or the labeled equivalent construction, and the windows shall be pressure-releasing to comply with section 402.

413.27. Basements of Dry Cleaning Plants.—The basements of all buildings in which high or moderate hazard dry cleaning establishments are conducted shall be completely separated from the superstructure with unpierced floor construction of not less than two (2) hours fireresistance. The access to such basements shall be from the exterior only.

413.3. Boiler Room Separation.—Boiler rooms and heating equipment for high hazard dry cleaning plants shall be separated from drying rooms, dry cleaning and dry dyeing rooms with unpierced walls of not less than four (4) hours fireresistance and in moderate hazard establishments with solid walls of not less than two (2) hours fireresistance; or such boiler rooms shall be located in a separate building.

413.4. Ventilation.—All rooms and spaces in high hazard dry cleaning plants shall be provided with a mechanical system of ventilation capable of twenty (20) complete and continuous changes of air per hour. Mechanical systems of ventilation in moderate hazard plants shall have sufficient capacity to insure ten (10) complete and continuous changes of air per hour. Satisfactory mechanical or natural ventilation shall be provided in low hazard plants by means of fans, pipes and ducts to ventilate drying tumblers, drying cabinets and similar equipment directly to the outer air.

413.5. Solvent Storage.—All volatile flammable solvents with a flash point under seventy-five (75) degrees F. (closed-cup tester) shall be stored underground in accordance with the provisions of section 403. Interior aboveground storage shall be permitted for solvents with a flash point above seventy-five (75) degrees F. (closed-cup) provided the aggregate quantity of such solvent in use in the system and in storage is not more than five hundred and fifty (550) gallons and the capacity of any individual tank is not more than two hundred and seventy-five (275) gallons.

413.6. Electric Wiring and Equipment.—All electrical equipment and wiring shall conform to the requirements of article 15 and the National Electrical Code for hazardous locations; and the cylinders and shells of all washing machines, drying tumblers, extractors, and all aboveground storage containers shall be grounded as therein required.

413.7. Fire Protection.—Every dry cleaning room, and dry dyeing room employing high and moderate hazard solvents shall be protected with a fire-extinguishing system consisting of approved automatic sprinklers, manually controlled steam-blankets, carbon dioxide flooding systems or other approved fire-extinguishing equipment.

SECTION 414.0. PRIVATE GARAGES

414.1. Attached Garages.

414.11. One- and Two-Family Dwellings.—Private garages located beneath a one- and two-family dwelling shall have walls, partitions, floors and ceilings separating the garage space from the dwelling constructed of not less than three-quarter (¾) hour fireresistance, with the sills of all door openings between them raised not less than four (4) inches above the garage floor. The door opening protectives shall be three-quarter (¾) hour fire doors complying with article 9 or one and three-quarter (1¾) inch solid core wood doors.

414.12. Motels and Multi-Family Dwellings.—Private garages located beneath motels and multi-family dwellings and in which no gasoline or oil is stored or handled shall be of protected construction of not less than one and one half (1½) hour fire-resistance.

414.13. Separation by Breezeway.—Private garages exceeding seven hundred and fifty (750) square feet in area and attached to one- and two-family dwellings shall be protected as required in section 414.11. Such garages separated from residence outside the fire limits by a breezeway not less than ten (10) feet in length may be of unprotected frame (type 4-B) construction but the junction of the garage and breezeway shall be firestopped to comply with section 877.0.

414.14. Other Conditions.—All private garages not falling within the purview of sections 414.11, 414.12, or 414.13, attached to or located beneath a building shall comply with the requirements of section 415.13 for public garages.

414.2. Egress.—Where living quarters are located above a private garage, required egress facilities shall be protected from the garage area with three-quarter (¾) hour fireresistive construction.

SECTION 415.0. PUBLIC GARAGES

Public garages shall comply with the applicable requirements of the following sections. The portions of such buildings and structures in which gasoline, oil and similar products are dispensed shall comply with the requirements of section 416; the portions in which motor vehicles are repaired shall comply with section 417; and the portions in which paint spraying is done shall comply with the requirements of section 412.

415.1. Construction.—All group 1 public garages hereafter erected shall be classified as storage buildings, moderate hazard (use group B-1) and all group 2 public garages shall be classified as storage buildings, low hazard (use group B-2) and shall conform to the height and area limitations of table 6 except as herein specifically provided. The areas used for dispensing gasoline in such buildings shall be located on the grade floor and shall comply with the requirements of section 416.

415.11. Special Height Limitations.—Public garage buildings shall comply with the height and area limitations of table 6 for the classification of the use as specified in section 415.1. Such heights may be increased one (1) additional story when the building is equipped with an approved sprinkler system.

415.12. Basements.—The first floor construction of public garages of all classifications and public hangars with basements shall be constructed of not less than two (2) hour fireresistance and shall be water and vapor proof. Where openings are provided in the floor they shall be protected by a curb or ramp not less than six (6) inches high above the floor to avoid the accumulation of explosive liquids or vapors and prevent them from spilling to the lower floor. There shall be not less than two (2) means of egress from such areas, one of which shall be directly to the outside independent of the exits serving other areas of the building.

415.13. Mixed Occupancy.—No public garage shall be located within or attached to a building occupied for any other use, unless separated from such other use by walls or floors complying with table 16 for fireresistance. Such fire division shall be continuous and unpierced by openings; except that door openings equipped with self-closing fire doors complying with article 9 shall be permitted. In buildings of single occupancy not excluding the area limitations of table 6, doors without fireresistance shall be permitted between the garage area and salesroom or offices that are operated in connection with the garage.

415.14. Roof Storage of Motor Vehicles and Airplanes.—The roof of a public garage shall not be used for the parking or storage of motor vehicles unless the building is of fireproof construction (type 1-A or 1-B). When the roof of a building is used for parking or storage of motor vehicles it shall be provided with a parapet wall or guard rail not less than three (3) feet six (6) inches in height and a wheel guard not less than six (6) inches in height, located so as to prevent any vehicle from striking the parapet wall or guard rail. The use of roofs for airplanes storage and landing shall be subject to the approval of the Civil Aeronautics Authority.

415.15. Floor Construction and Drainage.—Floors of public garages and airplane hangers shall be graded to drain through oil separators or traps to avoid accumulation of explosive vapors in building drains or sewers as provided in the Plumbing Code. The floor finish shall be of concrete or other approved nonabsorbent, noncombustible material.

415.2. Ventilation.—All public garages and airplane hangars shall be provided with mechanical or natural ventilation adequate to prevent the accumulation of carbon monoxide or exhaust fumes in excess of one (1) part in ten thousand (10,000) (.01 percent) or the concentration of gasoline vapors in excess of twenty (20) percent of the lower explosive limit. The building official may require test by a qualified testing laboratory to determine the adequacy. The cost of test shall be borne by the owner.

415.21. Below Grade.—Basement and cellar garages shall be equipped with mechanical ventilation adequate to provide the ventilation required under section 415.2. The ventilation system shall be operated at all times the basement areas are occupied by human beings.

415.22. Repair Shops or Rooms.—When motor vehicles are to be operated or engines are run for test purposes or minor adjustments, provisions shall be made to collect the exhaust fumes from each vehicle individually and to discharge such fumes to the outer air by means of a positive induced draft. The discharge from such system shall be located so as not to create a hazard to adjoining properties, but not less than eight (8) feet above the adjacent ground level on the exterior of the building and shall discharge into a yard or court. When necessary to discharge across a walkway or private thoroughfare the discharge opening shall be carried to a height of not less than twenty-five (25) feet above the ground level or to a distance four (4) inches above the highest point of the wall of the building or structure on which it is located.

415.23. Pits.—No pits shall be installed in floors below the first; and pits in first and upper stories shall be provided with mechanical ventilation adequate to provide the ventilation required under section 415.2. The ventilation system shall be operated at all times the pits are occupied by human beings.

415.3. Special Hazards.—Any process conducted in conjunction with public garages involving volatile flammable solvents shall be segregated or located in a detached building or structure, except as provided in section 403 for the storage and handling of gasoline and other volatile flammables. The quantity of flammable liquids stored or handled in public garages other than in underground storage and in the tanks of motor vehicles shall be not more than five (5) gallons in approved safety cans.

415.4. Heating and Protection of Equipment.—Radiation and heating coils and pipes located within six (6) inches of the floor shall be protected with wire mesh or other approved noncombustible shields of adequate strength; and with asbestos or other insulation on top of the equipment when located in partitions or near combustible racks or woodwork.

415.5. Boiler Rooms of Public Garages.—All heat generating plants other than approved direct fired heaters shall be located in separate buildings or shall be separately enclosed within the structure with solid, water and vapor tight masonry. All rooms housing boilers, stoves or other heating apparatus shall be cut off from all other parts of the building with four (4) hour fireresistive construction with entrance from outside only, and no openings through the fire division other than those necessary for heating pipes or ducts.

SECTION 416.0. MOTOR FUEL SERVICE STATIONS

416.1. Construction.—Buildings and structures used for the storage and sale of motor fuel oils may be of all types of construction within the height and area limitations of table 6 for business (use group E) buildings and as modified by sections 303 and 304.

416.11. Opening Protectives.—All permissible openings in walls with a fire separation of less than twenty (20) feet shall be protected with approved fire windows or fire doors complying with article 9, except doors in such walls to rest rooms.

416.12. Basements.—Motor fuel service stations shall have no cellars or basements; and when pits are provided they shall be vented as required in section 415.2.

416.2. Gasoline Storage.—All volatile flammable liquid storage tanks shall be installed below ground and vented as specified in section 403. Gasoline may be stored or handled above ground in approved safety cans of not more than five (5) gallons each.

416.3. Location of Pumps.—No gasoline pumps or other mechanical equipment shall be installed so as to permit servicing of motor vehicles

standing on a public street or highway; except when necessitated by the widening of streets or highways, the use of the outer driveway of existing service stations may be continued for servicing of vehicles when approved by the authority having jurisdiction. The canopies and supports over pumps and service equipment when located less than twenty (20) feet from interior lot lines or from any building or structure shall be constructed of approved noncombustible materials.

SECTION 417.0. MOTOR VEHICLE REPAIR SHOPS

All buildings and structures designed and used for repair and servicing motor vehicles, motor boats, airplanes or other motor driven means of transportation shall be subject to the limitations of tables 5 and 6 for moderate hazard storage (use group B-1). Such buildings shall be used solely for that purpose.

417.1. Enclosure Walls.—Exterior walls, when located within six (6) feet of interior lot lines or other buildings shall have no openings therein.

417.2. Handling of Volatile Flammables.—All volatile flammables shall be stored and handled as provided in section 416.2.

417.3. Ventilation.—All rooms and spaces used for motor vehicle repair shop purposes shall be provided with an approved system of mechanical ventilation meeting the requirements of section 415.2 and article 18.

417.4. Fire Prevention.—No open gas flames except heating devices complying with section 415.5, torches, welding apparatus, or other equipment likely to create an open flame or spark shall be located in a room or space in which flammable liquids or highly combustible materials are used or stored.

SECTION 418.0. PLACES OF PUBLIC ASSEMBLY

The provisions of this section shall apply to all places of public assembly and all parts of buildings and structures classified in the use group F-1, theatres and in other places of public assembly, use groups F-2, F-3, and F-4, except as specifically exempted in section 419.

418.1. Restrictions.

418.11. High Hazard Uses.—No place of public assembly shall be permitted in a building classified in the high hazard group (use group A).

418.12. Superimposed Theatres.—No addition or extension shall be erected over the stage section of a theatre, nor shall a second theatre be erected above another. The building official may waive the prohibition against superimposed theatres and construction above the stage when adequate access is provided for fire fighting with direct means of ventilation to the outer air from the stage portion.

418.13. Frame Construction.—No theatre with stage, fly gallery and rigging loft shall be permitted in a building of frame (type 4) construction.

418.14. Location.—All buildings used for assembly purposes shall front on at least one (1) street in which the main entrance and exit shall be located. The total capacity of such main exit shall be not less than one-third (⅓) of the total required width of building exits.

418.15. Trim, Finish and Decorative Hangings.—All permanent acoustic, insulating and similar materials and temporary hangings shall comply with the flameresistance requirements of article 9. Moldings and decorations around the proscenium openings shall be constructed entirely of noncombustible material.

418.16. Existing Buildings.—Nothing herein contained shall prohibit the alteration of a building heretofore occupied as a place of public assembly for such continued use provided the occupancy load is not increased and seats, aisles, passageways, balconies, stages, appurtenant rooms and all special permanent equipment comply with the requirements of this article.

418.17. New Buildings.—No building not heretofore occupied as a place of public assembly shall hereafter be altered to be so occupied unless it is made to comply with all the provisions of this article.

418.2. Theatre Exit Requirements.

418.21. Types of Exit.—The required exits from every tier or floor of a theatre shall consist of grade exits, interior or exterior stairways or horizontal exits which provide direct access to a street, an exit court, or unobstructed passageway, hallway or lobby leading to a street or open public space. The number, location and construction of all exitways shall comply with the requirements of article 6 and the applicable standards listed in appendix B, except as herein specifically provided.

418.22. Number of Stairways in Auditorium.—Each tier above the main floor of a theatre or other auditorium shall be provided with at least two (2) interior enclosed stairways which shall be located on opposite sides of the structure; except that enclosures shall not be required for stairs serving the first balcony only, or mezzanine thereunder. Such stairways shall discharge to a lobby on the main floor. Exit stairways serving galleries above the balcony shall lead directly to the street or open public space as provided in section 418.21.

418.23. Emergency Exits from Main Floor of Auditorium.—In addition to the main floor entrance and exit, emergency exits shall be provided on both sides of the auditorium which lead directly to a street, or through a passageway to the street independent of other exits, or to an exit court as defined in the Basic Code.

418.24. Emergency Exits from Balconies and Galleries.—Emergency exits shall be provided from both sides of each balcony and gallery with direct egress to the street, or to an independent passageway, or to an exit court. There shall be no communication from any portion of the building to the emergency exit stairways except from the tier for which such exitway is exclusively intended.

418.25. Exit Courts.—All exit courts shall be not less than six (6) feet wide for the first six hundred (600) persons to be accommodated or fraction thereof, and shall be increased one (1) foot in width for each additional two hundred and fifty (250) persons. Such courts shall extend sufficiently in length to indicate the side and rear emergency exits from the auditorium.

418.26. Hardware.—All required exits shall be equipped with self-releasing panicproof latches or bolts of an approved type complying with section 614.42.

418.27. Width of Exit Doors.—The maximum width of single exit doors shall be forty-two (42) inches and the minimum width of double doorways shall be sixty (60) inches.

418.28. Exit Lights.—All exit doors shall be marked with illuminated signs complying with section 626 which shall be kept lighted at all times during occupancy of the building.

418.3. Theatre Seatings.

418.31. Fixed Seats.—In all theatres and similar places of assembly except churches, stadiums and reviewing stands, individual fixed seats shall be provided with an average width of not less than twenty (20) inches and no seat less than nineteen (19) inches wide. All seats shall be provided with separating arms and arranged in rows not less than thirty-two (32) inches apart, back to back, measured horizontally.

418.32. Number of Seats.—Aisles shall be provided so that not more than seven (7) seats intervene between any seat and the aisle or aisles, except that the number of seats in a row shall not be limited when self-raising seats are provided which leave an unobstructed passage between rows of seats of not less than eighteen (18) inches in width leading to side aisles in which exit doorways are located at not more than twenty-five (25) foot intervals to the exit corridor or exit court.

418.33. Box Seats.—In boxes or loges with level floors, the seats need not be fastened when not more than fourteen (14) in number.

418.4. Theatre Aisles.

418.41. Longitudinal Aisles.—The width of longitudinal aisles at right angles to rows of seats and with seats on both sides of the aisle shall be not less than thirty-six (36) inches, increasing one-quarter (¼) inch for every foot of length of aisle from its beginning to an exit door, or to a cross aisle or between cross aisles. The width of the longitudinal aisles with banks of seats on one side only shall be not less than thirty (30) inches, increasing one-quarter (¼) inch for each foot of length.

418.42. Cross Aisles.—When there are twenty-seven (27) or more rows of seats on the main floor of theatres, cross aisles shall be provided so that no block of seats shall have more than twenty-two (22) rows. The width of cross aisles shall be not less than the widest aisle with which they connect or the width of exit which they serve; but no cross aisle shall be less than forty-two (42) inches wide, or when bordering on means of entrance not less than forty-eight (48) inches wide. In balconies and galleries of theatres, one or more cross aisles shall be provided when there are more than ten (10) rows of seats.

418.43. Gradient.—Aisles shall not exceed a gradient of one and three-quarter (1¾) inches per foot.

418.44. Balcony Steps.—Steps may be provided in balconies and galleries only, and such steps shall extend the full width of the aisle with treads and risers complying with article 6, which shall be illuminated by lights on both sides or by a step light or otherwise to insure an intensity of not less than one (1) foot candle.

418.45. Railings.—Metal or other approved noncombustible railings shall be provided on balconies and galleries as herein prescribed:

At the facia of boxes, balconies and galleries not less than thirty (30) inches in height; and not less than thirty-six (36) inches in height at the foot of steps;

Along cross aisles not less than twenty-six (26) inches in height except where the backs of the seats along the front of the aisle project twenty-four (24) inches or more above the floor of the aisle;

Where seatings are arranged in successive tiers, and the height of rise between platforms exceeds eighteen (18) inches, not less than twenty-six (26) inches in height along the entire row of seats at the edge of the platform.

418.5. Theatre Foyers.

418.51. Capacity.—In every theatre or similar place of public assembly, not including churches, for theatrical use with stage and scenery loft, a foyer or lobby shall be provided with a net floor area, exclusive of stairs or landings, of not less than one and one-half (1½) square feet for each occupant having access thereto. The use of foyers and lobbies and other available spaces for harboring occupants until seats become available shall not encroach upon the clear floor area herein prescribed or upon the required clear width of front exits.

418.52. Egress.—When the foyer is not directly connected to the public street through the main lobby, an unobstructed corridor or passage shall be provided which leads to and equals in minimum width the required width of main entrances and exits.

418.53. Gradient.—The rear foyer shall be at the same level as the back of the auditorium and the exits leading therefrom shall not have a steeper gradient than one (1) foot in eight (8) feet.

418.54. Construction.—The partitions separating the foyer from the auditorium and other adjoining rooms and spaces of theatres shall be constructed of not less than two (2) hour fireresistance; except that opening protectives may be constructed of noncombustible materials without fireresistance rating.

418.55. Waiting Spaces.—Waiting spaces for harboring occupants shall be located only on the first or auditorium floor. Separate exits in addition to the required theatre exits shall be provided from the waiting space based on an occupancy of one (1) person for each three (3) square feet of waiting space area.

418.6. Theatre Stage Construction.

418.61. Stage Enclosure Walls.—Every stage hereafter erected or altered for theatrical performances which is equipped with portable or fixed scenery, lights and mechanical appliances, shall be enclosed on all sides with solid walls of not less than four (4) hour fireresistance, extending continuously from foundation to at least four (4) feet above the roof. There shall be no window opening in such walls within six (6) feet of an interior lot line; and all permissible window openings shall be protected with three-quarter (¾) hour fire windows complying with article 9.

418.62. Floor Construction.—The entire stage, except that portion used for the working of scenery, traps, and other mechanical apparatus for the

presentation of a scene, and the roof over the stage shall be not less than three (3) hour fireresistive construction. All openings through the stage floor shall be equipped with tight fitting, solid wood trap doors not less than three (3) inches in thickness or other materials of equal physical and fireresistive properties.

418.63. Rigging Loft.—The rigging loft, fly galleries and pin rails shall be constructed of approved noncombustible materials.

418.64. Footlights and Stage Electrical Equipment.—Footlights and border lights shall be installed in troughs constructed of noncombustible materials. All electrical equipment shall conform to the requirements of article 15 and the National Electrical Code and the switchboard shall be so located as to be accessible at all times and shall be fully protected from falling objects and the storage or placing of stage equipment against it shall be prohibited.

418.65. Exterior Doors.—All required exit door openings to the outer air shall be protected with approved self-closing fire doors, complying with article 9. All exterior openings which are located on the stage for exit or loading and unloading purposes which are likely to be open during occupancy of the theatre, shall be constructed with vestibules to prevent air draughts into the auditorium.

418.66. Proscenium Wall.—There shall be no other openings in the wall separating the stage from the auditorium except the main proscenium opening; two (2) doorways at the stage level, one (1) on each side thereof; and, where necessary, not more than (2) doorways to the musicians' pit from the space below the stage floor. Each such doorway shall not exceed twenty-one (21) square feet in area and shall be protected with approved automatic and self-closing fire door assemblies complying with article 9 with a combined fireresistance rating of three (3) hours or the approved labeled equivalent.

418.67. Proscenium Curtain.—The proscenium opening shall be protected with an automatic fireresistive and smoke-tight curtain designed to resist an air pressure of not less than ten (10 pounds per square foot normal to its surface, both inward and outward. The curtain shall withstand a one-half (½) hour fire test at a temperature of not less than seventeen hundred (1700) degrees F. without the passage of flame. The curtain shall be operated by an automatic heat activated device to descend instantly and safely and to completely close the proscenium opening at a rate of temperature rise of fifteen (15) to twenty (20) degrees F. per minute; and by an auxiliary operating device to permit prompt and immediate manual closing of the proscenium opening.

418.68. Scenery—All combustible materials used in sets and scenery shall be rendered flameresistant to comply with article 9.

418.69. Stage Ventilation.—Metal or other approved noncombustible ventilators, equipped with movable shutters or sash shall be provided over the stage, constructed to open automatically and instantly by approved heat activated devices, with an aggregate clear area of opening not less than one-eighth (⅛) the area of the stage, except as otherwise provided in section 418.12. Supplemental means shall be provided for manual operation of the ventilator.

418.7. Dressing and Appurtenant Rooms.

418.71. Construction.—Dressing rooms, scene docks, property rooms, work shops and store rooms and all compartments appurtenant to the stage shall be of fireproof (type 1) construction and shall be separated from the stage and all other parts of the building by walls of not less than three (3) hour fireresistance. No such rooms shall be placed immediately over or under the operating stage area.

418.72. Opening Protectives.—No openings other than to trunk rooms and the necessary doorways at stage level shall connect such rooms with the stage and such openings shall be protected with one and one-half (1½) hour self-closing fire doors or the approved labeled equivalent complying with article 9.

418.73. Interior Trim.—All shelving and closets in dressing rooms, property rooms or storage rooms shall be constructed of flameresistant materials complying with article 9.

418.74. Dressing Room and Stage Exits.—Each tier of dressing rooms shall be provided with at least two (2) means of egress, one of which shall lead directly to an exit corridor, exit court or street. Exit stairways from dressing and storage rooms may be unenclosed in the stage area behind the proscenium wall. At least one approved exit shall be provided from each side of the stage and from each side of the space under the stage, and from each fly gallery and from the gridiron to a street, exit court or passageway to a street. An iron ladder shall be provided from the gridiron to a scuttle in the stage roof.

418.8. Lighting.

418.81. Exitways.—During occupancy all exitways in places of assembly shall be lighted to comply with the requirements of section 627.

418.82. Auditoriums.—Aisles in auditoriums shall be provided with general illumination of not less than one-tenth (1/10) foot candles at the front row of seats and not less than two-tenths (2/10) foot candles at the last row of seats and the illumination shall be maintained throughout the showing of motion pictures or other projections.

418.83. Other Places of Public Assembly.—All areas and portions of buildings used as places of public assembly other than theatres shall be lighted by electric light to provide a general illumination of not less than one (1) foot candle.

418.84. Control.—The lighting of exitways, aisles and auditoriums shall be controlled from a location inaccessible to unauthorized persons. Supplementary control shall be provided as specified in section 409.34 in the motion picture projection room.

418.85. Emergency Lighting.—In all theatre buildings and similar structures used for public assembly purposes, all public exitways shall be lighted by means of electricity so arranged and controlled that the interruption of service on any other circuit inside the building or structure will not interrupt the required exitway lighting.

418.9. Fire Protection and Fire Fighting Equipment.—Every theatre classified in the F-1 use group shall be equipped with fire-extinguishing equipment complying with the requirements of article 12 and as herein specified.

418.91. Sprinkler System.—Approved automatic sprinkler systems complying with the provisions of sections 1213 and 1214 shall be provided to protect all parts of the building except the auditorium, foyers and lobbies or in the immediate vicinity of automatic equipment or over dynamos and electric equipment. Such protection shall be provided over the stage, under the gridiron, under all fly galleries, in dressing rooms, over the proscenium opening on the stage side, under the stage, in all basements, cellars, work rooms, store rooms, property rooms and in toilet, lounge and smoking rooms.

418.92. Standpipes.—Standpipe fire lines complying with the provisions of sections 1207 and 1208 shall be provided with outlets and hose attachments one on each side of the auditorium in each tier; one in each mezzanine; one in each tier of dressing rooms; and protecting each property, store and work room.

418.93. First-Aid Standpipes.—First-aid standpipes complying with the provisions of section 1210 shall be provided on each side of the stage. Such standpipes shall be not less than two and one-half (2½) inches in diameter, equipped with one and one-half (1½) inch hose and three-eighth (⅜) inch nozzles.

418.94. Hose Outlets.—A sufficient quantity of hose shall be provided, equipped with regulation fire department couplings, nozzle and hose spanner, to reach all areas as specified in article 12.

418.95. First-Aid Hand Equipment.—Approved portable two and one-half (2½) gallon fire extinguishers shall be provided and located as follows: two (2) on each tier or floor of the stage; one (1) immediately outside of the motion picture projection room; one (1) in each dressing room; and one (1) in each work, utility and storage room. Fire axes and fire hooks shall also be provided as directed by the fire official; and all fire extinguishers and fire tools shall be securely mounted on walls in plain view and readily accessible.

SECTION 419.0. PUBLIC ASSEMBLY OTHER THAN THEATRES

Other places of public assembly including auditoriums, armories, bowling alleys, broadcasting studios, chapels, churches, community houses, dance halls, gymnasiums, lecture halls, museums, night clubs, rinks, roof gardens and similar occupancies and uses shall comply with the general exit requirements of article 6 and the applicable requirements of section 418, except the provisions of sections 418.45 and 418.54 or as herein specifically exempted. Places of public assembly which are equipped with a stage, movable scenery, scenery loft and dressing rooms shall comply with all the requirements of section 418, except use groups F-1 theatres.

419.1. Number of Exitways.—Every tier, floor level and story of places of public assembly other than theatres, shall be provided with the number of required exitways herein specified of not less than the required width complying with article 6 for the occupancy load. The required exits shall be remote and independent of each other and located on opposite sides of the area served thereby.

Occupancy Load Per Floor	*Minimum Number of Exitways*
Not more than 500	2
501 to 900	3
901 to 1800	4
Over 1800	5

419.2. Aisles With Fixed Seats.—All rows of seats shall be individually fixed or fixed in rigid units between longitudinal aisles complying with section 418.32 and 418.4 except as provided for chapels and churches in section 612.3. Where permitted, continuous fixed benches shall comply with the provisions of section 421.7.

419.3. Aisles Without Fixed Seats.—Tables and chairs in all rooms and spaces for public assembly shall provide convenient access by unobstructed aisles not less than thirty-six (36) inches wide which lead to required exitways complying with article 6.

419.4. Kitchen and Service Pantries.—Where kitchen and service pantries are provided, they shall be separately enclosed in partitions, floors and ceilings of not less than three-quarter (¾) hour fireresistance, except for opening protectives; and no required exitway shall pass through such areas.

419.5. Bowling Alleys.—The storage and use of all volatile flammable liquids shall comply with section 403 and the finishing rooms shall be separately enclosed in two (2) hour fireresistive construction with floor finish of concrete or other noncombustible, nonabsorbent material.

419.6. Skating Rinks.—No skating rinks shall be located below the floor nearest grade.

SECTION 420.0. AMUSEMENT PARKS

420.1. Construction.—All accessory buildings and enclosed structures shall be constructed to conform to the requirements of the Basic Code governing use and occupancy as regulated by tables 5 and 6 and in compliance with the fire district limitations of article 3 except as may be specifically required herein:

420.11. Amusement Devices.—The maximum height of any amusement device in which passengers are transported shall not exceed forty (40) feet in frame (type 4) construction; one hundred (100) feet in unprotected noncombustible (type 2-C) and heavy timber mill (type 3-A) construction; and shall not be limited in fireproof (type 1) construction;

420.12. Amusement Park Buildings.—All enclosed amusement park buildings over one (1) story in height shall be constructed or protected to furnish not less than three-quarter (¾) hour fireresistance; except

where roof framing and decking are specifically permitted to be of non-combustible or mill type construction under the provisions of the Basic Code;

420.13. Proximity to Lot Lines.—All structures located within twenty (20) feet of lot lines or within twenty (20) feet of other structures on the same lot shall be of protected noncombustible (type 2-B) or protected masonry enclosed (type 3-A or 3-B) construction or better.

420.2. Walkways and Ramps. — Walkways and ramps shall be erected with a slope not greater than one (1) in ten (10), except that when approved nonslip surfaces are provided, the grade may be increased to a maximum of one (1) in eight (8).

420.3. Elevating and Conveying Equipment.—The equipment and operation of all devices and mechanisms for transporting persons shall comply with the requirements of article 16.

420.4. Tests.—All amusement devices used by the public which involve hazardous features shall be installed and operated as directed by the building official and shall not be placed in service until acceptance tests have been made and the installation has been approved by him.

420.5. Fire Protection. — In addition to the fire extinguisher and fire fighting equipment required by the use and occupancy of each building and structure under the provisions of the Basic Code, every amusement and exhibition park when required by the building official shall be provided with a system of fire hydrants and fire lines with the required water supply, complying with article 12 and the standards listed in appendix B for yard systems.

SECTION 421.0. STADIUMS AND GRANDSTANDS

All outdoor stadiums and grandstands shall be constructed as herein required and in accordance with the approved rules and the applicable standards listed in appendix B.

421.1. Occupancy Load of Grandstands. — The occupancy load of a grandstand or other structure for outdoor assembly shall be computed on the basis of the number of fixed seats plus an allowance of one (1) individual for each six (6) square feet of floor or ground area used for standing space or movable seats. Such spaces shall not include the areas of required exitways; nor shall any aisle or other space used as an exitway be used for standing room or seats. The occupancy load shall not exceed the capacity of exitways as required herein or by the provisions of article 6.

421.2. Location of Grandstands.

421.21. Street Frontage.—Every stadium or grandstand shall have one or more frontages on streets, highways or other open public spaces, not less than thirty (30) feet in width, leading to a street as follows:

Occupancy Load	*Street Frontage*
1,000 or less	1 street
1,001— 5,000	2 streets
5,001—10,000	3 streets
Over 10,000	4 streets

421.22. Fire Separation.—No wood frame grandstand construction shall be located nearer than twenty (20) feet to an interior lot line or other frame structure unless provided with a protected exterior of not less than three-quarter (¾) hour fireresistance or separated from adjacent units of frame construction with a two (2) hour fire wall.

421.3. Type of Construction.

421.31. Frame Construction.—No frame grandstand unit or similar structure shall be more than ten thousand (10,000) square feet in area, nor more than twenty (20) feet in height to the highest level of seat platforms nor more than two hundred (200) feet in length; except that when fire-retardant lumber is used, complying with article 9, the allowable area and length may be increased one hundred (100) per cent. Not more than three (3) such units shall be constructed in any one group provided with the fire separations herein required. When more than one (1) such group is erected, they shall be separated by a wall of two (2) hours fireresistance when the fire separation is less than fifty (50) feet.

421.32. Noncombustible Construction.—All grandstand structures, two (2) or more tiers in height shall be of noncombustible (type 2-C) or heavy timber mill (type 3-A) construction or better.

421.4. Design.—All grandstand and similar structures shall be designed for a wind load of not less than thirty (30) pounds per square foot on the vertical projection in all directions; and for the live loads and swaying loads specified in article 7.

421.5. Means of Egress from Grandstands.—All means of egress shall comply with the requirements and occupancy loads of article 6 for places of public assembly.

421.51. Location of Exits.—The distance between exits in the grandstand shall not exceed one hundred (100) feet, except that only one exit shall be required when the length of a cross aisle does not exceed fifty (50) feet.

421.52. Number of Exits.—Every stairway, ramp, or vomitory shall lead directly to an exterior exit or to a horizontal exit passageway leading to a field or other open space, or to an exit gateway to the street. The number of exit gateways shall be as follows:

Occupancy load	*Number of Exits*
1,000	2
3,000	3
Each additional 3,000	1 additional

421.53. Exit Signs.—Illuminated exit and directional signs shall be provided complying with section 626.

421.6. Aisles.

421.61. Width of Aisles.—Aisles shall be not less than twenty-four (24) inches in width when serving not more than sixty (60) individuals and not less than thirty-six (36) inches in width when serving more than sixty (60) individuals. When aisles are divided by a column or other obstruction, a minimum width of twenty-two (22) inches shall be left on each side.

421.62. Steps.—When the entrance to an aisle is located above the ground level, a ramp or stairway shall be provided complying with article 6, not less than the width of the aisle. When the gradient or ramps exceeds one (1) in ten (10), steps may be provided to overcome the difference in level. When the rise of seating platforms is more than eleven (11) inches, an intermediate step shall be provided with equal risers; and when more than eighteen (18) inches, two (2) intermediate steps shall be provided with equal risers.

421.63. Rails.—Every ramp, stairway, deck and tier shall have an approved protective railing or guard not less than three (3) feet six (6) inches high on all open sides when three (3) feet or more above grade level or above any other level occupied by the public. Front railings of grandstands when the foot rest is more than two (2) feet above the ground shall be not less than thirty-three (33) inches high.

421.64. Strength of Rails.—Railings or guards shall be designed to comply with section 710.3.

421.65. Spaces Underneath Seats.—Spaces underneath grandstand seats shall be kept free of all combustible and flammable materials and shall not be occupied or used for other than exitways; except that when enclosed in not less than three-quarter (¾) hour fireresistive construction, the building official may approve the use of such spaces for other purposes that do not endanger the safety of the public.

421.7. Seats.

421.71. Number of Seats.—No seat shall have more than sixteen (16) seats between it and the nearest aisle nor shall the distance back to back of seats with back rests be less than thirty (30) inches, nor less than twenty-two (22) inches for bleacher type seats.

421.72. Width of Seats.—The minimum width of fixed seats with arms shall be twenty (20) inches; and without divisions between seats, a minimum width of eighteen (18) inches shall be provided for each person. No portable chairs or seats shall be permitted except in boxes or loges in which one chair may be installed for each five (5) square feet of floor area and not more than a total of sixteen (16) seats in a box.

421.73. Ceiling Clearance.—The clear height below ceilings in any exitway shall be not less than eight (8) feet and below trusses, beams, girders, and all other framing over occupiable spaces not less than six and two-thirds (6⅔) feet.

421.8. Temporary Stadiums of Combustible Construction.—Temporary and portable stadiums and grandstands of combustible construction and such permanent structures outside the fire limits shall not exceed twenty (20) feet in height above the grade, and the frames, stringers, and sleepers shall be rigidly secured and anchored with through bolts, ring connectors, rivets, lag screws or other approved connectors to resist all stresses and prevent displacement during occupancy. The occupancy load of each structure shall be not more than one thousand (1000).

421.9. Parking Space.—Parking spaces shall be located not less than twenty (20) feet from grandstand structures, unless provided with a fire division of not less than two (2) hours fireresistance on the side facing the parking.

SECTION 422.0. DRIVE-IN MOTION PICTURE THEATRES

The location of drive-in motion picture theatres shall be approved by the municipal or state authority having jurisdiction over highways and streets.

422.1 Arrangement of Lanes.—Separate entrance and exit lanes shall be provided not less than twelve (12) feet in width, with not less than forty (40) foot intervals between access lanes. The parking space for each car shall not be less than nine (9) feet by twenty (20) feet in area, and so arranged to provide continuous lanes of travel.

422.2. Projection Booth.—The projection booth shall comply with section 409.3 and shall be supported on a structure of type 2-C or other approved noncombustible construction. No motor vehicle shall be permitted to park within twenty (20) feet of the projection booth or room.

422.3. Toilet Facilities.—Separate toilet facilities shall be provided for each sex as required in the Plumbing Code for places of public assembly.

422.4 Fire Protection.—Sufficient approved portable fire extinguishers shall be provided in readily accessible locations, plainly and visibly identified by signs, at distances of not more than one hundred and fifty (150) feet so as to be available to every motor vehicle as directed by the fire official. The fire extinguishers shall be mounted on posts or platforms protected from mechanical injury with substantial guards as approved by the building official.

SECTION 423.0. TENTS AND TEMPORARY STRUCTURES

423.1. Location and Permits.—Outside of Fire Districts No. 1 and No. 2 temporary tents may be erected for a period not exceeding thirty (30) days for religious, educational or recreational purposes. A special permit shall be secured from the building official for all such installations.

423.2. Tent Construction.

423.21. Tarpaulins.—Tent tarpaulins and all decorative materials shall be treated to render the materials flame resistant for the period for which the permit is granted in accordance with the provisions of article 9 and the applicable standards listed in appendix G.

423.22. Structural Supports.—Tents shall be adequately guyed, supported and braced to withstand a wind pressure of not less than twenty (20) pounds per square foot of projected area. Tent poles shall be stayed with wire ropes; fiber rope shall be used only for mooring to stakes.

423.3. Fire Separation.—No tent shall be erected nearer than ten (10) feet to interior lot lines or to any building on the lot and shall not occupy more than seventy-five (75) per cent of the premises; unless otherwise approved by the building official under conditions which do not endanger the public safety.

423.4. Exits.—Not less than twenty-two (22) inches exit width shall be

provided for each five hundred (500) square feet of public space enclosed, with a minimum width of exitway of forty-four (44) inches. When the occupancy load is more than six hundred (600), there shall be at least three (3) exits and if more than one thousand (1000) there shall be at least four (4) exits. The line of travel to an exitway shall be not more than one hundred and fifty (150) feet.

423.5. Aisles and Passageways.—Aisles and passageways shall conform to the requirements of section 421 except that there shall be not more than eleven (11) seats between any seat and the nearest aisle. All exitways shall be maintained free and unobstructed at all times during the occupancy of the tent.

423.6. Combustible Materials.—No hay, straw, shavings or similar combustible materials shall be allowed within the tent structure other than that necessary for the daily feeding and care of animals, and sawdust and shavings for use in performances when kept damp. No combustible materials shall be permitted under stands or seats at any time.

423.7. Fire Prevention.

423.71. Combustible Trash.—The area within and adjacent to tents shall be maintained clear of all grass and underbrush creating a fire hazard within a radius of fifty (50) feet; and all combustible trash shall be removed from the enclosure at all performances.

423.72. Exposed Flames.—No gasoline, gas, charcoal or other heating or cooking device or other exposed flame not connected with the performance or exhibit shall be allowed inside or within twenty (20) feet of the tent enclosure.

423.73. Spot Lighting.—Spot or effect lighting shall be by electricity only; and all combustible construction within six (6) feet of such equipment shall be protected with asbestos not less than one-quarter (¼) inch thick or other approved noncombustible insulation.

423.8. Fire Protection.—Portable fire extinguishing equipment and fire fighting tools shall be provided complying with article 12 as directed by the fire official. When deemed necessary, he may direct the organization of a fire brigade trained in the operation of fire extinguishing equipment and the emergency vacating of the occupants.

SECTION 424.0. PARKING LOTS

424.1. Curb Cuts.—Parking lots shall be arranged to afford ready means of entrance and exit at sidewalk level; and special permits shall be secured for curb cuts from the administrative authorities.

424.2. Lanes and Parking Spaces.—Access lanes shall be provided for each row of cars not less than twelve (12) feet in width; and the parking space shall be not less than eight (8) feet by eighteen (18) feet in area for each motor vehicle.

424.3. Parking Lot Offices.—The construction of parking lot offices shall comply with the fire district limitations of section 303.

424.4. Protection of Adjoining Property.—A substantial bumper of masonry, steel or heavy timber shall be placed near all interior lot lines to protect structures and property abutting the parking lot.

424.5. Surface and Drainage.—Parking lots shall be graded with rolled or compacted cinders, gravel or other approved nonabsorbent materials to prevent raising of dust and shall be maintained to prevent drainage onto adjoining property or the sidewalk.

424.6. Electric Illumination.—Electric light wiring shall be provided on approved standards to furnish adequate illumination of driveways and lanes as required by the municipal authorities for street lighting, but in no case shall such illumination be less than one-tenth (1/10) of one (1) watt per square foot of parking area.

SECTION 425.0. MOBILE DWELLING UNITS

Travel trailers and mobile homes, as defined in section 401, and similar units designed to be transported from one location to another and not mounted on a permanent foundation, shall comply with the applicable standards listed in appendix B and the following. Whenever any such unit shall be placed upon a permanent foundation or on foundation piers the unit shall be made to comply with all of the requirements of the Basic Code for single-family dwellings.

425.1. Travel Trailers.—Travel trailers, as defined in section 401, shall comply with accepted engineering practice standards for such units listed in appendix B, including the requirements for plumbing, heating, electrical and air-conditioning facilities therein required.

425.11. Occupancy of Travel Trailers.—No travel trailer shall be used for permanent occupancy nor shall any such unit be occupied in any location without first obtaining a permit from the building official.

425.12. Temporary Location.—The building official may permit the temporary occupancy or use of a travel trailer in a location outside of an approved and licensed trailer or mobile homes park, as provided in sections 425.3, 425.4, and 425.5, for a period of not more than forty-eight (48) hours provided such use shall not create a health, traffic or other hazard. A temporary permit shall not be renewed for the same unit or location within a period of two (2) weeks after its expiration.

425.13. Approved Park Locations.—Travel trailers may be occupied for more than forty-eight (48) hours when parked in an approved and licensed trailer or mobile homes park; but no individual unit shall be continuously occupied in any location for a period of more than sixty (60) days within the period of one (1) year from the date it was first brought into the community. When a travel trailer is occupied for more than twenty-four (24) hours in an approved and licensed trailer or mobile homes park it shall be properly connected to the utility services provided and shall be anchored as required in section 425.35.

425.2. Mobile Homes.—Mobile homes, as defined in section 401, shall comply with accepted engineering practice standards for such units listed in appendix B and to the following subsections. Units not complying with these standards and requirements shall be classified as "travel trailers" and shall be subject to the requirements of sections 425.1, 425.3, and 425.4 applicable thereto.

425.21. Minimum Areas.—Mobile home units shall have a minimum floor area, exclusive of kitchen, bath and closet areas, of one hundred forty (140) square feet when occupied by not more than two (2) persons nor less than two hundred forty (240) square feet when occupied by three (3) persons, with an additional seventy (70) square feet per person when occupied by

more than three (3) persons. No individual room exclusive of kitchen, bath or utility room, shall have an area less than seventy (70) square feet nor be less than seven (7) feet six (6) inches in minimum dimension.

The minimum height of habitable spaces in mobile homes shall be not less than seven (7) feet.

425.22. **Light and Ventilation.**—Rooms or enclosed spaces, exclusive of kitchens or bath rooms, shall be provided with windows or exterior doors for natural light and ventilation. The aggregate glass area shall be not less than one-tenth (1/10) of the floor area served, with not less than one-half (½) of this area available for unobstructed ventilation; or the equivalent in mechanical ventilation shall be provided.

Kitchen and bath rooms shall be provided with windows not less than three (3) square feet in area with not less than one-half (½) of this area available for unobstructed ventilation; or the equivalent in artificial light and mechanical ventilation. When not provided with natural ventilation of the required area, kitchens shall be provided with an exhaust fan. Mechanical ventilation for kitchens and bath rooms shall provide a minimum air change of one hundred (100) cubic feet per minute; and in other spaces, when used, shall provide a minimum of not less than two (2) air changes per hour in the space served.

425.23. **Exit Requirements.**—Mobile home units shall have not less than two (2) doors or one (1) door and one (1) unobstructed emergency exit. One door shall be located near the front of the unit and one near the rear. An emergency exit may be substituted for the rear door when the length of the unit does not permit use of two (2) doors. Locking mechanism for doors shall be of the safety type permitting opening of the door from the inside by the operation of a single knob or lever. When sleeping rooms of a mobile home unit are arranged so that they have access to only one door of the unit without passing through a passageway that might be blocked by fire, the room shall be provided with at least one (1) outside window which can be opened from the inside without the use of tools and of such design that it may serve as an emergency exit if the normal avenues of escape are blocked.

425.24. **Mechanical Requirements.**—Plumbing, heating, electrical, and air-conditioning installations shall comply with the accepted engineering practice standards for such installations in mobile homes listed in appendix B.

425.3. **Transient and Mobile Homes Parks.**—Lots and parcels of land designed for the temporary or permanent parking and occupancy of two (2) or more travel trailers or mobile homes used for human habitation may be located in areas zoned to permit such use but shall not be located within the fire limits; and shall be of adequate area to provide parking spaces, access lanes, utilities and accessory buildings as herein required. Swimming pools, structures and accessory buildings provided for any such park shall comply with the applicable requirements of the Basic Code and the rules and regulations of the building official and the health official.

425.31. **Enclosures of Parks.**—Transient and mobile homes parks shall be enclosed with an approved fence or planted hedge, not less than seven (7) feet in height with no openings to adjoining property other than the required entrances and exits to streets or public spaces.

425.32. **Individual Unit Space.**—The minimum area and arrangements of spaces for individual travel trailers or mobile homes shall comply with the applicable requirements of sections 425.4 and 425.5. The number of spaces allowed shall be based upon the gross area of the park. Gross area shall be defined as the entire area of the park property. When a park provides space for both travel trailers and mobile homes, the portions of the park allotted to each shall be governed by the requirements for the specific use of the respective areas.

425.33. **Streets and Walkways.**—Streets and driveways shall be provided within the park area to afford easy access to all parking spaces. They shall be constructed with a hard, dustless road surface and shall provide ready means of entrance and exit to the street in an approved manner. The minimum width of streets providing for two-way traffic shall be thirty-six (36) feet when parking of cars is allowed on both sides and twenty-two (22) feet where parking is not allowed. Satisfactory means of drainage shall be provided with all streets and lanes draining into catch basins properly connected to the sewer system in accordance with applicable requirements for such facilities. Walkways shall be provided as necessary to all accessory buildings and service facilities of the park. Walks shall have a nonslip impervious surface and shall comply with applicable requirements for public sidewalks. Streets and walkways shall be illuminated as required for streets.

425.34. **Service Buildings.**—Office buildings and structures housing sanitary, service or similar equipment, shall be constructed to meet the applicable requirements of the Basic Code. Motor fuel service stations shall be located adjacent to a public street and shall be not less than thirty (30) feet from spaces for parking of travel trailers or mobile homes or any building. Mobile units, as defined in the Basic Code, may not be used for accessory uses in connection with any park except upon special permission in writing from the building official. Such units may be mounted on permanent foundations for accessory uses when specifically permitted by the special permit.

425.35. **Anchorage and Tie-Down.**—Every parking space for travel trailers or mobile homes shall be provided with devices for anchoring the unit to prevent overturning or uplift. Where concrete platforms are provided for the parking of the units, anchorage may be by eyelets imbedded in the concrete with adequate anchor plates or hooks; or other suitable means. The anchorage shall be adequate to withstand wind forces and uplift as required in article 7 for buildings and structures, based upon the size and weight of the units.

425.36. **Water Supply.**—An approved water supply system shall be installed with adequate water taps and connections for each travel trailer or mobile home parking space to supply running water for all sanitary and washing fixtures, drinking and domestic purposes as required by the Plumbing Code. Connections to individual units shall be arranged to prevent back syphoning into the main system.

425.37. **Sewer System and Sanitary Facilities.**—Faucets for community use shall be installed in accessible locations in a manner to be safe and sanitary. Sanitary facilities consisting of water closets, urinals, showers or baths, shall be provided for community use in accordance with the fixture requirements of the Plumbing Code. In addition, not less than one (1) laundry tub and one (1) slop sink shall be installed for each ten (10) travel

trailers and mobile home units. Such facilities shall be located so as to be accessible to all units in the park. Each space for a travel trailer or mobile home shall be provided with a sewer outlet not less than four (4) inches in diameter connected to the main sewer system and properly trapped to receive waste from the fixtures in the mobile unit. The main sewer system shall be connected to the public sewer system or to other approved disposal plant. Provisions shall be made for the receipt, collection and disposal of all garbage and rubbish from each mobile unit in accordance with requirements for dwelling occupancies. Garbage and waste receptacles shall be kept clean and in sanitary condition.

425.38. **Electrical Equipment and Systems.**—The main electric service to the park shall be of adequate capacity to serve the maximum connected load. Main service, fusing, switching and distribution shall comply with the applicable requirements of the electrical code and shall be installed and maintained in accordance with applicable laws and ordinances governing such systems. Each travel trailer or mobile home space shall be provided with electric service having a grounded type supply receptacle with appropriate fuse or circuit breakers. The minimum service for each mobile home unit shall be 110-125/220-225 volt, 50-60 ampere. The minimum service for a travel trailer shall be 115 volt AC 30 ampere. Service shall be mounted in an approved manner adjacent to each mobile unit space in accordance with the electrical code.

425.39. **Gas Supply.**—Installations for use of natural gas or liquefied petroleum gas shall comply with all laws and ordinances of the community applicable to the use of such systems for dwellings.

425.4. **Travel Trailer Parks.**—Trailer parks intended for parking of travel trailers, and those portions of mobile home parks designed for use of travel trailers shall comply with the applicable requirements of section 425.3 and the requirements of the following subsections.

425.41. **Record of Tenants.**—The operator of a trailer park or mobile homes park shall keep an accurate register of all transient tenants occupying transient trailers located in the park. The register shall show the name and permanent residence address of the owner and occupants of any travel trailer located in the park; the make and registration of the trailer; the time and date of arrival and departure; and such other information as might be necessary to provide information about the occupants of the trailer. These records shall be open to the authorities at all times.

425.42. **Area of Trailer Spaces.**—Based upon the gross area of the trailer park the number of individual unit spaces shall be not more than twenty (20) per acre. The minimum area of any space for a travel trailer shall be not less than eight hundred (800) square feet with no dimension less than twenty (20) feet. No such space shall be located less than twenty (20) feet from the street lot lines and alley lines and not less than five (5) feet from interior lot lines. Travel trailers shall be so located on each space so that there will not be less than ten (10) feet to any other trailer or building within the park.

425.5. **Mobile Homes Parks.**—Parks and portions thereof intended for parking mobile homes shall comply with the applicable requirements of section 425.3 and the requirements of the following subsections.

425.51. **Area of Mobile Home Spaces.**—Based upon the gross area of the park the number of individual unit spaces shall be not more than eight (8) per gross acre. The minimum area of any space for a mobile home shall be

not less than three thousand (3000) square feet with no dimension less than forty (40) feet. No such space shall be located less than twenty-five (25) feet from street lot lines or interior lot lines. Mobile homes shall be located on each space so that there will not be less than fifteen (15) feet to any other mobile home or building within the park.

425.52. **Parking Spaces.**—Off street parking shall be provided at the rate of not less than one and one-half (1½) cars per mobile home space. Provisions for auxiliary parking shall be provided where required.

SECTION 426.0. MOTELS

All buildings and accessory structures used as motels shall comply with the requirements and limitations of the Basic Code for the occupancy and use for which they are designed and as herein specifically required.

426.1. **Garages.**—Garages when attached to motel residential buildings shall have the interior faces of all walls, when not of approved masonry construction, and the ceilings protected to afford three-quarter (¾) hour fireresistance and all connecting openings shall be protected with approved three-quarter (¾) hour fire doors or their equivalent complying with article 9, or with one and three-quarter (1¾) inch solid core wood doors. Roofed-over passageways may be used to connect garages to dwellings if protected with three-quarter (¾) hour fireresistive construction.

426.2. **Required Exitways.**—All exitways in buildings more than one (1) story in height shall be constructed of three-quarter (¾) hour fire-resistance and all stories above the first shall have at least two (2) means of egress complying with article 6. All exits from residential quarters shall lead to open spaces not less than twenty (20) feet in width which provide direct exit to public streets or highways.

426.3. **Driveways and Parking Spaces.**—The arrangement and capacity of driveways, lanes and parking spaces shall comply with the requirements specified for parking lots and trailer camps in sections 424 and 425.

426.4. **Water Supply and Sanitary Facilities.**—Fresh water supply for drinking and domestic purposes and all sanitary facilities shall comply with the provisions of the Plumbing Code.

SECTION 427.0. RADIO AND TELEVISION TOWERS

Subject to the structural provisions of section 716 for wind loads and the requirements of section 927 governing the fireresistance of buildings for the support of roof structures, all radio and television towers shall be designed and constructed as herein provided.

427.1. **Location and Access.**—The towers shall be so located and equipped with step bolts and ladders as to be readily accessible for inspection purposes. No guy wires or other accessories shall cross or encroach upon any street or other public space, or over any electric power lines, or encroach upon any other privately owned property without written consent of the owner.

427.2. **Construction.**—All radio towers shall be constructed of steel or other approved corrosion-resistive noncombustible materials. Steel members shall be not less than one-eighth (⅛) inch thick if galvanized nor less than three-sixteenths (3/16) inch thick if painted to comply with section

827. Within the limitations of section 303 for fire districts and the provisions of section 927, isolated radio towers may be constructed of lumber sizes qualifying for mill type construction when not more than one hundred (100) feet in height.

427.3. Loads.—The structure shall be securely braced and anchored to resist a wind of not less than thirty (30) pounds per square foot on the net area of both sides of latticed construction and on the projected area of the antennae plus the wind on ice-covered sections in localities where subject to freezing temperatures. Where subject to winds of unusual velocity, the loads shall be increased accordingly. Due allowance shall be made for effect of shape of individual elements and contour of the tower as provided in section 716.5 in computing wind loads.

427.31. Dead Load.—Antennae and towers shall be designed for the dead load plus ice load in regions where ice formation is likely to occur.

427.32. Uplift.—Adequate foundations and anchorage shall be provided to resist two (2) times the calculated wind uplift.

427.4. Electrical Requirements.—Radio towers shall be grounded to comply with the requirements of the National Electrical Code and the approved rules with a copper conductor of not less than No. 8 U. S. gage or its equivalent; or shall be grounded through a resistance coil in the radio circuit.

SECTION 428.0. RADIO AND TELEVISION ANTENNAE

428.1. No Permit Required.—Antennae structures for private radio or television reception not more than twelve (12) feet in height may be erected and maintained on the roof of any building without a building permit. No such structure, however, shall be erected so as to injure the roof covering and when removed from the roof, the roof covering shall be repaired to maintain weather and water tightness. The installation shall in no case be erected nearer to the lot line than the total height of the antennae structure nor shall such structure be installed near electric power lines nor shall it encroach upon any street or other public space.

428.2. Permits Required.—The approval of the building official shall be secured for all antennae structures more than twelve (12) feet in height. The application shall be accompanied by detailed drawings of the structure and methods of anchorage. All connections to the roof structure must be properly flashed to maintain water tightness. The design and materials of construction shall comply with the requirements of section 427.2 for character, quality, and minimum dimensions.

428.3. Electric Grounding.—All wiring shall comply with the requirements of article 15 and the National Electrical Code and the antennae shall be grounded either by direct copper ground or through a resistance coil in the circuit.

SECTION 429.0. SWIMMING POOLS

429.1. General.—Pools used for swimming or bathing shall be in conformity with the requirements of this section, provided, however, these regulations shall not be applicable to any such pool less than twenty-four (24) inches deep or having a surface area less than two-hundred and fifty (250) square feet, except when such pools are permanently equipped with a water recirculating system or involves structural materials. For purposes of this code, pools are classified as private swimming pools or public and semi-public swimming pools, as defined in section 429.2.

Materials and constructions used in swimming pools shall comply with the applicable requirements of the Basic Code.

Pools used for swimming or bathing and their equipment or accessories which are constructed, installed and maintained in accordance with the applicable standards listed in appendix B, shall be deemed to conform to the requirements of the Basic Code, provided the requirements of section 429.8 are included in the installation.

429.2. Classification of Pools.—Any constructed pool which is used, or intended to be used, as a swimming pool in connection with a single family residence and available only to the family of the householder and his private guests shall be classified as a private swimming pool.

Any swimming pool other than a private swimming pool shall be classified as a public or semi-public swimming pool.

429.3. Plans and Permit.

429.31. Permits.—No swimming pool or appurtenances thereto shall be constructed, installed, enlarged or altered until a permit has been obtained from the building official. The approval of all city, county and state authorities having jurisdiction over swimming pools shall be obtained before applying to the building official for a permit. Certified copies of these approvals shall be filed as part of the supporting data for the application for the permit.

429.32. Plans.—Plans shall accurately show dimensions and construction of pool and appurtenances and properly established distances to lot lines, buildings, walks and fences; details of water supply system, drainage and water disposal systems, and all appurtenances pertaining to the swimming pool. Detail plans of structures; vertical elevations; and sections through the pool showing depth shall be included.

429.4. Locations.—Private swimming pools shall not encroach on any front or side yard required by the Basic Code, Abridged Code, or the governing zoning law, except by specific rules of the community in which it may be located. No wall of a swimming pool shall be located less than six (6) feet from any rear or side property line or ten (10) feet from any street property line, except by specific rules of the community in which it may be located.

429.5. Design and Construction.

429.51. Structural Design.—The pool structure shall be engineered and designed to withstand the expected forces to which it will be subjected.

429.52. Wall Slopes.—To a depth up to five (5) feet from the top, the wall slope shall not be more than two (2) feet horizontal in five (5) feet vertical.

429.53. Floor Slopes.—The slope of the floor on the shallow side of transition point shall not exceed one (1) foot vertical to seven (7) feet horizontal. The transition point between shallow and deep water shall not be more than five (5) feet deep.

429.54. Surface Cleaning.—All swimming pools shall be provided with a recirculating skimming device or overflow gutters to remove scum and foreign matter from the surface of the water. Where skimmers are used there shall be at least one (1) skimming device for each one thousand (1,000) square feet of surface area or fraction thereof. Where overflow gutters are used they shall be not less than three (3) inches deep, pitched one-quarter (¼) inch per foot to drains, and constructed so they are safe, cleanable and that matter entering the gutters will not be washed out by a sudden surge of entering water.

429.55. Walkways.—All public or semi-public swimming pools shall have walkways not less than four (4) feet in width extending entirely around the pool. Where curbs or sidewalks are used around any swimming pool they shall have a non-slip surface for a width of not less than one (1) foot at the edge of the pool and shall be so arranged to prevent return of surface water to the pool.

429.56. Steps and Ladders.—One (1) or more means of egress shall be provided from the pool. Treads of steps or ladders shall have non-slip surfaces and handrails on both sides, except that handrails may be omitted when there are not more than four (4) steps or when they extend the full width of the side or end of the pool.

429.6. Water Supply, Treatment and Drainage Systems.

429.61. Water Supply.—All swimming pools shall be provided with a potable water supply, free of cross-connections with the pool or its equipment.

429.62. Water Treatment. — Public and semi-public swimming pools shall be designed and installed so that there is a pool water turnover at least once every eight (8) hours. Filters shall not filter water at a rate in excess of three (3) gallons per minute per square foot of surface area. The treatment system shall be so designed and installed to provide in the water, at all times when the pool is in use, excess chlorine of not less than 0.4 p.p.m. or more than 0.6 p.p.m., or excess chloramine between 0.7 and 1.0 p.p.m., or disinfection may be provided by other approved means. Acidity-alkalinity of the pool water shall not be below 7.0 or more than 7.5. All recirculation systems shall be provided with an approved hair and lint strainer installed in the system ahead of the pump.

Private swimming pools shall be designed and installed so that there is a pool water turnover at least once every eighteen (18) hours. Filters shall not filter water at a rate in excess of five (5) gallons per minute per square foot of surface area. The pool owner shall be instructed in proper care and maintenance of the pool, by the supplier or builder, including the use of high test calcium hypochlorite (dry chlorine) or sodium hypochlorite (liquid chlorine) or equally effective germicide and algaecide and the importance of proper pH (alkalinity and acidity) control.

429.63. Drainage Systems.—The swimming pool and equipment shall be equipped to be completely emptied of water and the discharged water shall

be disposed of in an approved manner, that will not create a nuisance to adjoining property.

429.7. Appurtenant Structures and Accessories.

429.71. Appurtenant Structures.—All appurtenant structures, installations, and equipment, such as showers, dressing room, equipment houses or other buildings and structures, including plumbing, heating, and air conditioning, amongst others appurtenant to a swimming pool, shall comply with all applicable requirements of the Basic Code and the zoning law.

429.72. Accessories.—All swimming pool accessories shall be designed, constructed, and installed so as not to be a safety hazard. Installations or structures for diving purposes shall be properly anchored to insure stability, and properly designed and located for maximum safety.

429.8. Safety Precautions.

429.81. Overhead Electrical Conductors.—No overhead electrical conductors shall be installed within fifteen (15) feet of any swimming pool. All metal fences, enclosures or railings near or adjacent to swimming pool to which bathers have access, which may become electrically alive as a result of contact with broken overhead conductors, or from any other cause, shall be effectively grounded.

429.82. Equipment Installations.—Pumps, filters, and other mechanical and electrical equipment for public and semi-public swimming pools shall be enclosed in such a manner as to be accessible only to authorized persons and not to bathers. Construction and drainage shall be such as to avoid the entrance and accumulation of water in the vicinity of electrical equipment.

429.83. Swimming Pool Safety Devices.—Every person owning land on which there is situated a swimming pool, fish pond or other body of water which constitutes an obvious hazard and contains twelve (12) inches or more of water in depth at any point, shall erect and maintain thereon an adequate enclosure either surrounding the property or pool area, sufficient to make such body of water inaccessible to small children. Such enclosure, including gates therein, must be not less than four (4) feet above the underlying ground; all gates must be self-latching with latches placed four (4) feet above the underlying ground or otherwise made inaccessible from the outside to small children.

A natural barrier, hedge, pool cover or other protective device approved by the governing body may be used so long as the degree of protection afforded by the substituted devices or structures is not less than the protection afforded by the enclosure, gate and latch described herein.

ARTICLE 5

LIGHT AND VENTILATION

SECTION 500.0. SCOPE

The provisions of this article shall govern the means of light and ventilation required in all habitable and occupiable rooms. Every building and structure hereafter erected and every building, room or space which is changed in use shall be constructed, arranged and equipped to conform to the requirements of this article and the applicable standards listed in appendix B.

500.1. Conflicting Laws.—Nothing in this article shall be construed to nullify the provisions of any other law or ordinance regulating yards, courts, or other spaces required for light or ventilation; but the provisions specifying the greater requirements shall control the construction.

500.2. Buildings on Same Lot.—If more than one building is hereafter placed on a lot, or if a building is placed on the same lot with existing buildings, the several buildings may be treated as a single structure for the purpose of this article, provided equivalent uncovered lot area or other adequate sources of light and ventilation are furnished for all habitable and occupiable spaces and rooms.

500.3. Other Standards.—Compliance with the applicable provisions of the standards listed in appendix B shall be deemed to meet the requirements of this article, unless otherwise specifically provided herein.

SECTION 501.0. DEFINITIONS

court. An open, uncovered unoccupied space partially or wholly surrounded by the walls of a structure.

—enclosed or inner. A court surrounded on all sides by the exterior walls of a structure or by such walls and an interior lot line.

—outer court. A court having at least one side thereof opening on to a street, alley, or yard or other permanent open space.

habitable room. A room or enclosed floor space arranged for living, eating, and sleeping purposes (not including bathrooms, water closet compartments, laundries, pantries, foyers, hallways and other accessory floor spaces).

habitable room, minimum height. A clear height from finished floor to finished ceiling of not less than seven and one-half (7½) feet, except that in attics and top half-stories the height shall be not less than seven and one-third (7⅓) feet over not less than one-third (⅓) the area of the floor when used for sleeping, study or similar activity.

habitable room, minimum size. A room with a minimum dimension of seven (7) feet and a minimum area of seventy (70) square feet, between enclosing walls or partitions, exclusive of closet and storage spaces.

occupiable room. A room or enclosed space designed for human occupancy in which large numbers of individuals congregate for amusement, educational, or similar purposes or in which occupants are engaged at labor; and which is equipped with exit, light, and ventilation facilities meeting the requirements of the Basic Code.

ventilation. (See section 1801.0.)

width.

—inner court. As applied to an inner court, means its least horizontal dimension.

—outer court. As applied to an outer court, means the shortest horizontal dimension measured in a direction substantially parallel with the principal open end of such court.

yard. An open unoccupied space on the same lot with a building extending along the entire length of a street, or rear, or interior lot line.

SECTION 502.0. PLANS AND SPECIFICATIONS

Plans for all buildings and structures other than one- and two-family and multi-family dwellings, which are designed for human occupancy shall designate the number of occupants to be accommodated in the various rooms and spaces and when means of artificial lighting and ventilation are required, the application shall include sufficient details and description of the mechanical system to be installed as herein required or as specified in article 18.

SECTION 503.0. STANDARDS OF NATURAL LIGHT

In the application of the provisions of this article, the standard of natural light for all habitable and occupiable rooms, unless otherwise specifically required by the provisions of article 4 for special uses and occupancies, shall be based on two hundred and fifty (250) foot candles of illumination on the vertical plane adjacent to the exterior of the light transmitting device in the enclosure wall and shall be adequate to provide an average illumination of six (6) foot candles over the area of the room at a height of thirty (30) inches above the floor level.

SECTION 504.0. STANDARDS OF NATURAL VENTILATION

In the application of the provisions of this article, the standard of natural ventilation for all habitable and occupiable rooms shall be based on a volume of four hundred (400) cubic feet of air per occupant with ventilating skylights, monitors, louvres, windows, transoms, doors or other alternate ventilating devices located in the exterior walls or on the roof of the building as provided in sections 507 to 515 inclusive.

SECTION 505.0. ARTIFICIAL LIGHT AND VENTILATION

505.1. When Required.—When natural light and ventilation do not meet the minimum requirements of the Basic Code, or when rooms, which by use or occupancy, involve the presence of dust, fumes, gases, vapors or other noxious or deleterious impurities that create a fire or health hazard,

or when required by the provisions of article 4 for special uses, the building shall be equipped with artificial light and mechanical means of ventilation under the conditions and of the minimum capacity herein prescribed. The amount of fresh air required for various uses and occupancies shall be based on the minimum requirements of table 9-A and section 515.

TABLE 9-A.—REQUIRED MINIMUM FRESH AIR SUPPLY

Use of room or space	Number of air changes per hour	Cubic feet per minute per square foot
Auditorium and public assembly	6	1½-2
Bath and toilet rooms		
private	5	1
public	6	2
Convention halls	6	2
Dance halls	6	2
Interior cooking spaces	6-8	2-3
Institutional		
ward and class rooms	4	1½
operating rooms	10	5
Kitchens		
private	3	1-1½
public	8	3
Living and bed rooms	2	½
Locker and rest rooms	4	1½
Offices and jails	2	½
Work rooms		
Under 1000 cubic feet per individual	4	1½
1000 cubic feet or more per individual	2	½

505.2. Operation of Ventilating Systems.—Where mechanical ventilation is accepted as an alternate for natural means of ventilation or is required under the conditions herein prescribed, the system, equipment and distributing ducts shall be installed in accordance with the provisions of articles 10 and 18. Ventilating systems shall be kept in operation at all times during normal occupancy of the building or space so used.

SECTION 506.0. EXISTING BUILDINGS

506.1. Unsafe Conditions.—In all existing rooms or spaces in which the provisions for light and ventilation do not meet the requirements of this article and which in the opinion of the building official are dangerous to the health and safety of the occupants, he shall order the required repairs or installations to render the building or structure livable for the posted use and occupancy load.

506.2. Alterations.—No building shall hereafter be altered or rearranged so as to reduce either the size of a room, or the fresh air supply, or the amount of available natural light to less than that required for buildings hereafter erected; or to create an additional room unless made to conform to the requirements of section 507. The building official may permit new rooms to be of the same height as existing rooms in the same story unless in his opinion greater provision of artificial light and ventilation is deemed necessary to insure healthful living conditions.

506.3. Uncovered Yard and Court Area.—No building shall be hereafter

enlarged, nor shall the lot on which it is located be diminished so as to decrease the required courts or yards to less than that prescribed in this article for the lighting and ventilation of new buildings.

SECTION 507.0. NATURAL LIGHTING AND VENTILATION OF ROOMS

507.1. Window and Skylights.—All habitable and occupiable rooms or spaces shall contain windows, skylights, monitors, glazed doors, transoms, glass block panels or other light transmitting media opening to the sky or on a public street, yard or court complying with the provisions of this article. The light transmitting properties and the area of the devices used shall be adequate to meet the minimum daylighting and ventilating requirements specified herein and in the approved rules.

507.2. Window Size.—Windows and exterior doors may be used as a natural means of light and ventilation, and when so used their aggregate glass area shall amount to not less than one-tenth (1/10) of the floor area served, and with not less than one-half (½) of this required area available for unobstructed ventilation.

507.3. Openings on Yards and Courts.—In order to be credited as a source of natural light or ventilation under the provisions of this article, a window or any other approved device shall open directly on a public street, alley or other open public space, or on a yard or court located on the same lot or plot complying with the requirements of section 518, 519 and 520.

507.4. Alternate Devices.—In place of the means for natural light and ventilation herein prescribed, alternate arrangement of windows, louvres, or other methods and devices that will provide the equivalent minimum performance requirements shall be permitted when complying with the approved rules.

SECTION 508.0. LIGHTING AND VENTING OF SPECIAL SPACES

508.1. Alcove Rooms.—When alcove rooms open without obstruction into adjoining rooms, the required window openings to the outer air shall be based on the combined floor area of room and alcove. No such alcove space shall be more than sixty (60) square feet in area and the opening to the adjoining room shall be not less than eighty (80) per cent of the superficial area of the dividing wall, unless provided with separate means of light and ventilation.

508.2. Attic Spaces.—All attic spaces and spaces between roofs and top floor ceilings shall be ventilated by not less than two (2) opposite windows, louvres, or vents with a total clear area of opening not less than one-third (⅓) of one (1) per cent of the horizontally projected roof area.

508.3. Crawl Spaces.—In buildings and structures constructed without basements, in which the first floor construction does not bear directly on the ground, a space shall be provided under the first floor not less than

eighteen (18) inches in depth; and such space shall be vented with screened openings having a clear area of not less than one-third (⅓) of one (1) per cent of the enclosed building area, or shall be provided with other means of ventilation approved by the building official. When floating mat foundations are provided in accordance with section 729.2, the requirement for ventilation shall not apply.

SECTION 509.0. BASEMENTS AND CELLARS

Except as may be otherwise specified for habitable or occupiable rooms or specifically provided in article 4 for special uses, the glass window area in basements and cellars, except crawl spaces as provided in section 508.3, shall be not less than one-fiftieth (1/50) of the floor area served, and provisions shall be made for fresh air supply prescribed for specific uses in section 515.0 and table 9-A.

SECTION 510.0. BUSINESS AND WORK ROOMS

Offices, stores, mercantile and salesrooms, restaurants, markets, bakeries, hotel and restaurant kitchens, factories, workshops, machinery and boiler rooms shall be provided with the required windows specified in section 507 for habitable and occupiable rooms, opening directly on a street or required yard or court; or such rooms shall be equipped with an approved system of mechanical ventilation complying with section 505 and article 18.

SECTION 511.0. ASSEMBLY ROOMS

In addition to the requirements of article 4 for special uses, the required windows or other approved devices for natural ventilation shall be distributed as equally as practicable on at least two (2) sides of the room; and artificial lighting shall comply with the requirements of this article and article 15.

SECTION 512.0. ROOMS OF INSTITUTIONAL BUILDINGS

In buildings of the institutional use group, every habitable and occupiable room shall be provided with light and ventilation as herein provided, except that in buildings used for enforced detention of people (use group H-1) indirect openings to the street or court may be permitted through intermediate corridors or by other approved means of light and ventilation.

SECTION 513.0. BATH AND TOILET ROOMS

Every bath and toilet room shall be lighted and ventilated by one of the methods prescribed in this section:

513.1. Exterior Windows.—By windows opening to the outer air as provided in section 507 but in no case less than three (3) square feet in area;

513.2. Vent Shaft Windows.—By windows as provided in section 507 but in no case less than three (3) square feet in area, opening on a vent

shaft with a cross-sectional area of one (1) square foot for every foot in height but not less than nine (9) square feet in area, open to the outer air at top or constructed with equivalent side louvre openings;

513.3. Vents and Ducts.—By individual vents or ducts constructed of approved noncombustible materials complying with sections 1019 and 1119 with a minimum cross-sectional area of one-half (½) square foot and one-third (⅓) additional square foot for each additional water closet or urinal above two (2) in number. Such ducts shall be of adequate height and so located as to insure a minimum supply of two (2) cubic feet of fresh air per square foot of room area;

513.4. Skylights.—By a skylight of approved noncombustible construction complying with section 927.2 not less than three (3) square feet in area with ventilating opening;

513.5. Mechanical Ventilating Systems.—By any system of mechanical or gravity ventilation capable of exhausting forty (40) cubic feet of air per minute per water closet or urinal in public bathrooms and not less than twenty-five (25) cubic feet of air per minute in private bathrooms, but in no case shall the fresh air supply be less than specified in section 515 and table 9-A.

513.6. Artificial Lighting.—Illumination shall be provided in all toilet rooms to afford an average intensity of three (3) foot candles measured at a level thirty (30) inches above the floor.

SECTION 514.0. STAIRWAYS AND EXITWAYS

514.1. Residential and Institutional Buildings.

514.11. Windows.—In all multi-family dwellings (use group L-2) and in institutional buildings for the care or treatment of people (use group H-2) required interior stairways shall be provided with windows to the outer air having a glass area of not less than ten (10) square feet which opens on a required street, alley, yard or court, or with the equivalent source of light for each story through which the stairway passes; and such additional artificial lighting to provide the equivalent illumination at all times that the building is occupied as specified in section 627 and article 15.

514.12. Skylights.—When the building is not more than three (3) stories in height, a ventilating skylight of the required area may be used in lieu of windows.

514.13. Hallways.—Hallways shall have at least one window opening directly on a street or on a required yard or court in each story, located so that light penetrates the full length of the hallway, with additional windows for each change of direction of the hallway; or the equivalent artificial lighting shall be provided. Every recess or return with a depth or length which exceeds twice the width of the hall, and every corridor separately shut off by a door, shall be treated as a separate hall in applying the provisions of this section.

514.2. Business and Assembly Buildings.—All stairway enclosures shall conform to the requirements of articles 6 and 9 for construction and with the means of artificial illumination to meet the requirements of this article and article 15.

514.3. Intensity of Illumination.—In all required exitways, except in one- and two-family dwellings, and wherever natural lighting is not available, artificial lighting shall be provided to furnish not less than three (3) foot candles at the floor level of all required exitways.

SECTION 515.0. REQUIRED FRESH AIR SUPPLY

Mechanical or gravity systems of ventilation shall provide the minimum air changes per hour specified in table 9-A but in no case less than the fresh air supply in cubic feet per minute per square foot of floor area of rooms and spaces as herein prescribed.

515.1. Workrooms.

515.11. Sedentary Work.—Workrooms with occupants engaged in sedentary work shall be provided with not less than one (1) cubic foot of fresh air;

515.12. Arduous Work. — Workrooms in which arduous work is performed shall be provided with not less than one and one-half (1½) cubic feet of fresh air;

515.13. Exception.—The ventilation requirements specified in section 515.11 and 515.12 may be reduced fifty (50) per cent when the net space per occupant exceeds one thousand (1000) cubic feet.

515.2. Auditoriums.—Auditoriums, department stores, lecture rooms, libraries, theatres, school and classrooms, gymnasiums, restaurants and dining halls shall be provided with not less than one and one-half (1½) cubic feet of fresh air.

515.3. Art Galleries.—Art galleries, museums, railroad stations, convention halls, offices, asylums, orphanages, jails, and prisons shall be provided with not less than one-half (½) cubic feet of fresh air.

515.4. Hospital Wards.—Hospital wards and dormitories of institutional buildings shall be provided with not less than one and one-half (1½) cubic feet of fresh air.

515.5. Operating Rooms.—Operating rooms of institutional buildings shall be provided with not less than five (5) cubic feet of fresh air.

515.6. Chemical Laboratories.—Chemical laboratories shall be provided with not less than two (2) cubic feet of fresh air, except that when instrument benches are equipped with exhaust hoods or canopies with separate exhaust vents, the fresh air supply may be reduced fifty (50) per cent.

515.7. Dance Halls.—Dance halls and interior cooking spaces shall be provided with not less than two (2) cubic feet of fresh air.

515.8. Kitchens.—Kitchens which supply food for institutions, restaurants, hotel dining rooms, and cafeterias shall be provided with not less than three (3) cubic feet of fresh air.

515.9. Exitways.—Exitways in multi-family dwellings (use group L-2) and in institutional (use group H) buildings shall be provided with not less than one and one-half (1½) cubic feet of fresh air.

SECTION 516.0. VENTILATION OF SHAFTS OTHER THAN ELEVATOR AND DUMBWAITER HOISTWAYS

All enclosed vertical shafts extending through more than two (2) stories

of every building or structure, except elevator or dumbwaiter hoistways, shall be automatically vented to the outer air as herein required or as specified in section 911.

516.1. Extending to Roof.—Shaft enclosures extending to the roof shall be provided with a metal skylight constructed to comply with section 927.2 or with windows of equivalent area or with other approved automatic means of removing hot air and gases.

516.2. Thermostatic Control.—The automatic operation of fire shutters, skylights and other vent relief devices may be controlled by fusible links designed to operate at a fixed temperature of not more than one hundred and sixty (160) degrees F., or by electric or pneumatic operation under a rapid rise in temperature at a rate of fifteen (15) to twenty (20) degrees F. per minute or by other approved methods.

516.3. Not Extending to Roof.—Shaft enclosures not extending to the roof shall be provided with gas and smoke relief vents or adequate mechanical means of ventilation in conformity to the provisions of section 911.4 and article 18.

SECTION 517.0. INDUSTRIAL BUILDINGS WITH UNPIERCED ENCLOSURE WALLS

517.1. Air Conditioning.—When light and ventilation yards, courts or other required open spaces are not provided as herein specified, buildings may be erected for industrial and commercial uses within the height and area limitations of article 3 and table 6, when such buildings and structures are equipped with approved artificial lighting, ventilating and air conditioning systems furnishing the equivalent light and ventilation. The installation of all such systems shall comply with the provisions of article 18.

517.2. Fire Protection.—Buildings and structures without exterior window openings in all stories which are provided with approved mechanical ventilating and air conditioning systems shall be equipped with the fire protection and fire-extinguishing media herein prescribed complying with the requirements of article 12:

517.21. Standpipes.—Standpipe Fire Lines shall be located so as to be readily accessible to the private fire brigade and the municipal fire department;

517.22. Access Panels. — Fire Access Panels of the required size and location shall be installed in the enclosure walls as specified in section 861;

517.23. Fire Alarms.—Interior Fire Alarm signal systems, trained fire brigades and organized fire drills shall be provided and maintained as specified in article 12;

517.24. Sprinklers. — Two-Source Automatic Sprinkler systems with supervisory service and fire department connections shall be installed to comply with article 12;

517.25. Fire-Venting.—The building or structure shall be fire-vented as prescribed in section 521.

SECTION 518.0. COURTS

All courts required to serve rooms for light and ventilation purposes shall comply with the requirements of this section.

518.1. Width of Court.

518.11. Minimum Width.—Every such court shall have a minimum width of three (3) inches for each foot of height or fraction thereof but not less than five (5) feet for outer courts and twice these values for inner courts.

518.12. Irregular Court Width.—In the case of irregular or gore-shaped courts, the required minimum width of court may be deemed to be the average width, provided that no such court shall be less than five (5) feet at any point.

518.2. Area of Court.—The cross-sectional area of a required court shall be not less than one and one-half (1½) times the square of its width; nor shall the length of any court be more than twice its width.

518.3. Access to Court.—A door or other means of access shall be provided at the bottom of every court that is not otherwise conveniently accessible for purposes of cleaning.

518.4. Air Intakes to Court.

518.41. Inner Court.—Every court serving one or more habitable rooms that does not open for its full height on one or more sides to a street or legal yard shall be connected at or near the bottom with a street or yard by a horizontal intake or passage of fireresistive construction. Such intake or passage shall have a cross-sectional area of not less than twenty-one (21) square feet, and shall remain fully open at both ends and unobstructed for its full size and length, except that grilles of noncombustible construction complying with the approved rules may be permitted at the ends of the intake.

518.42. Fireresistance.—The walls, floors and ceilings of such intakes or passages shall have a fireresistance rating of not less than two (2) hours in buildings of types 1, 2 or 3 construction and not less than three-quarter (¾) hour in type 4 construction.

518.5. Court Walls.—When in the opinion of the building official, windows facing on courts do not receive adequate direct light by reason of peculiar arrangement or orientation, he may require the walls to be constructed of light colored masonry, or to be painted and maintained a light color to furnish additional reflected light.

518.6. Court Drainage.—The bottom of every court shall be properly graded and drained to a public sewer or other approved disposal system complying with the Plumbing Code; and shall be paved with concrete or other non-absorbent material when required by the building official.

SECTION 519.0. REAR YARDS

519.1. Residential and Institutional Buildings.—At the rear of every building hereafter erected to be occupied as a one- and two-family or multi-family dwelling (use groups L-2 and L-3), or institutional building (use group H), there shall be maintained a yard of the minimum dimen-

sions herein prescribed. When such yard serves as a required light and ventilation court, its minimum dimensions shall be those required for a court in this article.

519.2. Depth of Yards.—The depth of a required yard between the extreme rear of the building and the rear lot line shall be not less than fifteen (15) feet at any point for a height of thirty-five (35) feet, and shall increase four (4) inches in depth for each additional foot of height above that limit; except that for a corner lot the minimum depth shall be not less than ten (10) feet. When the lot is less than sixty-five (65) feet in depth, the required yard may be diminished six (6) inches in depth for each foot less than sixty-five (65) feet.

519.3. Other Use Groups.—In buildings of other use groups, rear yards shall be provided to serve all habitable and occupiable rooms requiring light and ventilation from such source. The lowest level of such yards shall begin at the sill level of the second story windows, with a depth of not less than ten (10) feet for a height of thirty-five (35) feet and shall increase three (3) inches for each additional foot of height above that level.

SECTION 520.0. OBSTRUCTION OF COURTS AND YARDS

520.1. Permissible Projections.—Every required court and yard shall remain unobstructed for its required area and full height, except for the projections permitted in section 313. In residential and institutional buildings, clothes poles, arbors, garden trellises and other such accessories shall not be prohibited in the open spaces at ground level.

520.2. Motor Vehicle Parking.—When approved by the building official, required court and yard areas may be used for automobile parking spaces or private garages not exceeding one story in height when accessory to and only for the use of the occupants of a residential building, provided required windows for light and ventilation are not obstructed thereby.

SECTION 521.0. FIRE EMERGENCY VENTILATING SYSTEM

521.1. Where Required.—In all buildings and structures for institutional use (use groups H-1 and H-2), and all hotels and apartment houses (use groups L-1 and L-2), which exceed three (3) stories or forty (40) feet in height, with more than twenty-five (25) sleeping rooms or which are occupied by more than fifty (50) persons above the first floor or which exceed ten thousand (10,000) square feet in area and all fully enclosed industrial buildings without provision of exterior window openings for ventilation purposes, the public exit halls and corridors shall be constructed with vertical fire vent stacks and lateral fire vent ducts as herein provided, or with windows to the outer air, or with mechanical ventilating or exhaust systems, or with other equivalent approved means of dissipating smoke, heated air and toxic gases directly to the outer air in the event of fire.

521.2. Fire Vent Ducts.—When the public hallways, corridors and exit ways are not ventilated by windows opening directly to the outer air as

required in section 514, a system of collecting fire ducts shall be provided in each story of aggregate size to remove the smoke, hot air and noxious fumes or gases in event of fire. Each duct shall be not less than one (1) square foot in area located in the public hallways and corridors, with screened openings complying with the approved rules, constructed as provided for hot air ducts in sections 1019 and 1119.

521.3. Thermostatic Operation.—When not connected to a vent stack, the inlet openings on each story shall be controlled by automatic heat-operated devices as required in section 516.2 and in accordance with the approved rules.

521.4. Fire Vent Stacks.—When the fire ducts do not discharge directly to the outer air in each story, one or more fire vent stacks of adequate capacity shall be installed to accommodate the discharge from the fire duct system in any one floor or enclosed fire area, but in no case shall any individual stack be less than four (4) square feet in area, and all stacks shall terminate in an approved automatic cowl or ventilator outlet above the roof.

521.5. Location of Stacks.—The vent stack shall be located in as central a position as practicable with respect to the floor area vented thereby, preferably in the vicinity of vertical shafts, and shall extend continuously to the roof.

521.6. Vent Control of Stacks.—The vent control of the vertical stacks shall consist of approved noncombustible dampers, shutters, or glazed metal sash designed to open outwardly, located not less than twenty (20) feet distant from window openings or exit doors in adjoining walls, and shall be equipped with a thermostatic unit arranged to open at a predetermined rate of temperature rise in accordance with the approved rules. Auxiliary mechanical means for manual operation of all vent controls shall be provided in an accessible location designated by the building official.

521.7. Stack Construction.—The stack enclosure shall be constructed to be vapor and smoke tight with walls of not less than two (2) hours fire-resistance, with no openings other than the fire duct inlets and the top automatic ventilator outlet.

521.8. Mechanical Exhaust Systems.—When mechanical exhaust is required to operate the emergency ventilating system either in horizontal ducts or vertical vent stacks, the installation shall be thermostatically controlled and installed in accordance with the provisions of article 18 and the approved rules.

SECTION 522.0. FIRE VENTILATION OF OPEN WELLS

Unenclosed well openings for moving stairways constructed in accordance with the provisions of section 1621 and not accepted as required means of egress shall be permitted in mercantile buildings when equipped with an approved two-source supervised automatic sprinkler system and protected on every floor pierced by the opening with an approved automatic exhaust system or by other approved method as herein required to prevent the passage of fire, smoke and gases to the story above.

522.1. Exhaust System.—The approved automatic exhaust system may be a separate unit or integrated with an approved air conditioning system and shall be thermostatically controlled to operate simultaneously with the detection of fire.

522.11. Capacity of Exhaust System.—The exhaust system shall be of adequate capacity to create a down draft in the open well with sufficient velocity of flow over the entire area of the well opening under normal conditions of window and door openings in the building. In air conditioned buildings the system shall operate satisfactorily to the building official with the normal air conditioning fans shut off.

522.2. Water Curtain.—An approved water curtain with baffles shall be located to form a continuous water barrier extending from floor to ceiling on all exposed sides of the well opening. Such water curtain shall be formed and operated automatically, either with open sprinklers or spray nozzles or with approved automatic sprinklers, or other approved thermostatically controlled devices.

522.3. Power Control.—The power lines to all parts of the exhaust system and fresh air intake shall be furnished from an independent power supply complying with article 15 and the standards listed in appendixes B and I for the control of automatic fire pumps and blower and exhaust systems.

522.4. Alternate Protection.—Unenclosed stairwells, when not protected as herein specified, shall be equipped with an approved automatic power-controlled fire shutter conforming to the provision of section 1621.2.

522.5. Air Conditioned Buildings.—The exhaust system herein required, when installed in an air conditioned building, shall be so arranged as to automatically stop the operation of the mechanical air conditioning and ventilating systems and close the dampers of the return air duct connection in the event of fire.

SECTION 523.0. WINDOW CLEANING SAFEGUARDS

All buildings and structures over fifty (50) feet or four (4) stories in height, other than one- and two-family and multi-family dwellings (use groups L-2 and L-3), in which the windows are cleaned from the outside shall be provided with anchors or other approved safety devices for all window openings. Such anchors, belt terminals or other devices shall be of approved design, constructed of corrosion-resistive materials securely attached to the window frames or anchored in the enclosure walls of the building. Cast iron or cast bronze anchors shall be prohibited.

ARTICLE 6

MEANS OF EGRESS

SECTION 600.0. SCOPE

The provisions of this article shall control the design, construction and arrangement of exit facilities to insure safe means of egress from all buildings hereafter erected, and from all buildings hereafter altered to a new occupancy load, manner of use or inherent fire hazard. Existing buildings and uses shall be controlled by the provisions of section 606.

600.1. Modification of Exit Requirements. When strict compliance with the provisions of the Basic Code is not practical, the building official may accept alternate means of egress which will accomplish the same purpose, by the procedure established in article 1 for modification of the Basic Code or by adoption of approved rules.

600.2. Minimum Requirements.—It shall be unlawful to alter any building or structure in any manner that will reduce the means of egress below the requirements of the Basic Code for new buildings of the proposed use and occupancy.

600.3. Other Standards.—Compliance with the applicable provisions of the standards listed in appendix B shall be deemed to meet the requirements of this article, unless otherwise specifically provided herein.

SECTION 601.0. DEFINITIONS

automatic. An automatic fire door or other opening protective is one so constructed and arranged that if open it will close when subjected to a predetermined temperature rise or rate of rise.

automatic collapsible revolving door. A door which is designed, supported and constructed so that the wings will release and fold back in the direction of egress under pressure exerted by persons under panic conditions, providing a legal passageway on both sides of the door pivot.

exitway. The exit doorway or doorways, or such doorways together with connecting hallways or stairways, either interior or exterior, or fire escapes, designed to provide means by which individuals may proceed safely from a room or space to a street or to an open space which provides safe access to a street.

fire door. (See section 901.0.)

fire door assembly. (See section 901.0.)

fire window. (See section 901.0.)

grade hallway, grade lobby, grade passageway. An enclosed hallway, exitway or corridor connecting a required exit to a street or to an open space or court communicating with a street.

hallway grade. (See grade hallway.)

hallway, public. (See public hallway.)

horizontal exit. An exitway consisting of protected openings through or around a fire wall, exterior wall, party wall or fire partition connecting two (2) adjacent floor areas of the required size and exit facilities which furnish an area of refuge and escape complying with the provision of the Basic Code.

moving stairway. (See section 1601.0.)

public hallway. A public corridor or space separately enclosed which provides common access to all the exitways of the building in any story.

self-closing. As applied to a fire door or other opening protective, means normally closed and equipped with an approved device which will insure closing after having been opened for use.

slidescape. A straight or spiral chute erected on the interior or exterior of a building which is designed as a means of human egress with direct exit to the street or other public space.

smokeproof tower (Fire tower). An interior enclosed stairway, with access from the floor area of the building either through outside balconies or ventilated fireproof vestibules opening on a street or yard or open court, and with a separately enclosed direct exit or exit passageway to the street at the grade floor.

stairway. One or more flights of stairs and the necessary landings and platforms connecting them to form a continuous and uninterrupted passage from one floor to another.

SECTION 602.0. PLANS AND SPECIFICATIONS

602.1. Arrangement of Exits.—The plans shall show in sufficient detail the location, construction, size and character of all exits and exitways together with the arrangement of aisles, corridors, passageways and hallways leading thereto in compliance with the provisions of the Basic Code.

602.2. Number of Occupants.—In other than one- and two-family and multi-family dwellings, the plans and the application for permit shall designate the number of occupants to be accommodated on every floor, and in all rooms and spaces when required by the building official. When not otherwise specified, the minimum number of occupants to be accommodated by the exit facilities shall be determined by the occupancy load prescribed in section 608. The posted occupancy load of the building shall be limited to that number.

SECTION 603.0. USE AND OCCUPANCY REQUIREMENTS

603.1. New Buildings.—Every building and structure and part thereof hereafter erected shall have the prescribed number of exits of one or more of the approved types defined in this article providing safe and continuous means of egress to a street or to an open space with direct access to a street.

603.2. Mixed Use Groups.—In buildings classified in more than one use group, the occupancy of the greatest fire hazard shall govern the number, capacity, size and construction of all exitways. When places of assembly, night clubs and rooms and spaces for similar uses are provided in a building, the exitways shall be adequate for the combined occupancy.

603.3. MultipleTenants.—When more than one tenant occupies any one floor of a building or structure, each tenant shall be provided with separate direct means of egress to approved exitways.

603.4. One- and Two-Family Dwellings.—Every sleeping room in one- and two-family dwellings, unless it has two (2) doors providing separate ways of escape, or has a door leading directly to the outside of the building, shall have at least one outside window which can be opened from the inside without the use of tools and of such design that it may serve as an emergency exit if the normal avenues of escape are blocked. The sill of such windows shall not be more than three and one-half (3½) feet above the floor.

SECTION 604.0. UNLIMITED ONE STORY BUILDINGS

In one-story business, industrial and storage buildings of unlimited area when permitted under the provisions of section 309, sufficient exitways shall be provided to accommodate the entire occupancy on each front of the building; and the unobstructed length of travel to a street exit or to the entrance of an enclosed tunnel or other enclosed exitway leading to a street exit shall not exceed one hundred and fifty (150) feet.

SECTION 605.0. AIR-CONDITIONED BUILDINGS

605.1. Location of Stairways.—In all buildings, without exterior window openings in all stories, that are artificially ventilated and air-conditioned as provided in section 517, the exit stairways shall be located as to be accessible to the fire department either through the access openings specified in section 861 or as otherwise approved in at least alternate stories of the building.

605.2. Exhaust Ducts.—No exhaust ducts or vents of air-conditioning systems shall discharge into stair or elevator enclosures nor shall corridors or other exitways in hotels and institutional buildings be used as the return exhaust from air-conditioned spaces through louvres or other devices in the doors or partitions enclosing such air-conditioned spaces; unless such passageways are equipped with approved devices to automatically stop the supply and exhaust fans and close the louvres when such use is approved by the building official.

SECTION 606.0. EXISTING BUILDINGS

606.1. Owner Responsibility.—The owner or lessee of every existing building and structure shall be responsible for the safety of all persons in or occupying such premises with respect to the adequacy of means of egress therefrom.

606.2. Unsafe Exit Doors.

606.21. Inadequate Exits.—In any existing building or structure, not now provided with exit facilities as herein prescribed for new buildings and in which the exits are deemed inadequate for safety by the building official, such additional provision shall be made for safe egress as he shall order.

606.22. Appeal from Exit Order.—Within seven (7) days after the service of the exit order of the building official, the owner may file a written appeal therefrom, and the building official shall appoint a board of survey as required in section 127 to make a final determination.

606.3. No Change in Use.—When there is no change in use group or occupancy load, the minimum exitway requirements shall be as follows:

606.31. New Exitways.—If new or altered exit facilities are installed or constructed they shall comply with all the requirements for new buildings.

606.32. Existing Exitways.—In all buildings other than one- and two-family dwellings, exceeding three (3) stories or forty (40) feet in height, or having more than seventy-five (75) occupants above or more than forty (40) occupants below the grade floor, all existing unenclosed stairways shall be enclosed with partitions and opening protectives of three-quarter (¾) hour fireresistance rating complying with article 9; or such exitways may be protected with a partial sprinkler system operated on the house water supply when approved by the building official and complying with section 1214.6. Existing enclosures of substandard fireresistive construction shall be covered on the stair side only with the component materials required for a three-quarter (¾) hour fireresistive assembly.

606.33. Fire Escapes.—In buildings not over five (5) stories or sixty-five (65) feet in height, fire escapes complying with the requirements of section 624 may be accepted as a secondary means of egress when deemed adequate by the building official and when approved access to the street is provided from the termination of the fire escape.

606.4. Existing Use Changed.—In every building or structure in which there is a change from one use group to another with special requirements, or when there is an increase in occupancy load, the exit facilities serving the new use and occupancy shall be made to comply with all the provisions of this article for buildings hereafter erected.

SECTION 607.0. MAINTENANCE OF EXITWAYS

607.1. Obstructions.—It shall be unlawful to obstruct, or reduce in any manner the clear width of any doorway, hallway, passageway or any other exitway required by the provisions of the Basic Code.

607.2. Exterior Exitways.—Exterior stairways and fire escapes shall be kept clear of all flower boxes, pots and other obstructions; and no display sign or other obstruction shall be attached to the building as to interfere with the free operation and use of such means of egress.

607.3. Maintenance.—All exterior stairways and fire escapes shall be kept free of snow and ice. They shall be properly painted before and after erection; and shall be scraped and painted as often as necessary to maintain them in safe condition.

SECTION 608.0. OCCUPANCY LOAD

608.1. Design Occupancy Load.—In determining required exit facilities, the number of occupants for whom provision is made on any given floor area shall be the normal occupancy for which the floor area or part thereof is designed; but in no case less than the number which can be accommodated on the net floor area within the perimeter of the building, not includ-

ing elevator, stair or other shaft enclosures, at the rate of one occupant per unit of area as prescribed in table 10.

608.2. Mezzanine Floors.—The occupancy load of a mezzanine floor discharging through a floor below shall be added to the main floor occupancy and the capacity of the exits shall be designed for the total occupancy load thus established.

608.3. Roofs.—Roof areas occupied as roof gardens or for assembly, storage or other purposes shall be provided with exit facilities to accommodate the required occupancy load, but in no case shall there be less than two (2) approved means of egress for assembly uses from such roof areas.

608.4. Special Uses.—For areas in other use groups not specified in the Basic Code, the building official shall establish by legally adopted rule the occupancy load to be assumed in the design.

TABLE 10.—OCCUPANCY ALLOWANCES

Use group	Floor area in square feet per occupant
Assembly with fixed seats	6
Assembly without fixed seats	15
Business buildings	100
Court Rooms	40
Dance halls, lodge rooms	15
Hotels, lodging houses, multi-family dwellings	125
Institutional buildings	150
Mercantile buildings, first floor	30
Mercantile buildings, basement sales floor	30
Mercantile buildings, other floors	60
Schools	40
Storage buildings	300
Bowling alleys, allow 5 persons for each alley, including 15 feet of runway, and for additional areas	10

608.5. Conflicts.—When there are special requirements for specific occupanies and uses in article 4 which differ from general requirements herein prescribed, such special provisions shall take precedence.

SECTION 609.0. TYPES AND LOCATION OF EXITWAYS

All approved exitways, including doorways, passageways, corridors, hallways, interior stairways, exterior stairways, moving stairways, smoke-proof towers, ramps, horizontal exits, bridges, balconies, elevators and fire escapes shall be arranged and constructed as provided herein and in compliance with article 16 for elevators and moving stairways and article 9 for fire enclosure requirements.

609.1. Arrangement.—All required exits shall be so located as to be visible and readily accessible with unobstructed access thereto and so arranged as to lead directly to the street or to an area of refuge with supplemental means of egress that will not be obstructed or impaired by fire, smoke or other cause.

609.2. Remote Location.—Whenever more than one (1) means of exit is required from any room, space or floor of a building, they shall be placed as remote from each other as practicable, and shall be arranged to provide direct access in separate directions from any point in the area served.

609.3. Length of Travel.—Except as may be modified by the provisions of section 611 for number of exitways, all exits shall be so located that the maximum length of travel, measured from the most remote point to an approved stairway or horizontal exit along the natural and unobstructed line of travel shall not exceed the distances given in table 11; except that in buildings of other than high hazard use where the area is subdivided into rooms or compartments, the distance shall be measured from the corridor entrance to the nearest exit.

TABLE 11.—LENGTH OF TRAVEL TO EXITS IN FEET

Use Group	Types 1 and 2 Construction	Types 3 and 4 Construction	
		Protected	Unprotected
High Hazard	75	75	75
Storage	100	100	100
Mercantile	100	100	100
Industrial	100	100	100
Business	150	150	100
Place of Assembly	100	100	100
Institutional	75	75	75
Residential	75	75	75

609.4. Floors Below Grade.—In buildings of all use groups the permissible length of travel to the stairway on any floor more than one (1) story below grade shall not exceed seventy-five (75) feet.

609.5. Sprinklered Buildings.—In storage, mercantile and industrial buildings equipped with an approved two-source automatic sprinkler system, the permissible length of travel to the exit may be increased by fifty (50) percent.

SECTION 610.0. CAPACITY OF EXITS

610.1. Unit of Exit Width.—The unit of exit width for all approved types of exit and exitway facilities specified in section 609 shall be twenty-two (22) inches with a credit of one-half (½) unit for each twelve (12) inches clear width in addition to one or more twenty-two (22) inch units.

610.2. Design Allowance for Use Groups.—Except as may be specifically modified in article 4, the design capacity per unit of exit width shall be computed in accordance with table 12 for the specified use groups.

610.3. Sprinkler Allowance.—When the building is protected with an approved automatic sprinkler system complying with the requirements of article 12, and such sprinkler protection is not specifically required by the Basic Code, the capacity per story per unit exit width of stairways may be increased fifty (50) per cent above the values specified in table 12.

610.4. Horizontal Exit Allowance.—When an approved horizontal exit complying with the provisions of section 616 is provided in buildings of storage, mercantile, industrial, business and assembly uses, the capacity per story per unit exit width of stairways may be increased fifty (50) per cent above the value specified in table 12; and in buildings of institutional use groups, the capacity per unit exit width may be increased one hundred (100) per cent.

TABLE 12.—CAPACITY PER UNIT EXIT WIDTH

Use group	Number of occupants	
	Stairways	Doors
High hazard	25	40
Storage	50	75
Mercantile	50	75
Industrial	50	75
Business	50	75
Assembly	60	90
Institutional	25	75
Residential	25	75

610.5. Combined Total Allowance.—When both approved automatic sprinklers and horizontal exits are provided as specified in the Basic Code, the capacity per unit exit width of stairways may be double the values specified in table 12.

610.6. Area of Refuge Allowance.—The capacity of required areas of refuge enclosed within fire partitions or fire walls shall be computed on a net floor area allowance of three (3) square feet for each occupant to be accommodated therein, not including areas of stair, elevator and other shafts or courts.

SECTION 611.0. NUMBER OF EXITWAYS

The following general requirements apply to buildings of all use groups. More restrictive requirements that may be provided in article 4 for special uses and occupancies shall take precedence over the general provisions of this section.

611.1. Minimum Number.—There shall be not less than two (2) approved independent exitways serving every floor area above and below the first or grade floor, at least one (1) of which shall be an interior enclosed stairway, except in one- and two-family dwellings and as modified in section 611.3 and section 621.1. Exits in dwellings shall be so arranged that they may be reached without passing through another living unit.

611.2. Grade Floor Exits.—From the first or grade floor, direct exits shall be provided to the street consisting of one unit of exit width for each fifty (50) occupants on the grade floor in buildings of the high hazard use group and for each one hundred (100) occupants in all other use groups, in addition to the exits from upper and lower floor exitways.

611.3. Buildings With One Stairway.—Only one exitway consisting of an interior enclosed stairway shall be required in buildings of the uses and occupancies herein specified:

611.31. Residential Buildings.—In multi-family dwellings (use group L-2), not over three (3) stories and attic in height for not more than six (6) families, nor more than three thousand (3000) square feet in area of fireproof construction (type 1) or protected noncombustible construction (types 2-A and 2-B), and in other types of construction, not more than two thousand four hundred (2400) square feet in area. The distance of travel to the one required exit shall not exceed fifty (50) feet and the stairway shall be enclosed in partitions of two (2) hour fireresistance with three-quarter (¾) hour fire doors complying with article 9 at the opening.

In multi-family dwellings (use group L-2) not over two (2) stories and nonhabitable attic in height, for not more than eight (8) families, nor more than four (4) families to a floor nor more than three thousand (3000) square feet in area. The distance of travel to the one required exit shall not exceed fifty (50) feet and the stairway shall be enclosed with partitions of not less than one and one-half (1½) hour fireresistance with three-quarter (¾) hour fire doors complying with article 9 at the openings.

611.32. Business Buildings.—In business buildings (use group E) not over three (3) stories in height or four thousand (4000) square feet in area of fireproof (type 1) construction or protected noncombustible (type 2-A) construction and in other types of construction not more than two (2) stories in height nor more than three thousand (3000) square feet in area. The distance of travel to the exit shall not exceed seventy-five (75) feet in such cases nor shall the occupancy load be more than fifty (50).

611.4. Basement Recreation Rooms.—In residential buildings (use groups L-1 and L-2), the basements of which are used as playrooms or for similar recreation purposes, with an occupancy load of twelve (12) or more, such areas and the interior stairway shall be enclosed with partitions and ceilings of not less than three-quarter (¾) hour fireresistance construction with direct access to the main street exit. A direct secondary exit from the basement to streets, yards, or courts leading to the street, shall be acceptable in lieu of the requirement for an enclosed stairway.

SECTION 612.0. PASSAGEWAYS AND CORRIDORS

612.1. Access Passageways.—Direct access shall be provided to stairways or other required means of egress through continuous passageways, aisles or corridors, conveniently accessible to all occupants and maintained free of obstruction.

612.11. Turnstiles and Gates.—Access from public areas through turnstiles, gates, rails or similar devices shall not be permitted unless such a device is equipped to readily swing in the direction of exit travel under a total pressure of not less than fifteen (15) pounds.

612.2. Dead Ends.—Exit corridors and hallways in all stories above the first which serve more than one exit stairway, shall provide direct connection to such stairways in opposite directions from any point in the corridor. Dead ends in corridors shall be avoided insofar as practicable; and in no case shall the length of travel to a stairway or other approved exit be more than the distance prescribed in table 11.

612.3. Width.—The unit exit width and occupancy allowance of aisles and corridors, unless otherwise provided for special uses and occupancies in article 4, shall be the same as for stairways (table 12) with a minimum total width of forty-four (44) inches in buildings of the storage, business, industrial and assembly use groups, sixty (60) inches in mercantile and institutional buildings and ninety-six (96) inches in school buildings and seventy-two (72) inches in church schools; except that in churches and chapels, side aisles may be one-half (½) these widths but in no case less than twenty-four (24) inches.

612.4. Opening Protectives.—All doors from rooms opening on a public corridor in buildings more than two (2) stories in height or with more than twenty-five (25) occupants above the first floor used as hotel or institutional buildings shall be three-quarter (¾) hour fire doors or one and three-quarter (1¾) inch thick solid core wood doors or their approved equivalent complying with article 9. The use of transoms and louvres shall be prohibited.

SECTION 613.0. GRADE PASSAGEWAYS AND LOBBIES

613.1. Enclosure of Passageways.—Every required interior and exterior stairway which does not adjoin a street shall be directly connected to the street or to an open court leading to the street by an enclosed passageway, hallway, lobby or other unobstructed exitway constructed as provided in this section and in section 909.0.

613.2. Width and Height.—The effective width of the lobby or other enclosed passageway shall be not less than three-quarters (¾) of the aggregate width of all exit stairways leading thereto and all required exit doorways opening into the passageway, provided that such passageway shall have a minimum width of forty-four (44) inches and a minimum clear ceiling height of eight (8) feet.

613.3. Maximum Stairway Limitations.—Not more than two (2) required stairways shall discharge through the same passageway; except that in school and factory buildings and other use groups in which the occupants are regularly trained in supervised fire drills for rapid dismissal, a common corridor or lobby may be arranged to accommodate not to exceed four (4) stairways.

613.4. Construction.—In all buildings more than three stories in height or with more than seventy-five (75) occupants above or more than forty (40) occupants below the grade floor, unless protected as required in section 613.44, the enclosures of grade passageways and lobbies connecting required means of egress to the street shall be of two (2) hour fireresistive construction with openings protected as herein required. In all other buildings, except one- and two-family dwellings, such enclosures shall be of not less than three-quarter (¾) hour fireresistive construction. Except in buildings involving uses which are incidental to the main use and when such accessory uses are designed to serve the convenience of occupants in hotels, office buildings and buildings of similar uses, the following additional requirements shall apply:

613.41. Door Openings.—All required exitway doors shall comply with the requirements of article 9 for fire doors;

613.42. Show Windows.—Show windows opening on such lobbies shall be protected with automatic sprinklers or shall be backed with fire partitions of two (2) hour fireresistance rating;

613.43. Trim and Finish.—All architectural trim and finish and decorative materials in grade floor lobbies shall comply with the requirements of sections 923.2 and 925;

613.44. Sprinklered Buildings.—When the grade floor lobbies, passageways, public hallways and other public spaces connected thereto are equipped with an approved automatic sprinkler system complying with article 12, the requirements of sections 613.42 and 613.43 shall be waived.

613.5. Sales Spaces.—Sales spaces in grade floor lobbies for the retail sale of merchandise not exceeding one hundred (100) square feet in area shall be permitted in grade floor lobbies, provided the required clear width of the exit corridor is not reduced thereby.

SECTION 614.0. EXIT DOORWAYS

614.1. Number of Doorways.—Every room with an occupancy load of more than seventy-five (75) or which exceeds fifteen hundred (1500) square feet in area shall have at least two (2) exit doorways and the doors shall be hung to swing in the direction of exit travel without obstructing the required width of exit passageway. Grade exit doors shall not project more than twelve (12) inches beyond the street lot line complying with section 312.4.

614.11. Entrance and Exit Doorways.—Where separate doors are provided for entrance and egress use the entrance door shall be clearly marked "ENTRANCE ONLY" in letters not less than six (6) inches in height and legible from both inside and outside; unless such doors are equipped with an emergency release bracket that will disengage the door operator and permit the door to swing outward under total pressure of not more than fifteen (15) pounds. Unless so equipped, doors swinging inward only shall not be accepted as part of the required exit facilities. When doors are operated by a mechanical opening device they shall comply with the requirements of section 614.45.

614.2. Size of Doors.—The minimum width of single exit doors shall be thirty-two (32) inches and the maximum width shall be forty-four (44) inches; except that single exit doors in one- and two-family dwellings and from retail stores and similar spaces on the grade floor to the street may be not less than thirty (30) inches wide. When the doorway is subdivided into two (2) or more separate openings, the minimum clear width of each opening shall be not less than twenty-eight (28) inches and each opening shall be computed separately in determining the number of required units of exit width. A door forty (40) inches in width shall be deemed the equivalent of two (2) full units of exit width. The height of exit doors shall in no case be less than six and two-thirds (6⅔) feet. In applying the provisions of the Basic Code, the nominal door dimensions shall be used for computing required size of doors.

614.3. Location of Doors.—The exit doorways opening from a building and from each room or space within a building leading to an exit corridor, street or passageway to a street shall be located as remote as practicable from each other. The distance of travel from any point to a required door shall not exceed the limitations of section 609.3 and table 11.

614.4. Door Hardware.

614.41. Operation.—Locks and fastenings on required exit doors shall be readily opened from the inner side without the use of keys. Draw bolts, hooks and other similar devices shall be prohibited on all required exit doors, unless there is a readily visible, durable sign on the door stating "THIS DOOR TO REMAIN UNLOCKED DURING OCCUPANCY". The sign shall be in letters not less than one (1) inch high on a contrasting background. The locking device must be of a type that will be readily distinguishable as locked.

614.42. Panic Proof.—In rooms of the assembly use group (use group F-2) with an occupancy load of more than seventy-five (75) and in all other rooms and places of public assembly with an occupancy load of more than three hundred (300), exit doors shall be equipped with approved panic proof latches or bolts which release under a pressure of fifteen (15) pounds.

614.43. Remote Control.—In rooms of the institutional use group (use group H-1) occupied as places of detention, approved releasing devices with remote control shall be provided for emergency use.

614.44. Fireresistance of Hardware.—Fire door opening protectives of specified fireresistance rating shall include approved hardware in the assembly to comply with sections 904 and 917.

614.45. Mechanical Operations.—Where required exit doors are arranged to be opened by mechanical devices of any kind, they shall be so constructed that the door may be opened manually and will release under a total pressure of not more than fifteen (15) pounds applied in the direction of exit travel.

614.5. Door Construction.—All required exit doors shall be self-closing fire doors complying with article 9, except for grade floor exit doors and as herein provided for approved collapsible revolving doors and where one and three-quarter (1¾) inch solid core wood doors are permitted.

614.51. Grade Exit Doors.—Exit doors at grade may be glazed with plate glass not less than seven thirty-seconds (7/32) inches thick, or with any other approved glazing materials of equal flameresistance and fireresistance. Plate glass doors having one or more unframed edges may be used provided they are constructed of tempered glass not less than three-quarter (¾) inches thick.

SECTION 615.0. REVOLVING DOORS

615.1. Limitations of Use.

615.11. Where Permitted.—Except in places of assembly with an occupancy load of more than two hundred (200) and in buildings of the institutional use group (use group H), approved automatic collapsible revolving doors when constructed and installed as herein provided shall be accepted in required exit doorways from the first floor to the street but not to exceed fifty (50) per cent of the total required grade floor exits.

615.12. Prohibited Construction.—Braces or other devices that prevent normal operation of the automatic releasing mechanism shall be prohibited.

615.13. Supplemental Exits.—Approved swinging doors may be provided to furnish one-half (½) the required exit width in accordance with provisions of this article; and at least one swinging door shall be located immediately adjacent to each revolving door.

615.2. Width of Passage.

615.21. Unit Exit Width.—Automatic collapsible revolving doors approved as required exitways shall provide a minimum clear unit exit width of passageway through the vestibule when the leaves are in a collapsed position.

615.22. Minimum Diameter.—The minimum diameter of approved revolving doors shall be adequate to provide the required clear exit width when collapsed, but in no case less than six and one-half (6½) feet in diameter.

615.3. Speed Control.—All approved automatic collapsible revolving doors shall be equipped with an approved speed control governor adjustable to safe traffic speed as required by the approved rules, but in no case more than fifteen (15) nor less than ten (10) revolutions per minute.

615.4. Construction.—All approved automatic collapsible revolving doors shall be constructed as follows:

615.41. Operating Mechanism.—The collapsing mechanism shall be constructed of stainless steel or other approved corrosion-resistive materials;

615.42. Use of Wood.—Where not otherwise required by the provisions of article 9, the doors may be constructed of wood or other approved materials of similar combustible characteristics with a minimum thickness of one and one-quarter (1¼) inches;

615.43. Floor Covering.—Approved mats or other floor coverings complying with the provisions of article 9, not more than one-half (½) inch thick, may be installed within the enclosure when permanently secured to the structural flooring and finishing flush with the adjacent floor area;

615.44. Glazing.—The doors shall be glazed with not less than seven thirty-seconds (7/32) inch plate glass.

615.5. Inspection and Maintenance.—The owner shall be responsible for the care, operation and maintenance of all revolving door installations after such doors are placed in operation. He shall have periodic inspections made by the person or firm responsible for the installation at intervals of not more than three (3) months and shall maintain all parts in proper working order.

SECTION 616.0. HORIZONTAL EXITS

Horizontal exits as herein defined shall be accepted as an approved means of exit when complying with the requirements of this article. The connection between the areas of refuge as herein specified may be accomplished by protected openings in a fire wall, by a vestibule, or by an open-air balcony or bridge.

616.1. Opening Protectives.—One side of the opening in fire walls or fire divisions which are required to have a fireresistance rating of two (2) hours or more shall be protected with a one and one-half (1½) hour self-closing fire door, swinging in the direction of exit travel, and on the opposite side with an approved automatic fire door, fire curtain or water curtain. When serving as a dual exitway, there shall be adjacent openings with swinging fire doors opening in opposite directions; except that in school buildings where supervised fire drills are conducted a double-acting fire door may be substituted for the pair of doors herein specified.

616.2. Size of Doors.—Size of openings in fire walls shall comply with the provisions of section 908, but in no case shall the width of one opening used as a required exit be greater than eighty-eight (88) inches nor shall the area exceed eighty (80) square feet.

616.3. Area of Refuge.—The areas connected by the horizontal exit shall be either public areas or spaces occupied by the same tenant and each such area of refuge shall be adequate to house the total occupancy load of both connected areas as provided in section 610.6.

616.4. Unlocked Doors.—Horizontal exit doors shall be kept unlocked and unobstructed whenever the premises on either side of the exit are occupied.

616.5. Egress from Area of Refuge.

616.51. Stairway Exit.—There shall be at least one interior enclosed stairway or fire tower on each side of the horizontal exit and any fire section not having a stairway accessible thereto shall be considered as part of an adjoining section with such stairway; but in no case shall the length of travel exceed the requirements of section 609.3 and table 11.

616.52. Auxiliary Elevator.—When horizontal exits are provided in floors located twelve (12) or more stories above grade, the required stairway shall be supplemented by at least one (1) passenger elevator complying with section 623, maintained ready for use during normal occupancy of the building.

SECTION 617.0. RAMPS

Ramps with a gradient of not more than one (1) in ten (10) may be substituted for and shall comply with all the applicable requirements of required stairways as to enclosure, capacity, and limiting dimensions; except in existing buildings and where specified in article 4 for special uses and occupancies, larger gradients may be permitted but in no case greater than one and three-quarter (1¾) inches per foot. For all slopes exceeding one (1) in ten (10) and wherever the use is such as to involve danger of slipping, the ramp shall be surfaced with approved non-slip materials.

SECTION 618.0. INTERIOR STAIRWAYS

618.1. Capacity of Stairs.—The capacity of exit stairs and doors per unit of exit width shall be computed in accordance with section 610.

618.2. Minimum Dimensions.

618.21. Width.—All interior required stairways shall be not less than forty-four (44) inches in width except that such width may be reduced to thirty-six (36) inches in one- and two-family dwellings (use group L-3), or in business buildings (use group E) with an occupancy load of not more than forty (40) below or seventy-five (75) above grade, or in exitways from boiler rooms and similar service spaces not open to the public or in general use by employees. When the boiler room is less than thre hundred (300) square feet in area, housing a low pressure boiler, and is completely enclosed in two (2) hour fireresistive construction with approved opening protectives and an iron ladder or other approved direct exit is furnished to the street, the primary stairway may be omitted.

618.22. Headroom.—The minimum headroom in all parts of the stair enclosure shall be not less than six and two-thirds (6⅔) feet.

618.23. Restrictions.—No stairways shall reduce in width in the direction of exit travel.

618.3. Landings and Platforms.

618.31. Width.—The least dimension of landings and platforms shall be not less than the required width of stairway.

618.32. Vertical Rise.—In assembly (use group F) and institutional (use group H) buildings, the height of vertical rise shall not exceed eight (8) feet between landings and intermediate platforms. In all other buildings, no stairway shall have a height of rise of more than twelve (12) feet between landings, nor shall any single flight of stairs have less than three (3) risers.

618.4. Treads and Risers.

618.41. Minimum Dimensions.—The height of risers and width of treads in inches shall be as follows:

Use Group	*Maximum Riser*	*Minimum Tread*
One- and two-family dwellings (use group L-3)		
All stairs with closed risers	8¼"	9" plus 1¼" nosing
Basement service stairs with open risers	8¼"	9" plus ½" nosing
All other residential (use groups L-1 and L-2)	8"	9" plus 1¼" nosing
Assembly and institutional	7½"	9½" plus nosing
Business	7¾"	9½" plus nosing

618.42. Winders.—No winders shall be permitted in required stairways except that in one- and two-family dwellings and in ornamental stairways not required as a means of exit, treads with a minimum width of four (4) inches and an average width of nine (9) inches may be permitted.

618.5. Handrails.—Unless otherwise specifically provided, all stairways not exceeding eighty-eight (88) inches in width shall have continuous walls, guards and handrails on both sides, projecting not more than three and one-half (3½) inches into the required stair width; and when the width exceeds eighty-eight (88) inches, the stairway shall be provided with

intermediate handrails dividing the stairway in approximately equal widths with a maximum lateral spacing of sixty-six (66) inches. The height of the handrail shall be not less than thirty (30) inches nor more than thirty-three (33) inches above the nosing of treads and shall be returned to the enclosure walls or posts at the ends of the stairs.

618.6. Stair Exit Doors.

618.61. Width.—The width of every exit door to a stairway shall be not less than the number of units of exit width required for the capacity of the stairway which services the floor or area from which the exit door leads; but in no case shall such door be less than thirty (30) inches nominal width in one- and two-family dwellings and thirty-two (32) inches nominal width in business buildings.

618.62. Direction of Swing.—All doors shall swing on a landing in the direction of exit travel. When open, stair exit doors shall not reduce the width of landings to less than the minimum required for its capacity and in no case to less than thirty-six (36) inches.

618.63. Door Construction.—All required stair exit door opening protectives, including the frames and hardware, shall be approved self-closing swinging fire doors complying with article 9 except in one- and two-family dwellings and where one and three-quarter (1¾) inch solid core wood doors are permitted.

618.7. Spiral Stairways.—Spiral stairways of noncombustible construction may be used as exits from mezzanine floors not more than two hundred and fifty (250) square feet in area nor more than one-third (⅓) the area of the floor below. The minimum width shall be twenty-two (22) inches for the accommodation of not more than ten (10) persons.

618.8. Supplemental Stairways.—Monumental or ornamental stairways, extending from the grade floor to basement or to second floor, in buildings of other than industrial, assembly and institutional use groups, except as permitted in section 418.22, when not required as means of egress may be erected without an enclosure, but not to connect more than two (2) adjoining stories. Such ornamental stairways shall be additional to and shall not obstruct or interfere with required exit facilities.

618.9. Stair Construction.—Unless herein otherwise provided, all required interior stairways shall be built entirely of noncombustible materials with solid risers, treads and landing platforms and all finish floor surfaces of non-slip noncombustible materials except that wood handrails shall be permitted, complying with the requirements of section 618.5.

618.91. Strength.—All stairways, platforms, landings and exitways in other than one- and two-family dwellings, shall be adequate to support a live load of one hundred (100) pounds per square foot.

618.92. Enclosures.—Unless otherwise specifically required in the Basic Code, all required interior stairways shall be enclosed in partitions of two (2) hour fire-resistance rating, except in one- and two-family dwellings not exceeding three (3) stories in height; and except further that in buildings not more than three (3) stories or more than forty (40) feet in height, with an occupancy load of not more than seventy-five (75) above nor more than forty (40) below the grade floor, the enclosures shall be of not less than three-quarter (¾) hour fireresistance.

618.93. Combustible Construction.—In all buildings of type 3 or 4 construction in all use groups other than assembly and institutional buildings, not over three (3) stories or forty (40) feet in height with not more than seventy-five (75) occupants above nor more than forty (40) occupants below the grade floor, the stairways and their enclosures may be constructed of wood or other approved materials of similar combustible characteristics and of adequate strength; except that in no case shall combustible stairs be permitted in school buildings.

618.94. Enclosures for Combustible Construction.—The enclosure and underside of stairways of combustible construction, except in one- and two-family dwellings, shall be protected with fireresistive partitions and ceilings as herein required, fire-stopped as specified in sections 877, 909 and 921; and the space below the stairs shall be kept open or shall be solidly enclosed with fireresistive partitions.

SECTION 619.0. ACCESS TO ROOF

619.1. By Stairway.—In buildings more than three (3) stories in height with roofs having a slope of less than twenty (20) degrees, access to the roof shall be provided by means of a stairway or a ladder and scuttle. Where the roof is used as a roof garden or for other habitable purposes, sufficient stairways shall extend to it to provide the necessary exit facilities required for such occupancy. Roof trap doors shall be constructed to comply with section 927.

619.2. Roof Enclosures.—Stairways extending through roofs shall be enclosed in roof structures of fireresistive construction meeting the requirements of section 928.

SECTION 620.0. SMOKEPROOF TOWERS

620.1. Where Required.—In every mercantile (use group C), industrial (use group D), business (use group E), assembly buildings other than theatres (use groups F-2, F-3, and F-4), institutional (use group H), and residential buildings accommodating more than twenty (20) individuals (use group L-1), over six (6) stories or seventy-five (75) feet in height, at least one (1) required means of egress shall be a smokeproof tower.

620.2. Access.—Access to the stairway at each story shall be through a vestibule, balcony or landing, with an unobstructed width not less than the required stairway width, but not less than forty-four (44) inches in any case, open to a street, alley, yard or court with four (4) feet high guard railings across the open side. Outside vestibules or balcony floors shall be level with or installed below the building floor where climatic conditions involve possibility of door obstruction by snow or ice. No step shall be permitted into the stair enclosure.

620.3. Court Size.—The yard or court shall have a minimum area of two hundred (200) square feet and a minimum dimension of ten (10) feet and the exterior vestibule opening shall have a minimum area of eighteen (18) square feet and a minimum width of thirty (30) inches.

620.4. Interior Open Courts.—When interior open courts are used to vent the access balcony or vestibules, special provision shall be made in the design to avoid the creation of vertical drafts resulting in negative pressures which would retard the opening of the exit door to the stairway from the balcony or vestibule.

620.5. Opening Protectives.

620.51. Windows.—All window openings facing on the yard or court within thirty (30) feet below or to the side of any access balcony or vestibule shall be protected with three-quarter (¾) hour opening protectives complying with article 9.

620.52. Doors.—Door openings from building to vestibules or balconies and to the stairways shall be not less than forty-four (44) inches wide. The doors shall be capable of being opened from both sides without a key, complying with all the requirements of exit doors for stairways, except that the fireresistance rating shall be not less than one and one-half (1½) hours or the approved labeled equivalent complying with article 9.

620.6. Terminal Exit Corridor.—The fire tower shall terminate at grade level and shall exit to the street independently of all other stairways. When exit passageways are used, they shall comply with the requirements of section 612; except that there shall be no openings in the exit corridor other than the fire tower and street exit doorways and the enclosure walls shall be constructed of four (4) hour fireresistance and the floor and roof construction of three (3) hour fireresistance.

620.7. Construction.—The enclosure of fire towers shall be constructed of walls with a four (4) hour fireresistance rating without openings other than the exit doorways; with platforms, landings and balconies of not less than three (3) hour fireresistance rating complying with all the applicable construction details specified for interior stairways.

SECTION 621.0. EXTERIOR STAIRWAYS

621.1. As Required Exitway.—Exterior stairways conforming to the requirements for interior stairways in all respects, except as to enclosures and except as herein specifically modified, may be accepted as required means of egress in buildings not exceeding five (5) stories or sixty-five (65) feet in height for other than institutional use (use group H), provided there is at least one (1) additional approved interior stairway, except as provided in section 621.11 for residential buildings. Exterior stairways which are accepted as exits in residential buildings of use groups L-2 and L3 shall be relieved from requirements for screens and fire doors, but shall be provided with handrails as required for interior stairs and shall be covered by a roof providing protection from the weather.

621.11. Residential Buildings.—In the residential portion of motels (use group L-1) of fireproof (types 1A and 1B) protected noncombustible (types 2A and 2B) and heavy timber (type 3A) construction, not more than two (2) stories and nonhabitable attic or thirty (30) feet in height, interior enclosed stairways may be omitted where at least one (1) door from each motel unit opens onto a roofed-over open porch or balcony served by at

least two (2) stairways so located as to provide a choice of independent, unobstructed paths of exit directly to the grade. Such porches and stairways shall comply with the requirements of interior stairways (section 618.0) except as provided in section 621.1. Porches shall be not less than four and one-half (4½) feet in width. The stairways shall be not less than three (3) feet eight (8) inches in width and shall be located remotely from each other. The maximum travel distance from any motel unit to the nearest stairway shall be seventy-five (75) feet. Porches and stairways shall be located at least ten (10) feet from adjacent property lot lines and from other buildings on the same lot unless openings in such buildings are protected by three-quarter (¾) hour fire resistive doors or windows.

621.2. Screens.—Screens shall be provided on all exposed sides of required exterior stairways to a height of five (5) feet, constructed of wire or other noncombustible weather resisting mesh having a maximum opening of one and one-half (1½) inches. The top of the stairway shall be protected with a hood or canopy of metal or other approved noncombustible material.

621.3. Opening Protectives.

621.31. Doors.—Except as specified in section 621.1 for residential buildings, access shall be provided at each story through a three-quarter (¾) hour self-closing fire door of the required number of unit exit widths.

621.32. Windows.—In buildings more than three (3) stories in height, or with an occupancy load of more than seventy-five (75) above or more than forty (40) below grade, the openings below and within ten (10) feet horizontally of the stairway shall be protected with approved three-quarter (¾) hour automatic fire windows.

621.4. Location.

621.41. Access to Street.—All exterior required stairways shall be located so as to lead directly to a street or open space with direct access to a street; or when located on the rear of the building they may exit through a passageway at grade complying with section 612.

621.42. Projection.—In no case shall exterior stairways project beyond the street lot line.

621.5. Construction.—Exterior stairs shall be constructed entirely of steel or other approved noncombustible materials with pipe handrails on both sides of stairways and platforms. On buildings of type 3 or type 4 construction, not more than three (3) stories in height, exterior stairways may be constructed of wood members not less than two (2) inches in thickness.

SECTION 622.0. MOVING STAIRWAYS AS EXITS

622.1. When Acceptable.—Moving stairways of the horizontal non-slip tread type moving in the direction of egress may be accepted as an approved exitway in buildings of all use groups except assembly and institutional uses, when constructed and approved in accordance with the requirements of this article and the provisions of section 1621. When accepted as a required means of egress, they shall be enclosed with fireresistive partitions as specified in section 618.

622.2. Width.—The width shall be not less than forty (40) inches between balustrades and the moving tread shall be not less than thirty-six (36) inches in width, and fifteen and three-quarter (15¾) inches in depth.

622.3. Capacity.—The occupancy capacity shall be computed as provided in section 610 for approved stairway exits.

622.4. Landings and Platforms.—Landings and platforms shall be provided at the top and bottom of each unit as required for interior approved stairways.

622.5. Railings.—Railings shall be of the balustrade type surmounted by moving handrails traveling at the same speed as the stairway.

622.6. Egress.—Direct egress to the street shall be provided as specified herein for interior stairway exits, except that in mercantile buildings completely equipped with a two-source automatic sprinkler system moving stairways may be accepted for one-third (⅓) the total required exit capacity when discharging through the main grade floor area.

622.7. Construction.

622.71. Noncombustible Materials.—Only noncombustible materials shall be used in the construction of moving stairways accepted as a required means of egress except for step wheels, handrails, electrical equipment, and wood veneers not more than one twenty-eighth (1/28) inches thick directly attached to metal or other noncombustible backing with a nonvolatile and non-flammable cement.

622.72. Fireresistance.—The enclosure shall afford the fireresistance required for approved interior stairway exits as specified in table 5.

622.73. Extension to Roof.—The construction shall comply with all the applicable requirements of the Basic Code for interior stairway exits except that a legal fixed stairway may be substituted for the extension to the roof when required.

622.74. Height of Travel Per Unit.—No single moving stairway unit shall have a vertical travel of more than two (2) stories nor more than thirty-five (35) feet.

SECTION 623.0. ELEVATORS AS EXITS

Passenger elevator installations complying with the requirements of article 16 may be accepted as approved means of egress as follows:

623.1. Auxiliary Exit.—As a required auxiliary exit when used in connection with horizontal exits as provided in section 616.52;

623.2. Supplementary Exit.—In business buildings of fireproof construction (type 1), not exceeding fifteen thousand (15,000) square feet in area, as a substitute for one of two (2) or more required stairways provided the capacity in number of occupants per elevator is computed as one-third (⅓) of that allowed for a twenty-two (22) inch stairway unit.

623.3. Limiting Number.—Not more than two (2) elevators shall be counted for exit purposes and shall be separately enclosed from the stairway.

623.4. Grade Exit Corridor.—The width of grade exit corridor into which stairways and elevators discharge shall be not less than three-quarters (¾) of the combined required width for stairways and elevators; but

in no case shall the width of corridor be less than five (5) feet when accommodating the discharge from five (5) or less elevators; and not less than one-half (½) foot additional for each additional elevator.

SECTION 624.0. FIRE ESCAPES

624.1. Where Permitted.—Except in one- and two-family and multifamily dwellings (use groups L-2 and L-3), fire escapes shall not in general be accepted as a required means of egress and only by special order of the building official in existing buildings or structures of other use groups not exceeding five (5) stories or sixty-five (65) feet in height, when constructed in accordance with the approved rules and when more adequate exit facilities cannot be provided.

624.2. Location.—When located on the front of the building and projecting beyond the building line, the lowest platform shall be not less than ten (10) nor more than fourteen (14) feet above grade, equipped with a counterbalanced stairway to the street and with fixed ladder to the roof. In alleyways and thoroughfares less than thirty (30) feet wide, the clearance under the lowest balcony shall be not less than fourteen (14) feet.

624.3. Construction.—The fire escape shall be designed to support a live load of one hundred (100) pounds per square foot and shall be constructed of metal or other approved noncombustible materials.

624.31. Dimensions.—Stairs shall be at least twenty-two (22) inches wide with risers not more and treads not less than eight (8) inches and platforms at foot of stairs not less than forty (40) inches wide by thirty-six (36) inches long, located not more than eight (8) inches below the access window or door.

624.32. Opening Protectives.—Doors and windows along the fire escape shall be protected with three-quarter (¾) hour opening protectives in other than residence buildings of use groups L-2 and L-3.

624.33. Outside Fire Limits.—On buildings not over three (3) stories nor more than forty (40) feet in height located outside the fire limits, accommodating not more than twenty (20) persons, fire escapes may be constructed of wood or other approved material of similar combustible characteristics.

624.34. Within Fire Limits.—Within Fire District No. 2, fire escapes may be constructed of wood not less than two (2) inches thick on buildings of type 3 or type 4 construction not more than three (3) stories in height.

SECTION 625.0. SLIDESCAPES

Slidescapes and safety chutes shall be permitted in buildings of the high hazard use group and in existing school and institutional buildings, when approved by the building official and constructed in accordance with the approved rules.

625.1. Location.—The arrangement and location of slidescapes shall conform to this article for exitways and shall be designated by exit signs and lights as provided in section 626.

625.2. Construction.—All chutes shall be constructed of approved noncombustible materials with a pitch in the line of travel of not less than twenty-four (24) nor more than forty-two (42) degrees measured on the developed circumference of spiral chutes. Straight chutes shall be not less than twenty-four (24) inches and spiral chutes not less than twenty-eight (28) inches wide in the clear; nor more than forty-four (44) inches wide in any case. When erected on the interior of a building, they shall be enclosed as required in section 618.92 for interior stairways with direct exit to the street or other public space.

625.3. Extension to Roof.—Where constituting a supplemental means of egress from roofs all slidescapes and chutes shall extend to the roof as required for exit stairways in section 619.

SECTION 626.0. EXIT SIGNS AND LIGHTS

626.1. Size and Location.—In other than one- and two-family and multifamily buildings having not more than eight (8) dwelling units, all required means of egress shall be indicated with approved metal signs reading "EXIT" in red letters at least six (6) inches high on a white background or in other approved distinguishable colors; illuminated by an electric light of not less than twenty-five (25) watts, visible from the exit approach and, when necessary, supplemented by directional signs in the access corridors indicating the direction and way of egress. Or such signs may be internally illuminated with an enclosing noncombustible case through ruby glass. The letters of internally illuminated signs shall be not less than four and one-half (4½) inches high.

626.2. Power Source.—All exit signs shall be generally located at doors or exitways so as to be readily visible and not subject to obliteration by smoke. They shall be illuminated at all times when the building is occupied from an independently controlled electric circuit or other source of power.

SECTION 627.0. EXITWAY LIGHTING

627.1. Artificial Lighting.—All stairways, exitways and passageways appurtenant thereto in other than one- and two-family dwellings shall be equipped with artificial lighting facilities to provide the intensity of illumination herein prescribed continuously during the time that conditions of occupancy of the building require that the exitways be available.

627.2. Intensity of Illumination.—The intensity of floor lighting in all exitways shall be not less than three (3) foot candles.

627.3. Places of Assembly.—In places of assembly for the exhibition of motion pictures or other projections by means of directed light, the illumination of floors of exitways may be reduced during such period of projection to not less than one (1) foot candle.

627.4. Independent Power Source.—In department stores of over five thousand (5000) square feet area, places of public assembly, schools, institutional buildings, and hotels with sleeping accommodations for more than twenty-five (25) persons, the lighting shall be from an independent power source to assure continued illumination of all exitways in case of emergency.

ARTICLE 7

STRUCTURAL AND FOUNDATION LOADS AND STRESSES

SECTION 700.0. SCOPE

The provisions of this article shall control the structural design of all buildings and structures and their foundations hereafter erected to insure adequate strength of all parts thereof for the safe support of all superimposed live and special loads to which they may be subjected in addition to their own dead load, without exceeding the allowable stresses prescribed in the Basic Code or in accepted engineering practice.

SECTION 701.0. DEFINITIONS

controlled construction. The construction of a building or structure or a specific part thereof which has been designated and erected under the supervision of a licensed or registered engineer or architect using controlled materials as herein defined in compliance with accepted engineering practice under the procedure of section 129.

controlled materials. Materials which are certified by an accredited authoritative agency as meeting accepted engineering standards for quality and as provided in sections 722 and 800.

formed steel construction. That type of construction used in floor and roof systems consisting of integrated units of sheet or strip steel plates which are shaped into parallel steel ribs or beams with a continuous connecting flange deck; generally attached to and supported on the primary or secondary members of a structural steel or reinforced concrete frame.

foundation wall. A wall below the floor nearest grade serving as a support for a wall, pier, column or other structural part of a building.

light gage steel construction. That type of construction in which the structural frame consists of studs, floor joists, arch ribs, rafters, steel decks and other structural elements which are composed and fabricated of cold-formed sheet or strip steel members less than three-sixteenths (3/16) inch thick.

load.

—**dead load.** The weight of all permanent construction including walls, floors, roofs, partitions, stairways and of fixed service equipment.

—**earthquake load.** The assumed lateral load acting in any horizontal direction on the structural frame due to the kinetic action of earthquakes.

—**impact load.** The load resulting from moving machinery, elevators, craneways, vehicles, and other similar forces and kinetic loads.

—**lateral soil load.** The lateral pressure in pounds per square foot due to the weight of the adjacent soil, including due allowance for hydrostatic pressure.

—live load. The weight superimposed by the use and occupancy of the building, not including the wind load, earthquake load, or dead load.
—wind load. The lateral pressure on the building or structure in pounds per square foot due to wind blowing in any direction.
ordinary materials. Materials which do not conform to the requirements of the Basic Code for controlled materials.
primary member. Any member of the structural frame of a building or structure used as a column; grillage beam; or to support masonry walls and partitions; including trusses, isolated lintels spanning an opening of eight (8) feet or more; and any other member required to brace a column or a truss.
secondary member. Any member of the structural framework other than a primary member including filling-in beams of floor systems.
steel joist. Any secondary steel member of a building or structure made of hot or cold-formed solid or open-web sections, or riveted or welded bar, strip or sheet steel members or slotted and expanded or otherwise deformed rolled sections.
structural steel member. Any primary or secondary member of a building or structure consisting of a rolled steel structural shape other than formed steel, light gage steel or steel joist members.

SECTION 702.0. DESIGN SAFE LOAD

702.1. Structural Analysis.—The safe load for any structural member or system of construction shall be determined by accepted engineering analysis except as provided in sections 703 and 803 for tests of assemblies not capable of analysis.

702.2. Check Tests.—When there is reasonable doubt as to the design capacity of any structural unit or assembly, the building official may require that check tests be made of the assembled unit and its connections or he shall accept certified reports of such tests from accredited testing authorities conducted in accordance with the approved rules.

SECTION 703.0. TEST SAFE LOAD

703.1. When Required.—When not capable of design by accepted engineering analysis, any system of construction or structural unit and its connections shall be subjected to the tests prescribed in article 8 or in the test standards listed in appendixes D and E, or to such other tests acceptable to the building official that simulate the actual loads and conditions of application that occur in normal use; or he shall accept certified reports of such tests conducted by an accredited testing laboratory providing such tests meet the requirements of the Basic Code and the approved rules.

703.2. Test Load.—When approved by test, every structural assembly shall sustain without failure minimum superimposed loads equal to two and one-half (2½) times the required live load; and under the approved working load, the deflection shall not exceed the limits prescribed in section 804.

SECTION 704.0. DESIGN LIVE LOAD

704.1. Required Live Load.—The live loads to be assumed in the design of buildings and structures shall be the greatest load produced by the intended use and occupancy, but in no case less than the minimum uniformly distributed unit loads required in section 707 for specific uses.

704.2. Loads Not Specified.—The building official shall determine the required live load for any use not specifically provided for in table 13.

SECTION 705.0. DESIGN DEAD LOAD

705.1. Construction Materials.—In estimating dead load for the purposes of structural design, the actual weights of materials shall be used, but in no case less than the unit dead loads prescribed in appendix J.

705.2. Service Equipment.—The weight of all building service equipment including plumbing stacks, heating and air conditioning equipment and similar fixtures shall be included in the dead load supported by the structural frame.

705.3. Partition Load.—In office and other buildings, in which subdividing partitions may be subsequently erected, rearranged or relocated, provision shall be made to support the actual weight of such partitions where they occur or for an equivalent uniform load, which shall be assumed not less than twenty (20) pounds per square foot of floor area in addition to the specified uniformly distributed live load.

SECTION 706.0. EXISTING BUILDINGS

In the reconstruction, repair, extension or alteration of existing buildings, the allowable working stresses used in design shall be as follows:

706.1. Building Extended.—When an existing building is altered by an extension in height or area, all existing structural parts affected by the addition shall be strengthened where necessary and all new structural parts shall be designed to meet the requirements for buildings hereafter erected;

706.2. Building Repaired.—When repairs are made to the structural portion of an existing building, and the uncovered structural portions are found unsound, such parts shall be made to conform to the requirements for buildings hereafter erected;

706.3. Existing Live Load.—When an existing building heretofore approved is altered or repaired within the limitations prescribed in sections 106.3 or 106.4, the structure may be designed for the loads and stresses applicable at the time of erection, provided the public safety is not endangered thereby.

706.4. Posted Live Load.—Any existing building heretofore approved, in which there is no change in use to a new use group requiring greater floor loads, may be posted for the originally approved live loads, provided the building is structurally safe in all its parts and adequate for its existing use, and the public safety is not endangered thereby.

SECTION 707.0. UNIT LIVE LOADS

The plans for all buildings and structures intended for other than residential uses shall specify the live loads for which each floor or part thereof has been designed.

707.1. Uniform Live Load. — The minimum uniformly distributed live load in pounds per square foot shall be as provided in table 13 and for all concentrated loads wherever they occur as provided in section 708.

TABLE 13.—MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS

Use	Pounds per square foot
Alleys, driveways, yards and terraces	
Pedestrian	100
Vehicular	250
Armories and drill rooms	150
Assembly:	
Fixed seats	60
Removable or no seats	100
Baleony (exterior)	100
Bowling alleys, pool rooms and similar recreational areas	75
Class Rooms	60
Fixed seats	60
Removable seats	100
Cornices	75
Corridors:	
Hotels, hospitals and multi-family dwellings	60
One- and two-family dwellings	40
Serving public rooms in hotels	100
Corridors and entranee hallways other than residential buildings	100
Corridors (other than those speeifically designated):	
Private	Same as occupancy served.
Public	100
Court rooms	100
Danee halls and gymnasiums	100
Dwellings:	
Dwelling units (Multi-family dwellings)	40
First floor	40
Second floor and habitable attic	30
Uninhabitable attics	20(c)
Elevator machine rooms	100
Garages and stables, passenger cars not exeeeding, 6,000 lbs. wt.	75
Garages, buses and trucks not exceeding 20,000 lbs. wt.: (b)	
Columns, beams and girders	120
Floor slabs	175
Grandstands, reviewing stands and bleachers	100
Hospitals:	
Operating rooms	60
Private rooms	40
Wards	40
Libraries:	
Reading rooms	60
Stack rooms	150(a)
Loft buildings and light manufaeturing	125
Manufacturing:	
Heavy	Not less than actual loads.
Light (See Loft buildings . . .)	
Marquees	75
Offiee buildings:	
Lobbies	100
Rooms	50
Penal institutions: cell blocks	40
Parking struetures, passenger cars only:	
Parts of floor aeeessible to wheel loads	75
Parts of floor not accessible to wheel loads	50
Restaurants and public dining rooms	100
Reviewing stands and bleachers (See Grandstands . . .)	
Sidewalks	250
Skating rinks	75
Stairs, fire escapes and exitways	100
Storage warehouse:	
Heavy	250
Light	125
Stores and shops:	
Retail, and banking rooms	100
Grade floor	75
Upper floors	125
Wholesale	
Theatres:	
Aisles, corridors and lobbies	100
Baleonies	60
Orchestra floors	60
Stage floors	150

Note a. Minimum 150 lb./sq. ft. but not less than actual weight of loaded shelves.
Note b. For garages for vehicles exceeding 20,000 lbs. wt.: See sec. 707.2.
Note c. Live load need be applied to joists or to bottom chords of trusses or trussed rafters only in those portions of attie spaee having a clear height of forty-two (42) inches or more between joist and rafter in conventional rafter eonstruction; and between bottom ehord and any other member in trussed or trussed rafter construetion. However, joists or the bottom chords or trusses or trussed rafters shall be designed to sustain the imposed dead load or ten pounds per square foot (10 p.s.f.), whichever be greater, uniformly distributed over the entire span.

707.2. Heavy Truck Loads.—The floor loads for garages designed to house trucks or buses exceeding twenty thousand (20,000) pounds gross weight shall be determined by the actual load conditions; but in no case shall the assumed load be less than one hundred and fifty (150) per cent of the maximum wheel load on any point of the floor construction.

SECTION 708.0. CONCENTRATED LOADS

Floors of buildings in the use groups specified in table 14 shall be designed to support the uniformly distributed live loads prescribed in section 707 or the following concentrated loads in pounds, whichever produces the greater stresses. Unless otherwise specified, the indicated concentration shall be assumed to occupy an area of two and one-half (2½) feet square, and shall be so located as to produce the maximum stress conditions in the structural members; except that in steel joist construction, bridged in accordance with the requirements of section 829, the specified concentration shall be assumed as distributed over three (3) of the secondary members and each individual joist shall be capable of sustaining a concentrated load of eight hundred (800) pounds at the panel point.

TABLE 14.—CONCENTRATED LOADS

Location	Pounds
Elevator machine room grating (on area of 4 sq. in.)	300
Finish light floor plate construetion (on area of 1 sq. in.)	200
Garages, pleasure ears	2000
Garages, trueks (not less than 150 per eent maximum wheel load)	——
Office floors	2000
Scuttles and skylight ribs	200
Sidewalks	8000
Stair treads (on center of tread)	300

SECTION 709.0. IMPACT LOADS

The unit live loads specified in section 707 shall be assumed to include adequate allowance for ordinary impact conditions. Provision shall be made in the structural design for special uses and loads which involve vibration and impact forces.

709.1. Elevators.—All moving elevator loads shall be increased one hundred (100) per cent for impact and the structural supports shall be designed within the limits of deflection prescribed by the standard safety code for elevators listed in appendix B.

709.2. Heavy Machinery.—Unless otherwise specified, all heavy machinery and other moving loads shall be increased not less than twenty-five (25) per cent for impact.

709.3. Craneways.—All craneways shall be designed to resist a lateral transverse force equal to twenty-five (25) per cent of the crane capacity plus the weight of the trolley applied one-half (½) at the top of each runway rail; and a lateral longitudinal force equal to twelve and one-half (12½) per cent of the maximum wheel loads applied at the top of each rail.

709.4. Outdoor Assembly Structures.—Grandstands, stadiums and similar outdoor assembly structures shall be designed to resist a horizontal swaying load applied parallel to the rows of seats, in addition to the wind loads, of not less than twenty-four (24) pounds per lineal foot of seats; and of not less than ten (10) pounds per lineal foot of seats applied transversely.

SECTION 710.0. SPECIAL LOADS

Provisions shall be made for all special loads herein prescribed and all other special loads to which the building or structure may be subjected.

710.1. Below Grade.—All retaining walls and other walls below grade shall be designed to resist lateral soil pressures with due allowance for hydrostatic pressure and for all superimposed vertical loads.

710.2. Hydrostatic Uplift.—All foundation slabs and other footings subjected to water pressure shall be designed to resist a uniformly distributed uplift equal to the full hydrostatic pressure.

710.3. Railings.—Railings around stairwells and other floor openings shall be designed to resist a lateral force applied horizontally at the top of the railings of forty (40) pounds per lineal foot and railings at the front of balconies of theatres and similar locations, a lateral force of fifty (50) pounds per lineal foot. In addition to the lateral loads, railings and guards of grandstands and similar outdoor assembly structures shall be capable of sustaining a vertical load of one hundred (100) pounds per lineal foot.

710.4. Construction Loads and Erection Stresses.—Provision shall be made for temporary construction and wind loads which may occur during the erection of the building; and all structural members and connections shall be designed and erected so as to prevent overstressing during construction.

SECTION 711.0. ROOF LOADS

The structural supports of roofs shall be designed to resist wind and where applicable snow and earthquake loads in addition to the dead load of the construction and the appropriate live loads specified in section 707.

711.1. Minimum Roof Load.—Flat and pitched roofs shall be designed for a live load of not less than twenty (20) pounds per square foot of horizontal protection. In areas subject to snow loads, the roof shall be designed for a live load of thirty (30) pounds per square foot in the absence of specific information as designated in section 712.2. When used for incidental promenade purposes, roofs shall be designed for a minimum live load of sixty (60) pounds per square foot; and one hundred (100) pounds per square foot when designed for roof-garden or assembly uses.

711.2. Curved Roofs.—Roofs with a radius of curvature not less than the half-span nor more than the three-quarter (¾) span of the roof shall be designed to resist ten (10) pounds per square foot of horizontally projected area on buildings forty (40) feet or less in height; and fifteen (15) pounds per square foot on buildings exceeding forty (40) feet in height. When valleys are formed by a multiple series of curved roofs, special provision shall be made for the increased load at the intersections.

711.3. Overhanging Eaves.—In other than one- and two-family dwellings and except where framing of overhang is a continuation of the roof framing, overhanging eaves, cornices and other roof projections shall be designed for a minimum uniformly distributed live load of sixty (60) pounds per square foot.

SECTION 712.0. SNOW LOAD

712.1. Shape of Roof.—When the effect of the shape of roof structure as determined by actual test indicates lesser or greater snow retention value than specified in this article, the roof load shall be modified accordingly.

712.2. Special Snow Loads.—In sections subject to snow loads as indicated by the average snow depth in the records of the U. S. Weather Bureau, the design loads shall be modified accordingly.

SECTION 713.0. WIND LOAD

The structural frame of all buildings, signs, tanks and other exposed structures or parts of structures shall be designed to resist the horizontal pressures due to wind in any direction, both inwardly and outwardly, allowing for suction on the leeward side, as provided in sections 714 to 718 inclusive.

713.1. Torsional Resistance.—The structural frame of all buildings and structures subjected to wind or other lateral loads shall be designed to resist the torsional moment due to eccentricity of the resultant load with respect to the center of rigidity of the structure.

SECTION 714.0. WIND ON VERTICAL SURFACES

The wind pressures on vertical surfaces to be considered in the design of primary members shall be those prescribed in section 714.1, distributed in accordance with section 714.2.

The wind pressures on vertical surfaces to be considered in the design of secondary members, wall panels, sheathing and girts and their connections shall be those prescribed in section 714.1 distributed in accordance with section 714.2 and as modified by section 714.3.

714.1. Primary Framing Members.—Except in geographical localities subject to hurricanes, cyclones, tornadoes or similar unusual wind pressures shall be as required in the following section:

714.11. Height Not More than Fifty Feet.—On buildings or parts thereof that are fifty (50) feet or less in height the wind pressure on exposed vertical surfaces shall be assumed to be fifteen (15) pounds per square foot.

714.12. **Height Not More Than 100 Feet.**—On all buildings or parts thereof between fifty (50) and one hundred (100) feet in height, a pressure of twenty (20) pounds per square foot shall be assumed on those exposed vertical surfaces in excess of fifty (50) feet in height.

714.13. **Height Over 100 Feet.**—On all buildings or parts thereof over one hundred (100) feet in height the wind pressure shall be assumed to increase twenty-five thousandths (0.025) pounds per square foot for each foot of height in excess of one hundred (100) feet above the one hundred (100) foot level.

714.2. **Distribution of Wind Force.**—The wind pressure shall be distributed between opposite walls, two-thirds (⅔) as a normal pressure on the windward side and one-third (⅓) as a normal outward suction on the leeward side.

714.3. **Secondary Wall Framing and Wall Panels.**—In buildings provided with one-third (⅓) or more wall openings, internal wind forces of ten (10) pounds per square foot shall be assumed to occur simultaneously with the above external forces both in pressure and suction.

714.31. **External Pressures.**—External Pressures or suctions to be considered in the design of secondary wall framing and wall panels and sheathing and their connections shall be one and one-half (1½) times those determined in accordance with section 714.2.

714.32. **Internal Pressures.**—In buildings having one-third (⅓) or more of any wall surface open, or subject to being opened or broken, an internal pressure of ten (10) pounds per square foot or internal suction of five (5) pounds per square foot, whichever is critical, shall be considered in the design of secondary wall framing and wall panels and sheathing and their connections, in addition to the external pressures or external suction required by section 714.31. For lesser amounts of wall openings the internal pressure or suction assumed shall be one-half (½) of the foregoing values.

714.4. **Design Wind Load for Glass.**—Firmly supported lights of glass of four (4) square feet or more in area installed in a vertical position, or at an angle of not more than twenty (20) degrees from the vertical, shall be designed to withstand wind pressure in accordance with design criteria stated in appendix K-12.

SECTION 715.0. WIND LOAD ON ROOFS

The external wind pressures and suctions specified in sections 715.1 and 715.2 shall be considered in the design of primary roof framing and trusses.

External wind pressures and suctions to be considered in the design of secondary roof framing, purlins, roof panels and sheathing and their connections shall be one and one-half (1½) times those determined in accordance with those sections. Internal pressures to be considered in the design of secondary roof framing and roof panels and sheathing and their connections shall be those specified in section 714.3 for wall elements.

715.1. **Pitched Roofs.**—External wind forces on roofs, assumed to be acting upon primary roof framing members shall be not less than the following listed fractions of the values specified in sections 714.11, 714.12 and 714.13, and shall be based on the average height of the roof eave above grade, the slope of the roof at the location under consideration and the ratio of sidewall height to building width.

EXTERNAL WIND PRESSURE ON ROOFS

Ratio of Sidewall Height to Building Width	Flat Roofs	Windward Slope of Roofs				Leeward Slope
		Less than 1:12	1:12 to 4.05:12	4.05:12 to 6:12	6:12 to 12:12	All Slopes
0.2	—.60	—.60	—.06	.12	.19	—.50
0.4	—.60	—.60	—.33	.01	.09	—.50
0.6	—.60	—.60	—.49	—.20	—.06	—.50
0.8	—.60	—.60	—.57	—.30	—.18	—.50
1.0 or more	—.60	—.60	—.60	—.39	—.28	—.50

For all roof surfaces having a slope greater than 12:12 the same wind forces as for vertical surfaces shall be assumed.

715.2. **Curved Roofs.**—The external wind forces assumed to be acting upon the primary framing members in the windward quarter of curved roofs shall be not less than the wind pressure specified in sections 714.11, 714.12 or 714.13 multiplied by the rise-to-span ratio of the entire roof arch and shall be considered as acting as an inward acting pressure. An external suction of not less than seven-tenths (7/10) of the pressure specified in sections 714.11, 714.12 or 714.13 shall be assumed to be acting upon the center half of all arch roofs and an external suction of not less than six-tenths (6/10) of such pressures shall be assumed to be acting upon the leeward quarter of all such roofs. All wind pressures acting upon curved roofs shall be considered as acting normal to the chord of the curved section under consideration.

715.3. **Test Determination.**—The effect of shape of irregular or unusual roofs may be determined by wind tunnel or equivalent tests. In determining the effect of shape, the assumed wind velocity shall be the maximum average for a five (5) minute period shown in the records of the U. S. Weather Bureau during the past fifteen (15) years, and the prescribed wind forces shall be modified accordingly.

715.4. **Anchorage.**—Roof framing shall be anchored to wall framing and walls to foundations so as to resist wind uplift and sliding in excess of seventy-five (75) per cent of the dead load resistance.

715.5. **Uplift on Eaves.**—Overhanging eaves, cornices and other roof projections shall be designed and constructed to withstand an upward pressure of forty (40) pounds per square foot.

SECTION 716.0. WIND LOADS ON SIGNS, TANK AND RADIO TOWERS AND CHIMNEYS

716.1. **Ground Signs and Towers.**—The wind pressure on ground signs and towers other than radio and television towers, shall be assumed at fifteen (15) pounds per square foot of net exposed area of the structure

normal to the direction of the wind, for structures up to fifty (50) feet in height and twenty (20) pounds for structures over fifty (50) feet in height.

716.2. Roof Structures.—The wind pressure on roof signs, tank towers, stacks, chimney and other exposed roof structures with plane surfaces shall be assumed at thirty (30) pounds per square foot applied to the net projected area of the structure normal to the direction of the wind except as provided in section 716.3 and 716.4.

716.3. Shielding Effect.—No shielding effect of one element by another shall be considered when the distance between them exceeds four (4) times the projected smallest dimension of the windward element.

716.4. Effect of Shape.—The wind pressure on circular tanks, stacks or other circular structures shall be assumed effective on two-thirds (⅔) of the projected area; and for hexagonal or octagonal structures on seven-eighths (⅞) of the projected area.

716.5. Radio Towers.—Radio towers shall be subjected to the loads provided in sections 427 and 428 unless smaller or greater loads are demonstrated by approved tests.

SECTION 717.0. UNUSUAL WIND EXPOSURES

For buildings and structures located in unusually exposed positions or in geographical regions subjected to higher wind loads than herein specified, the design wind load shall be determined by the prevailing conditions.

SECTION 718.0. OVERTURNING AND SLIDING

The overturning moment due to the wind load on all structures shall not exceed seventy-five (75) per cent of the moment of stability resulting from the dead load of the building, unless the building or structure is anchored to resist the excess overturning moment and the excess horizontal shear over sliding friction.

SECTION 719.0. EARTHQUAKE LOAD

In regions where local experience or the records of the U. S. Coast and Geodetic Survey show loss of life or damage of buildings resulting from earthquakes, buildings and structures hereafter erected shall be designed to withstand lateral forces as provided in appendix K-11 of the Basic Code, except as exempted in section 719.1.

719.1. Exemptions.—In zone "0" of table 14C in appendix K-11 and where local experience or the records of the U. S. Coast and Geodetic Survey do not show loss of life or damage to property, regardless of zone, or when the building complies with any one or more of the following conditions, no earthquake loading shall be required in calculating the structural frame of the building or structure.

(a) Is a one- or two-family dwelling;
(b) Is a minor accessory building;
(c) Is not over three (3) stories or thirty-five (35) feet in height;
(d) Is of skeleton frame construction with wind and sway bracing as

required by approved engineering practice for the type of frame used, and the least dimension of the building is not less than thirty-five (35) percent of the height.

SECTION 720.0. COMBINED LOADING

The structural frame of all buildings shall be investigated for the combined effect of lateral and vertical loading and the individual members of the frame shall be proportioned as follows:

720.1. With Earthquake.—For combined stresses due to earthquake load together with dead, live and snow loads, the allowable working stress for the structural material may be increased thirty-three and one-third (33⅓) per cent;

720.2. With Wind.—For combined stresses due to wind load together with dead, live and snow loads, the allowable working stress for the structural material may be increased thirty-three and one-third (33⅓) percent);

720.3. Minimum Section.—The section determined for the combined loadings herein specified shall be compared with that required for dead, live and snow loads only, and the section of greatest strength shall determine that to be used in the structure.

720.4. Wind Neglected.—When the stress due to wind is less than one-third (⅓) of the stress due to dead plus live loads, the wind stress may be neglected.

SECTION 721.0. LIVE LOAD REDUCTION

In all buildings and structures except places of assembly, the design live loads may be reduced on columns, piers, walls, trusses, girders and foundations as herein specified; but in no case shall a reduction be applied to the roof live load.

721.1. Live Loads 100 Pounds or Less.—For live loads of one hundred (100) pounds or less per square foot, the design live load on any member supporting one hundred fifty (150) square feet or more may be reduced at the rate of eight-hundredths (0.08) per cent per square foot of area supported by the members, except that no reduction shall be made for areas to be occupied as places of public assembly. The reduction shall exceed neither R as determined by the following formula, nor sixty (60) percent:

$$R = 100 \times \left(\frac{D+L}{4.33L}\right)$$

in which

R = reduction in percent
D = dead load per square foot of an area supported by the member
L = design live load per square foot of area supported by the member.

721.2. Live Loads More Than 100 Pounds.—For live loads exceeding one hundred (100) pounds per square foot, no reduction shall be made, except that the design live loads on columns may be reduced twenty (20) percent.

721.3. Foundations and Column Supports.—The full dead load plus the reduced live load as herein prescribed shall be used in the design of foundations and of trusses or girders which support columns.

SECTION 722.0. ALLOWABLE WORKING STRESSES

722.1. Controlled Materials.—The design and working stresses of all controlled materials as defined in section 701, or of any structural material that is identified as to manufacture and grade by mill tests or the strength and stress grade is otherwise confirmed to the satisfaction of the building official, shall conform to the specifications and methods of design of accepted engineering practice or to the approved rules in the absence of applicable standards. A building or structure may be erected in whole or in part of controlled design and materials.

722.2. Ordinary Materials.—The use of ordinary materials without selection and without controlled design and supervision, or when the material is not identified as to strength and stress grade, shall be limited to the average unit working stresses prescribed in appendix K.

722.3. New Materials.—For materials which are not specifically provided for in the Basic Code, the working stresses shall be established by tests as provided in sections 703 and 803.

SECTION 723.0. ALLOY AND SPECIAL STEELS

The use of alloy, high carbon or other special high-strength steels shall be permitted in the design and construction of buildings and structures as controlled materials and as prescribed in section 833 in accordance with accepted engineering practice.

SECTION 724.0. LIGHT WEIGHT METALS

Aluminum and other light weight metals and their alloys may be used in the design and construction of buildings or structures only after special approval of the building official, subject to the determination of the physical properties by tests as prescribed in article 8 and in accordance with the provisions of section 834.

SECTION 725.0. BEARING VALUE OF SOILS

All applications for permits for the construction of new buildings or structures, and for the alteration of a permanent structure which require changes in foundation loads and distribution, shall be accompanied by a statement describing the soil in the ultimate bearing strata, including sufficient records and data to establish its character, nature and load-bearing capacity. Such records shall be certified by a licensed professional engineer or a licensed architect.

725.1. Satisfactory Foundation Materials.—Satisfactory bearing materials for spread footings shall include ledge rock on its natural bed;

natural deposits of sand, gravel or dry clay, or a combination of such materials, provided they do not overlie an appreciable amount of peat, organic silt, moist clay, or other objectionable materials.

725.2. Presumptive Bearing Values.—Except when determined by field loading tests or as otherwise provided herein, the maximum allowable pressure on supporting soils under spread footings at or near the surface shall not exceed the values specified in table 15. Presumptive bearing values shall apply to all materials of similar physical characteristics and disposition. Surface values shall be adjusted for deep footings and for the bearing strata under piles as provided in the Basic Code. When foundation caissons are driven to penetrate into sound rock, the allowable bearing values in table 15 may be increased as prescribed in section 744.

725.3. Light Weight Structures.—Mud, organic silt, or unprepared fill shall be assumed to have no presumptive bearing capacity unless approved by test, except where the bearing capacity is deemed adequate by the building official for the support of light weight and temporary structures.

TABLE 15.—PRESUMPTIVE SURFACE BEARING VALUES OF FOUNDATION MATERIALS

Class of material	Tons per square foot
1—Massive crystalline bed rock including granite, diorite, gneiss, trap rock, hard limestone and dolomite	100
2—Foliated rock including bedded limestone, schist and slate in sound condition	40
3—Sedimentary rock including hard shales, sandstones, and thoroughly cemented conglomerates	25
4—Soft or broken bed rock (excluding shale), and soft limestone	10
5—Compacted, partially cemented gravels, and sand and hardpan overlying rock	10
6—Gravel and sand-gravel mixtures	6
7—Loose gravel, hard dry clay, compact coarse sand, and soft shales	4
8—Loose, coarse sand and sand-gravel mixtures and compact fine sand (confined)	3
9—Loose medium sand (confined), stiff clay	2
10—Soft broken shale, soft clay	1.5

SECTION 726.0. BORINGS AND TESTS

726.1. When Required.—In the absence of satisfactory data from immediately adjacent areas, the owner or applicant shall make borings, test pits, or other soil investigations at such locations and to sufficient depths of the bearing materials to the satisfaction of the building official. For all buildings, in other than residential use groups, which are more than three (3) stories or forty (40) feet in height, and whenever it is proposed to use float, mat or any type of deep foundation, there shall be at least one exploratory boring to rock or to a depth of not less than fifty (50) feet below the load-bearing strata for every twenty-five hundred (2500) square feet of built-over area, and such additional tests that the building official may direct.

726.2. Soil Samples.—Samples of the strata penetrated in test borings or test pits, representing the natural disposition and conditions at the site, shall be available for examination of the building official. Wash or bucket samples shall not be accepted.

726.3. Varying Soil Values.—When test borings indicate non-uniformity of bearing materials, a sufficient number of additional borings shall be

made to establish strata levels of equal bearing capacity.

726.4. Cost of Tests.—When the safe sustaining power of the soil is in doubt, or superior bearing value than specified in the Basic Code is claimed, the building official shall direct that the necessary borings or tests be made by and at the expense of the applicant and under the supervision of the building official to determine the safe value.

SECTION 727.0. SOIL TEST PROCEDURE

727.1. Soil Test Method.—The test procedure and testing apparatus shall be approved by the building official before they are used; and a complete record of the tests together with a record of the soil profile shall be filed by the licensed engineer or architect who shall have a fully qualified representative on the site during all boring and test operations.

727.2. Loaded Area.—For spread footings, the soil shall be loaded at one or more places and at the required level or levels. The loaded area shall be approximately four (4) square feet for all bearing materials; except that when the footing overlies wet clay or other soft materials, the test load shall be applied to an area of not less than ten (10) square feet.

727.3. Recorded Settlements.—Loads shall be applied in continuous increments of not more than one-quarter (¼) of the proposed safe load. When the proposed load has been reached, it shall remain undisturbed and readings shall be recorded to determine the rate of settlement until the settlement in eight (8) consecutive hours is less than one-hundredth (0.01) inches. A fifty (50) per cent excess load shall then be applied and allowed to remain in place until the rate of settlement is less than one-hundredth (0.01) inches in twenty-four (24) hours.

727.4. Accuracy of Loading.—Test loads applied by mechanical devices shall be automatically controlled so as to insure not more than five (5) per cent variation in applied load. Such devices shall be calibrated prior to the test.

727.5. Test Acceptance.—The load settlement shall be represented diagramatically, and no test shall be deemed satisfactory if the net settlement after removal of the test load exceeds one-hundredth (0.01) inches per ton of gross load applied.

SECTION 728.0. ALLOWABLE FOUNDATION LOADS

The maximum allowable loads under all types of foundations shall be limited by accepted engineering practice and as provided herein.

728.1. Rock Foundations.—Where subsurface explorations at the project site indicate variations or doubtful characteristics in the structure of the rock upon which it is proposed to construct foundations, a sufficient number of borings shall be made to a depth of not less than ten (10) feet below the level of the footings to provide assurance of the soundness of the foundation bed and its bearing capacity.

728.2. Increased Rock Capacity.—The presumptive bearing capacity of class 1 or class 2 rock may be increased when the surface is leveled or benched; provided such increased safe capacity is determined by load tests

on an area of not less than one (1) square foot in accordance with the provisions of section 727; but in no case shall such loads be increased to exceed the unit compressive stress permitted on reinforced concrete footings under the provisions of the Basic Code.

SECTION 729.0. DEPTH OF FOOTINGS

Except when erected upon solid rock or when otherwise protected from frost, foundation walls, piers and other permanent supports of all buildings and structures shall extend below the frost line of the locality and spread footings of adequate size shall be provided when necessary to properly distribute the load within the allowable bearing value of the soil. Or such structures shall be supported on piles or ranging timbers when solid earth or rock is not available. No footings shall be founded on frozen soils unless such frozen condition is of a permanent character.

729.1. Isolated Footings.—Footings on granular soil of classes 5 to 10 inclusive in table 15 shall be so located that the line drawn between the lower edges of adjoining footings shall not have a steeper slope than thirty (30) degrees with the vertical, unless the material suporting the higher footing is braced or retained or otherwise laterally supported in an approved manner.

729.2. Floating Mat.—Floating mat foundations shall be located on permanently undisturbed soil of adequate bearing capacity. The building official may approve a continuous foundation mat which is located directly on the ground when adequate sub-soil drainage and a rat-proof apron as specified in section 875.1 are provided when required. Where subject to freezing, the footings shall be designed to resist frost action. The requirements of section 508 governing the ventilation of crawl spaces under grade construction shall be waived provided adequate provision is made for dampproofing and waterproofing when required.

SECTION 730.0. FOOTING DESIGN

730.1. Design Loads.—The full dead load including the weight of foundations, footings, and overlying fill and the reduced live loads as specified in section 721 shall be used in designing footings.

730.2. Pressure Due to Lateral Loads.—If the increased pressure on any footing due to wind, earthquake or other lateral loads does not exceed one-third (⅓) of the dead and live load pressures alone, such loads may be neglected. When such increased pressure is more than one-third (⅓), the lateral loads shall be considered in the design with a one-third (⅓) increase in allowable soil pressure under the combined load.

730.3. Earthquake Loads.—In localities subject to seismic disturbances, special provision shall be made in the foundation design to comply with the provisions of section 719.

730.4. Vibratory Loads.—Where machinery or other vibrations may be transmitted through the foundations, consideration shall be given in the design of the footings to prevent detrimental disturbances of the soil.

730.5. **Varying Unit Pressures.**—Footings shall be so designed that the unit soil pressure under the dead load shall be as uniform as possible under all parts of the building or structure. When necessary for stability in the structure due to varying soil conditions as determined in section 726.3, variations may be permitted in the unit load under different footings in accordance with accepted engineering practice.

SECTION 731.0. TIMBER FOOTINGS

731.1. **Where Permitted.**—Unless otherwise approved by the building official, timber footings may be used only for wood frame structures. Such footings shall be placed entirely below the permanent water level except when installed over submerged or marsh lands as capping of wood piles which project above the water level, or when treated with an approved pressure preservative process.

731.2. **Untreated Timber.**—The compressive stresses perpendicular to the grain in untreated timber footings, supported upon piles, with the pile cut-off and the top of the footing and capping entirely below permanent ground water or mean low water level, shall not exceed seventy (70) per cent of the allowable stresses for the species and grade of lumber as specified in the national design specification for stress grade lumber listed in appendix B.

SECTION 732.0. STEEL GRILLAGES

All steel grillage beams shall be separated with approved steel spacers and shall be entirely encased in at least three (3) inches of concrete and the spaces between beams shall be completely filled with concrete or cement grout. When used on yielding soils, steel grillages shall rest on approved concrete beds not less than six (6) inches thick.

SECTION 733.0. UNREINFORCED CONCRETE FOOTINGS

733.1. **Concrete Strength.**—Concrete in unreinforced foundation footings shall be so proportioned as to develop an ultimate compressive strength of not less than two thousand (2000) pounds per square inch at twenty-eight (28) days.

733.2. **Deposition.**—No concrete footings shall be poured through water unless otherwise approved by the building official. When poured under or in the presence of water, the concrete shall be deposited by approved means which insure minimum segregation of the mix and negligible turbulence of the water.

733.3. **Dimensions.**—In unreinforced concrete footings, the edge thickness shall be not less than eight (8) inches for footings on soil, and not less than twelve (12) inches above the tops of piles in footings on piles; except that for one (1) story and basement buildings of wood frame or brick veneered walls, these thicknesses may be reduced to six (6) inches and eight (8) inches respectively.

733.4. **Protection.**—Concrete footings shall be protected from freezing during deposition and for a period of not less than five (5) days thereafter and in no case shall water be allowed to flow through the deposited concrete.

SECTION 734.0. MASONRY UNIT FOOTINGS

734.1. **Dimensions.**—Masonry unit footings shall be laid in type M or S mortar complying with section 816 and the depth shall be not less than twice the projection beyond the wall, pier or column; and the width shall be not less than eight (8) inches wider than the wall supported thereon.

734.2. **Offsets.**—The maximum offset of each course in brick foundation walls stepped up from the footings shall be one and one-half (1½) inches if laid in single courses, and three (3) inches if laid in double courses.

SECTION 735.0. REINFORCED CONCRETE FOOTINGS

735.1. **Design.**—Reinforced concrete footings shall comply with sections 841, 842, 843 and 844 and the applicable standards for the design of reinforced concrete listed in appendix B.

735.2. **Dimensions.**

735.21. **Edge Thickness.**—The net thickness at the edge shall be not less than five (5) inches above the reinforcement if on soil, and not less than twelve (12) inches if on piles.

735.22. **Pile Caps.**—The minimum distance from the edge of the cap to the nearest pile surface shall be three (3) inches and there shall be at least one (1) inch of concrete between the top of the pile and the steel reinforcement of the cap. The pile caps shall extend not less than four (4) inches below the pile cut-off.

735.3. **Protection.**—When the concrete is deposited directly against the ground, the reinforcement shall have a minimum covering of three (3) inches. At all other surfaces of foundation concrete, the reinforcement shall have a minimum covering of two (2) inches.

SECTION 736.0. MAT, RAFT AND FLOAT FOUNDATIONS

Mat, raft and float foundations shall be used only when the applied loads of the building or structure are so arranged as to result in practically uniformly balanced loading and the soil immediately below the mat is of uniform bearing capacity. The characteristics of the soil under the mat or raft shall be considered in the analysis of loading on mats and other continuous footings and due allowance shall be made for possible concentrated soil pressures under heavily loaded columns.

SECTION 737.0. PILE FOUNDATIONS

Pile foundations shall be designed to transmit building loads to lower strata of foundation materials when the supporting materials immediately underlying the structure are of inadequate load capacity or for the purpose of altering the physical properties of the surrounding strata. The bearing value of the supporting soil shall be evaluated as prescribed in section 739. Piles may be constructed of any approved structural materials within the limitations of design and allowable working stresses of the Basic Code.

737.1. Site Investigation.—The building site shall be investigated for all conditions which might promote deterioration of pile foundations, and approved protective measures shall be taken to prevent corrosion or other destructive action from deleterious conditions. When the boring records or site conditions indicate destructive action because of soil conditions or changing water level, the pile shall be protected by approved preservative treatments or impervious encasements as provided in section 737.7 or proper allowance shall be made for loss by corrosion.

737.2. Spacing.—The minimum center-to-center spacing of piles shall be not less than twice the average diameter of a round pile, nor less than one and three-quarter (1¾) times the diagonal dimension of a rectangular pile. When driven to or penetrating into rock, the spacing shall be not less than twenty-four (24) inches. When receiving principal support from end-bearing on materials other than rock or through frictional resistance, the spacing shall be not less than thirty (30) inches. For piles which cannot be checked for plumbness the minimum spacings herein prescribed shall be increased not less than six (6) inches in all cases.

737.3. Wall Piles.—All piles in wall foundations shall be staggered about the center line of the wall at a minimum distance of one-half (½) the top diameter therefrom; except that under wood frames, light gage steel and other light weight construction not over thirty-five (35) feet in height, piles may be driven in a single row.

737.4. Isolated Pier Piles.—When supported on piles, not less than three (3) piles shall be furnished under columns, piers or other isolated loads, unless lateral bracing is provided to insure stability.

737.5. Minimum Dimensions.—Tapered piles shall have a minimum butt diameter of eight (8) inches and a diameter of not less than six (6) inches at any other section; except as provided for wood piles in section 740.3. Piles of uniform circular section shall have a minimum outside diameter of eight (8) inches, and if of other than circular section, a minimum diameter of seven and one-half (7½) inches. Tapered shoes or points of lesser dimensions than herein prescribed may be attached to the pile unit.

737.6. Minimum Length and Penetration.—Piles located within twenty-five (25) feet of lot lines shall be driven so that the point shall be not less than ten (10) feet below the nearest established curb level; and no pile shall be less than ten (10) feet in length below the cut-off level unless otherwise approved by the building official.

737.7. Splices.—Splices shall be avoided insofar as practicable. Where used, splices shall be such that the resultant vertical and lateral loads at the splices are adequately transmitted. Splices shall be so constructed as to provide and maintain true alignment and position of the component

parts of the pile during installation and subsequent thereto. The ends of each section of steel pipe or other steel elements shall be cut perpendicular to the axis and bearing surfaces shall be true-fitted with milled or ground faces or by flame cutting or other approved method. Proper consideration shall be given to the design of splices at sections of piles which may be subject to tension or to bending. Except for piles which can be visually inspected after driving, splices shall develop not less than fifty (50) per cent of the value of the pile in bending.

737.8. Jetting.—Piles may be jetted through foundation material listed as classes 6 to 9 inclusive in table 15; and only when approved by the building official in other classes of materials. The approval to permit jetting of piles shall be issued by the building official in writing. Immediately after completion of jetting the piles shall be driven to the required load resistance as determined by the application of an approved pile driving formula.

737.9. Precautions.—During driving, all piles shall be held in their design location and position and shall be driven plumb. If any pile is out of plumb more than two (2) per cent of the pile length, or is driven more than three (3) inches laterally from design location, the design shall be modified to provide for resultant eccentricity. When necessitated by the severity of driving, both the butt and the point of the pile shall be protected from injury to the satisfaction of the building official. A competent and qualified inspector satisfactory to the building official shall be on the work at all times while pile foundations are being cast, driven or fabricated and while test piles are being loaded. The inspector shall make and submit to the building official complete records of all installations and tests.

SECTION 738.0. CORROSION PROTECTION

738.1. Preservative Treatments.—The preservative treatment of timber piles shall comply with the provisions of section 740.5 and the applicable standards in appendix C.

738.2. Deleted. No requirements.

738.3. Protective Jackets.—When the soil surrounding an all-metal or metal encased pile, caisson or pier contains destructive chemical elements, the pile shall be provided with an approved protective jacket. When the protective jacket is of concrete, the thickness of cover over the steel shall be not less than one and one-half (1½) inches.

738.4. Cinder Fill.—The presence of cinder fill or waste from any kind of chemical operation shall be considered sufficient reason for protective jacketing unless chemical study and analysis of the soil indicates it to be inactive.

SECTION 739.0. ALLOWABLE PILE LOADS

The allowable load on piles shall be determined by the applicable formulas complying with accepted engineering practice. The maximum load capacity shall be limited by the supporting capacity of the soil as determined by driving resistance or by load test as herein prescribed; but in no case shall the load exceed the capacity of the pile designed as a short

or long column in accordance with accepted engineering practice and the provisions of the Basic Code.

739.1. Short Column Load.—Except when extending above permanent ground level or when driven in surrounding material which furnishes negligible lateral support as defined in section 748, or when driven through soil which will be removed subsequently to the completion of the pile, all piles used to support a building or structure or part thereof shall be designed as short columns under the provisions of the Basic Code for the structural materials involved. The average compressive stress on any cross-section of a pile produced by that portion of the design load which is transmitted to that section shall not exceed the allowable column values of the Basic Code.

739.2. Driving Formula Load.—The allowable load on any pile when determined by the application of an approved driving formula shall not exceed forty (40) tons. The formula load shall be determined for gravity-drop or power-actuated hammers and the hammer energy used shall be the maximum consistent with the size, strength and weight of the driven piles. The use of a follower shall be permitted only with the approval of the building official.

739.3. Approved Test Load.—When greater loads per pile than permitted by section 739.2 are desired, control-test piles shall be tested in each area by maintaining constant load under increasing settlements in accordance with the procedure prescribed for soil tests in section 727. The resulting allowable load shall be not more than one-half (½) of that test load which produces a permanent net settlement per ton of test load of not more than one-hundredth (0.01) inch. In subsequent driving of the balance of foundation piles, all piles shall be deemed to have a supporting capacity equal to the control-pile, when the rate of penetration of such piles is equal to or less than that of the control-pile through a comparable driving distance; except as provided in section 739.4. Not less than three (3) test piles shall be driven in any area of uniform foundation materials and one (1) of such test piles shall be test loaded. At least one (1) test shall be made for each fifteen thousand (15,000) square feet of building area.

739.4. Group Pile Load.

739.41. Limiting Load.—In no case shall the total allowable load on any cluster or group of piles exceed the bearing capacity on the gross loaded area of the underlying soil stratum, assuming a uniform load spread within an angle of sixty (60) degrees with the horizontal from the area occupied by the pile group plus a margin of one (1) foot surrounding the periphery of the cluster. There shall be no overlap of pressure areas from similar distribution of loads for adjacent pile groups.

739.42. Load Test of Pile Groups.—In determining the load capacity by load tests of any group, when driven through materials subject to displacement or shift, the immediately surrounding pile groups shall be driven in place before the test load is applied to that group.

739.5. Limiting Pile Loads.—In no case shall the allowable load on any single pile exceed the following values:

200 Tons when open-ended concrete-filled steel pipe piles are installed to bear on rock;

120 Tons on all other types of piles when bearing on rock except timber piles (See section 740.6);

80 Tons when bearing on or in materials of classes 3, 4 and 5 in table 15;

60 Tons when bearing on or in other materials classified in table 15.

SECTION 740.0. TIMBER PILES

740.1. Species.—Piles shall be of southern yellow pine, Douglas fir, elm, Norway pine, red oak, white oak or other species approved for such use by the building official. All timber piles shall be driven in one piece except as provided in section 746 for composite piles.

740.2. Timber Specifications.—The quality of all round timber piles shall at least conform to class A and B, round timber piles listed in appendix C.

Round timber piles shall be cut above the ground swell, have a continuous taper from the point of butt measurement to the tip and free from decay, red heart, or insect attack with few exceptions. All knots and limbs shall be trimmed or smoothly cut flush with the surface of the pile or swell surrounding the knot. A straight line from the center of the butt to the center of the tip shall lie entirely within the body of the pile. Short crooks shall not deviate more than two and one-half (2½) inches in five (5) feet. Spiral grain shall not exceed one-half (½) of a complete twist in any twenty (20) feet of length, unsound or cluster knots are prohibited and splits and shakes are limited.

740.3. Minimum Dimensions.—Wood piles shall comply with the minimum dimensions specified in section 737.5, except that for temporary use and for small structures located on submerged or marsh lands, with loads of not more than ten (10) tons per pile, the minimum diameter may be four (4) inches at the point and eight (8) inches at the butt, provided the top five (5) feet of such piles remain exposed above high tide level for visual inspection.

740.4. Cut-Off.—The tops of all timber piles shall be sawed off in a horizontal plane; and if not treated by an approved preservative process, the cut-off shall be below mean low water level or lowest ground water level, except when used for light frame construction over submerged or marsh lands as provided in section 740.3.

740.5. Treated Piles.—Creosoted wood piles of southern yellow pine, Douglas fir, red oak or Norway pine shall be cut off below the ground surface but may extend above the ground water level. They shall be creosoted under pressure in accordance with the standards listed in appendix C to a final net retention of not less than twelve (12) pounds of creosote per cubic foot of wood, or treated by other approved process. The tops of such piles at cut-off shall be given three coats of hot creosote, followed by a coat of coal-tar pitch; and the cut-off shall be encased not less than four (4) inches in the concrete footing of the foundation.

740.6. Maximum Load on Wood Piles.—The maximum load on Class A or B piles shall be determined by the approved driving formula or approved test as provided for in section 739.0. Wood piles of smaller sizes shall be limited as provided for in sections 739.3 and 740.3.

SECTION 741.0. PRECAST CONCRETE PILES

741.1. Concrete Strength.—No precast concrete pile shall be driven before the concrete has attained a compressive strength of not less than three thousand (3000) pounds per square inch based on tests of cylinders cast from the same batches and cured under the same conditions as the pile concrete.

741.2. Design.—The piles shall be designed and reinforced in accordance with the applicable reinforced concrete regulations cited in appendix B. After casting, such piles shall be handled, driven and loaded to avoid all overstressing or injury. If for any reason the pile is injured, or the reinforcement is exposed, its use shall be condemned. The lateral reinforcement at both ends of the pile shall be spaced sufficiently close to resist impact stresses due to driving and in no case more than three (3) inches on centers. When driven to rock, all precast concrete piles shall be reinforced with an approved metal shoe.

741.3. Protection.—A minimum covering of two (2) inches of concrete shall be provided over all reinforcements, except that for piles to be subjected to the action of sea water, waves or other severe exposure, a three (3) inch protective covering shall be furnished in the zone of such exposure.

SECTION 742.0. CAST-IN-PLACE CONCRETE PILES

742.1. Concrete Strength.—All concrete for cast-in-place piles shall develop a compressive strength of not less than twenty-five hundred (2500) pounds per square inch at twenty-eight (28) days. The concrete shall be deposited in a continuous operation so as to insure a full-sized pile without voids or segregation. All concrete shall be placed in the dry; except when the bottom of the pile is sealed by depositing concrete by tremie or other approved method, after removing all soil and other foreign matter.

742.2. Design.—Except for dowels, all reinforcements shall be designed and installed as an assembled unit and no reinforcement shall be placed within one (1) inch of a protective metal casing. If no permanent casing is used, the protective coating of concrete shall be not less than two (2) inches thick; except when subjected to severe exposure, it shall be not less than three (3) inches thick.

742.3. Installation.—Piles shall be driven in such manner and sequence as to prevent distortion or injury of piles already in place.

742.4. Inspection.—Previous to the placing of concrete, full facilities shall be provided for inspecting the shell and other unfilled space of each pile.

SECTION 743.0. STEEL PIPE AND TAPERED TUBULAR PILES

743.1. Concrete Strength.—Concrete-filled pipe and tapered tubular piles may be driven open-ended or closed-ended. Pipe or tapered tube piles driven with closed ends shall be treated as cast-in-place concrete piles and shall be governed by the same regulations applicable thereto with suitable

load-bearing allowance for the metal casing. Concrete shall have a minimum compressive strength of twenty-five hundred (2500) pounds per square inch at twenty-eight (28) days' age. When driven open-ended to rock, no concrete shall be deposited until the pipe shall have been cleaned free of all soil or loose rock chips and satisfactory proof furnished of the condition of the rock. The concrete shall be deposited either in the dry, or by means of tremie, or by other approved process.

743.2. Steel Pipe.—All steel pipe and tapered tubing shall conform to the applicable standards listed in appendix C for welded and seamless steel pipe and tubes and for hot rolled carbon steel sheets. The yield point used in the design of steel casings shall be that of the fabricated element as determined by test.

743.3. Design.—When reinforcement is required, it shall be installed as an assembly unit or may consist of one (1) or more rolled structural shape cores complying with the applicable standards listed in appendix B. A minimum clearance of one (1) inch shall be maintained between the reinforcement and the enclosing shell.

743.4. Minimum Thickness.—The minimum wall thickness of all load-bearing pipe, tubes, and shells shall be one-tenth (1/10) inches. When required by soil conditions, allowance shall be made for corrosion as specified in section 738.

743.5. Splices.—All splices of the steel section shall comply with section 737.7 and shall be designed to insure true alignment of the shells and uniform transmission of load from one pipe length to another.

SECTION 744.0. DRILLED CAISSONS

744.1. Construction.—Drilled caissons shall consist of a shaft section of concrete-filled pipe or other approved steel shell extending to bed rock with an uncased socket drilled into the bed rock which is filled with concrete thoroughly bonded to the rock wall. The caisson may be provided with a structural steel core or other suitable reinforcement, installed so as to deliver its load to the rock through the socket filling. When such steel core is provided, it shall be bedded in cement grout at the base of the rock socket before initial set.

744.2. Steel Shell.—The steel shell shall be seamless or welded steel pipe with a minimum yield point of thirty-three thousand (33,000) pounds per square inch fitted with an approved cutting shoe and structural cap, or with other approved means of transmitting the superstructure load. None but the top section of the pipe shall be less than forty (40) feet in length. The minimum diameter shall be twenty-four (24) inches and minimum shell thickness five-sixteenths (5/16) inches. Steel shall be protected under the conditions specified in section 738. Splices shall comply with section 737.7.

744.3. Concrete Fill.—The concrete fill of drilled caissons shall be controlled concrete, with a compressive strength of not less than thirty-five hundred (3500) pounds per square inch at twenty-eight (28) days, deposited with a slump of not more than six (6) inches. When deposited in water, the concrete shall be placed with an approved bottom dump

bucket or tremie to eliminate segregation.

744.4. Rock Socket.—The socket shall be drilled in sound rock, and shall be thoroughly cleaned of all foreign matter and loose rock. After examination and approval of the rock surface, the concrete fill shall be deposited in the dry or by an approved method under a water seal. The depth of socket shall be adequate to develop the full load-bearing capacity of the caisson on the approved spread area of distribution within the limitations of table 15 and without overlapping of stress cones.

744.5. Reinforcing Core.—Structural steel cores used for reinforcement shall not exceed in area twenty-five (25) per cent of the gross caisson section. The minimum clearance between structural core and shell shall be two (2) inches. When such cores are installed in more than one length, they shall be assembled to develop the full compressive strength of the section. In all cases not less than one (1) inch of covering shall be provided around any reinforcement.

744.6. Driving Precautions.—No drilled caissons shall be driven more than two (2) per cent of the length out of plumb.

744.7. Spacing.—The minimum center-to-center spacing between caissons when no steel core is used shall be twice the diameter of the shell, and when reinforced with a core such spacing shall be not less than two and one-half (2½) times the diameter.

SECTION 745.0. STRUCTURAL STEEL PILES

745.1. Steel.—The steel in structural steel pile sections shall have a minimum nominal thickness of metal of three-eighth (⅜) inches. When of H section, the flange projection shall be not more than fourteen (14) times the minimum thickness of metal. Structural caps shall be rigidly attached to the pile section and shall be designed to transfer the full load into the piles; except that when the pile extends into the footing sufficiently to develop the full load by bond, or to permit the use of mechanical devices to develop the full load by shear, structural caps shall not be required.

745.2. Splices.—Splices of rolled steel sections shall comply with section 737.7.

745.3. Protection.—Structural steel piles shall be protected under the conditions specified in section 738 or due allowance shall be made for corrosion as therein specified.

SECTION 746.0. COMPOSITE PILES

746.1. Design.—Composite piles consisting of two (2) or more approved pile types shall be designed to meet the conditions of installation.

746.2. Limitation of Load.—The maximum allowable load shall be limited by the capacity of the weakest section incorporated in the pile.

746.3. Splices.—Splices between concrete sections and steel or wood sections shall be designed to prevent separation of the sections both before and after the concrete portion has set, and to insure the alignment and transmission of the total pile load. Splices shall be designed to resist uplift due to upheaval during driving of adjacent piles and shall develop

the full compressive strength and not less than fifty (50) per cent of the strength in tension and bending of the weaker section.

SECTION 747.0. SPECIAL PILES AND CAISSONS

Types of piles or caissons not specifically covered by the provisions of the Basic Code may be permitted provided sufficient test data, design and construction information is filed for the approval of any new type of pile, caisson or soil consolidation system by vibro-flotation, wick-drainage, electric, chemical, pressure or impact methods. Before approving new types or methods for actual use, the building official shall require complete test demonstrations on the site to determine the adequacy of design and the suitability of method of installation.

SECTION 748.0. LATERAL SUPPORT

748.1. Surrounding Materials.—Any soil other than water or fluid soil shall be deemed to afford sufficient lateral support to permit the design of any type of pile as a short column. When piles are driven through soil which will be removed subsequently to the completion of the foundation, the resistance offered by such material shall not be considered to contribute to the lateral supporting capacity.

748.2. Fixed Ends.—When not assumed laterally supported by the surrounding soils and when fixed by lateral supports at the upper end only, the unsupported length of pile or other isolated foundation shall be assumed as three-quarters (¾) the total length; and when supported at the bottom by drilling or other rigid attachment into the bed rock in addition to top lateral support, the unsupported length shall be assumed as one-half (½) the total length.

SECTION 749.0. FOUNDATION PIERS

749.1. Unreinforced.—When the unsupported height of foundation piers exceeds six (6) times the least dimension, the allowable working stress on piers of unit masonry or plain concrete shall be reduced in accordance with accepted engineering practice.

749.2. Reinforcement.

749.21. Design.—When constructed of reinforced concrete, foundation piers may be reinforced with spiral or vertical reinforcement in accordance with the applicable standards for the design of columns listed in appendix B; except that when adequate lateral support is furnished by the surrounding materials as defined in section 748 the requirements for long columns shall be waived.

749.22. Minimum Percentage.—An outer peripheral ring of a thickness of one-tenth (1/10) of the pier diameter, but not to exceed two (2) feet, shall be considered an envelope. Based on the area of such envelope, the minimum vertical reinforcement shall be three-fourths (¾) of one (1)

per cent and two-tenths (2/10) of one (1) per cent of horizontal reinforcement throughout its length. All reinforcement shall be protected with not less than three (3) inches of concrete.

749.3. Steel Shells.—When concrete piers are entirely encased with a circular steel shell, the area of the shell steel may be considered as reinforcing steel provided the steel is protected under the conditions specified in section 738. All horizontal joints in the shell shall be spliced to comply with section 737.

749.4. Dimensions.—Except for one- and two-family dwellings and other light structures, the minimum dimension of isolated piers used as foundations shall be two (2) feet, and the height shall in no case exceed twelve (12) times the least horizontal dimension unless constructed of reinforced concrete or structural steel, or when entirely encased in a steel shell at least one-quarter (¼) inches thick. Greater heights may be approved by the building official when surrounding foundation materials furnish adequate lateral support.

749.5. Belled Bottoms.—When foundation piers are belled at the bottom, the edge thickness of the bell shall be not less than (12) inches and the sides of the bell shall slope at an angle of not less than sixty (60) degrees to the horizontal.

749.6. Dewatering.—When piers are carried to depths below water level, the piers shall be constructed by a method which will insure accurate preparation and inspection of the bottom and the deposition or construction of sound concrete or other masonry in the dry.

ARTICLE 8 – PART A

MATERIAL AND TESTS

SECTION 800.0. SCOPE

The provisions of this article shall govern the quality, workmanship and requirements for all materials and methods and the minimum specifications for enclosure walls and wall thickness hereafter used in the construction of buildings and structures. All materials and methods of construction shall conform to the approved rules and the standards for materials and tests of accredited authoritative agencies and the requirements of accepted engineering practice as herein listed:

Appendix A .....Accredited Authoritative Agencies
Appendix B .....Accepted Engineering Practice
Appendix C .....Material Standards
Appendix D .....Structural Unit Test Standards
Appendix E .....Structural Assembly Test Standards
Appendix F .....Durability Test Standards
Appendix G .....Fire Test Standards
Appendix H .....Standard Time-Temperature Test Controls
Appendix I .....Fire Protection Standards

800.1. Accepted Engineering Practice.—The quality, use and installation of all materials and methods of building construction shall be controlled by the standards of accepted engineering practice as listed in Appendix B except where otherwise specifically provided in the Basic Code.

800.2. Material Standards.—All building units used in wall, partition and floor construction and for fireproofing or other insulation purposes shall comply with the applicable standards listed in appendix C.

800.3. New Materials.—All new building materials, equipment, appliances, systems or methods of construction not provided for in the Basic Code, and any material of questioned suitability proposed for use in the construction of a building or structure, shall be subjected to the tests prescribed in this article and in the approved rules to determine its character, quality and limitations of use.

800.4. Used Materials.—The use of all second-hand materials which meet the minimum requirements of the Basic Code for new materials shall be permitted.

800.5. Alternate Test Procedure.—In the absence of approved rules or other accepted standards, the building official shall make or cause to be made the necessary tests and investigations, or he shall accept duly authenticated reports from recognized testing authorities in respect to the quality and manner of use of new materials as provided in sections 108 and 109. The cost of all tests and other investigations required under the provisions of the Basic Code shall be borne by the applicant.

SECTION 801.0. DEFINITIONS

architectural terra cotta. Plain or ornamental hard-burned plastic clay units, larger in size than brick, with glazed or unglazed ceramic finish.

ashlar facing. Facing of solid rectangular units larger in size than brick of burned clay or shale, natural or cast stone, with sawed, dressed and squared beds and mortar joints.

ashlar masonry. Masonry composed of bonded, rectangular units, larger in size than brick, with sawed, dressed or squared beds and mortar joints.

brick. A solid masonry unit having a shape approximating a rectangular prism. not larger than 12 by 4 by 4 inches. A brick may be made of burned clay or shale, of lime and sand, of cement and suitable aggregates, or of fire clay or other approved materials.

buttress. A projecting part of a masonry wall built integrally therewith to furnish lateral stability which is supported on proper foundations.

ceramic surface unit. (See tile.)

clay masonry unit. A building unit larger in size than a brick composed of burned clay, shale, fireclay or mixtures thereof.

concrete. A mixture of cement, aggregates and water, of such proportions and manipulation as to meet specific requirements.

concrete masonry unit. A building unit or block larger in size than 12 by 4 by 4 inches made of cement and suitable aggregates.

floor fill. The fill between the structural floor arch or slab and the finished flooring.

floor filling. The type of short-span floor construction in fireproof and fireresistive buildings installed between structural steel framing to serve as a combination structural floor slab or arch and fireproof protection of the framing.

floor finish. The finish placed on top of the floor arch, slab or other structural floor element.

hollow masonry unit. A masonry unit whose net cross-sectional area in any plane parallel to the bearing surface is less than seventy-five (75) percent of its gross cross-sectional area measured in the same plane.

masonry. A built-up construction or combination of building units or materials of clay, shale, concrete, glass, gypsum, stone or other approved units bonded together with mortar; or monolithic concrete. Reinforced concrete is not classed as masonry.

mortar. A plastic mixture of approved cementitious materials, fine aggregates and water used to bond masonry or other structural units.

nominal dimension.

—lumber. A dimension that may vary from actual dimensions as provided in American Lumber Standard listed in appendix C.

—masonry. A dimension that may vary from actual masonry dimensions by the thickness of a mortar joint but not to exceed one-half (½) inch.

preservative treated wood. Wood treated by a recognized pressure impregnation process to increase its durability.

reinforced concrete. Concrete in which reinforcement other than that provided for shrinkage or temperature changes is combined in such manner that the two materials act together in resisting forces.

rubble.

—coursed rubble. Masonry composed of roughly shaped stones fitting approximately on level beds and well bonded.

—random rubble. Masonry composed of roughly-shaped stones laid without regularity of coursing but well bonded and fitted together to form well defined joints.

—rough or ordinary rubble. Masonry composed of unsquared field stones laid without regularity of coursing but well bonded.

—rubble masonry. Masonry composed of roughly shaped stones.

solid masonry. Masonry consisting of solid masonry units laid contiguously with the joints between the units filled with mortar, or consisting of plain concrete.

solid masonry unit. A masonry unit whose net cross-sectional area in every plane parallel to the bearing surface is seventy-five (75) percent or more of its gross cross-sectional area measured in the same plane.

structural clay tile. A hollow masonry unit composed of burned clay, shale, fireclay or mixtures thereof and having parallel cells.

tile. A ceramic surface unit, usually relatively thin in relation to facial area, made from clay or a mixture of clay and other ceramic materials, called the body of the tile, having either "glazed" or "unglazed" face and fired above red heat in the course of manufacture to a temperature sufficiently high to produce specific physical properties and characteristics.

wall. (See also sections 201.0 and 901.0.)

—cavity wall. A wall built of masonry units or of plain concrete, or a combination of these materials, arranged to provide an air space within the wall, and in which the inner and outer parts of the wall are tied together with metal ties.

—composite wall. A wall built of a combination of two (2) or more masonry units of different materials bonded together, one forming the back-up and the other the facing elements.

—faced wall. A wall in which the masonry facing and backing are so bonded as to exert common action under load.

—hollow wall. A wall built of masonry units so arranged as to provide an air space within the wall, and in which the facing and backing of the wall are bonded together with masonry units.

—veneered wall. A wall having a facing of masonry or other weather-resisting noncombustible materials securely attached to the backing, but not so bonded as to exert common action under load.

SECTION 802.0. BASIC CLASSIFICATION OF CONSTRUCTION MATERIALS

All materials and methods used in the design and construction of buildings and structures shall be classified as controlled materials and ordinary materials as defined in sections 701 and 722. The design and construction shall be based on the assumptions, limitations and methods of stress determination of recognized design procedures.

SECTION 803.0. TESTS

All structural units and assemblies shall be tested in accordance with the standards listed in appendixes D, E and F. In the absence of test procedures governing any specific material or method of construction, the building official shall accept authenticated reports from recognized authoritative sources which meet the requirements of the Basic Code.

803.1. Strength Tests.—To determine the safe uniformly distributed working load, when not capable of design by accepted engineering analysis, or to check the adequacy of the structural design of an assembly when there is reasonable doubt as to its strength or stability, every system of construction, sub-assembly or assembled unit and its connections shall be subjected to strength tests prescribed in the Basic Code, or to such other tests acceptable to the building official that stimulate the loads and conditions of application that the completed structure will be subjected to in normal use. Structural load determinations shall include transverse floor and roof, wall compression and racking, concentrated load, plaster bond, puncture penetration and soil tests.

803.11. Strength Tests for Glass.—The working strength of glass for any location in which it is required to withstand specific loads shall be determined as provided in appendix K-12-B.

803.2. Durability and Endurance Tests.—Whenever required by the building official or specified herein or in the approved rules, the material or construction shall be subjected to sustained and repetitive loading to determine its resistance to fatigue, and to tests for durability and weather resistance.

803.3. Maintenance Test.—In addition to durability and endurance tests, tests of all materials shall be made to assure the maintenance of the standards of approved materials when reasonable doubt exists as to quality and when required by the building official.

803.4. Workmanship Test.—Whenever there is reasonable doubt as to the stability or structural safety of a completed building or structure or part thereof for the intended use, the building official may require a load test of the building unit or portion of the structure in question. Such existing structure shall be subjected to a superimposed load equal to two (2) times the design live load. The test load shall be left in place for a period of twenty-four (24) hours. If during the test, or upon removal of the test load, the structure shows evidence of failure, the building official shall order such reinforcement or modifications deemed necessary to insure adequacy of the structure for the rated capacity; or in lieu thereof, he may specify a reduced working load to which the structure shall be limited. The structure shall be considered to have successfully met the test requirements if the total deflection does not exceed the theoretical deflection computed by accepted engineering formulae. When the total deflection is greater than such theoretical value, the structure shall be considered safe for the design load, if it recovers seventy-five (75) per cent of the maximum deflection within twenty-four (24) hours after removal of the test load.

803.5. Tests of Service Equipment and Devices.—Tests of service equipment and accessories shall include proscenium curtain and stage ventilation, section 418.6; structural load tests, section 703; flues and chimneys, section 1003; boilers, section 1103; sprinkler and standpipe equipment, section 1203; electric installations, section 1503; moving stairways, elevator interlocks and safety devices, section 1603; refrigerating equipment, section 1803; plumbing systems and devices as required by the Plumbing Code and all other service tests required by the approved rules.

803.6. Fire Tests.—In the determination of flash points, combustibility, flameresistance and fireresistance of construction materials and methods, all tests shall be conducted in conformity to section 903 and 904 and the applicable standards listed in appendixes G and I.

803.7. Prefabricated Construction Tests.—Prefabricated assemblies or sub-assemblies not capable of design by accepted engineering analysis, shall meet all the requirements and tests for at-site construction. The floor panels and other prefabricated units shall be assembled to form an integrated test specimen constructed as in practice, of not less than three (3) units in width with two (2) longitudinal joints; and when designed on the assumption of a simple span, such units shall be tested with flat end supports.

803.8. Test Specimens.—The selection and construction of all test specimens and the details of test procedure herein required shall conform to the recognized test procedures listed in the appendixes. All test specimens and constructions shall be truly representative of the materials, workmanship and details to be normally applied in practice. When structural or fireresistive properties of the material are dependent upon adequate curing, the age of the specimen shall be not less than seven (7) nor more than twenty-eight (28) days, unless otherwise approved by the building official.

Note B: Test Procedures.—Test requirements constitute fundamental performance standards and therefore come within the scope of the Basic Code. The detail test specifications and procedures are formulated and defined in the approved rules or by reference to accepted test standards of authoritative test agencies and organizations. Details of test procedures have been omitted from the Basic Code except for essential basic requirements when deemed necessary.

SECTION 804.0. CONDITIONS OF ACCEPTANCE

In evaluating the physical properties of materials and methods of construction when not subject to design by accepted engineering analysis, the structural requirements shall be based on the criteria established by the following provisions:

804.1. Test Load Factor.—The test assembly shall sustain without failure, superimposed loads equal to two and one-half (2½) times the design live load;

804.2. Working Load Deflection.—Under the approved working load, the deflection of floor and roof assemblies shall not be greater than one three-hundred-sixtieth (1/360) of the span for plastered construction; one two-hundred-fortieth (1/240) of the span for unplastered floor construction; and one one-hundred-eightieth (1/180) of the span for unplastered roof construction;

804.3. Wall and Partition Assemblies.—Bearing wall and partition assemblies shall sustain the load test both with and without window framing;

804.4. Comparative Tests.—When not available from existing authoritative test data, the building official may require comparative tests of assemblies of standard traditional forms of construction used for similar purposes to assist in determining the adequacy of the new construction;

804.5. Concentrated Load Tests.—When not capable of design all floor constructions in the use classification groups specified in table 14 shall be subjected to the concentrated loads therein prescribed when such loading exceeds in stress effect the uniformly distributed load specified for such uses in table 13;

804.6. Puncture Penetration Tests.—All finish floor constructions in which light gage metal or other thin materials are used as the structural floor shall withstand the application of a two hundred (200) pound concentrated load applied to the top surface on an area of one (1) square inch at any point or points of the construction designated by the building official.

SECTION 805.0. APPROVALS

805.1. Written Approval.—Any material, appliance, equipment, system or method of construction meeting the requirements of the Basic Code shall be approved by the building official in writing within a reasonable time after satisfactory completion of all required tests and submission of required test reports.

805.2. Approval Record.—Whenever any material, appliance, equipment, system or method of construction shall have been approved by the building official, a record of such approval, including all the conditions and limitations of its permitted use, shall be kept on file in his office and shall be open to public inspection during business hours.

805.3. Identification of Product.—When identification of a material is necessary for structural safety, the approved material shall be identified by the approved label and the grade mark, trademark or other manufacturer's identification for which official recognition is desired. A drawing of the identification marks shall be filed with the building official and kept in the official records.

805.4. Heretofore Approved Materials.—The use of any material already fabricated or of any construction already erected, which conformed to requirements or approvals heretofore in effect, shall be permitted to continue, if not detrimental to life, health or safety of the public.

SECTION 806.0. MASONRY CONSTRUCTION UNITS

806.1. Identification.—All masonry units shall bear the identification mark of the manufacturer consisting of a cast impression, embossing or painting as approved by the building official; and certified copies of such identification shall be kept on file by the building official.

806.2. Nominal Dimensions.—Dimensions and thicknesses specified in the Basic Code are nominal dimensions; actual dimensions may vary from the prescribed minimum in accordance with accepted tolerances in the building industry.

806.3. Second-Hand Units.—Brick and other second-hand masonry units may be reused subject to the approval of the building official as to quality, condition and compliance with the requirements for new masonry units. The unit shall be good, whole, sound material, free from cracks and other defects that would interfere with its proper laying or use; and shall be cleaned free from old mortar before reuse.

SECTION 807.0. BRICK UNITS

All clay, shale and sand-lime brick shall be selected on the appropriate grade specified by the applicable standards. Brick in contact with the ground and subject to water, frost and freezing action, shall have a minimum compressive strength of three thousand (3000) pounds per square inch; when subject to frost without danger of water saturation, a minimum compressive strength of twenty-five hundred (2500) pounds per square inch; and when not subject to severe weathering or when used as a backup in exterior walls or for interior construction, a minimum compressive strength of fifteen hundred (1500) pounds per square inch. Underburned clay brick shall not be used in isolated brick piers, nor in any part of a building exposed to the weather, nor in a bearing wall which is more than forty (40) feet in height.

SECTION 808.0. STRUCTURAL CLAY TILE UNITS

808.1. Load-Bearing Wall Tile.—Load-bearing wall tile for general masonry use exposed to weathering shall have a minimum compressive strength on the gross area of not less than fourteen hundred (1400) pounds per square inch when tested with cells vertical, and not less than seven hundred (700) pounds per square inch when tested with cells horizontal; and for use with an approved weather-protective veneer, or when not exposed to frost or water action, a minimum compressive strength on the gross area of one thousand (1000) pounds per square inch when tested with cells vertical, and not less than seven hundred (700) pounds per square inch when tested with cells horizontal.

808.2. Floor Tile.—Structural clay floor tile for use in end construction arches shall have a minimum compressive strength on the net area of two thousand (2000) pounds per square inch and not less than twelve hundred (1200) pounds per square inch for side construction arches.

808.3. Fireproofing Tile.—Structural clay tile for use in nonbearing partitions, in fireproofing of structural members and in wall furring shall not

be required to meet compressive strength specifications. The fireresistance rating shall be determined by standard test procedure to comply with the requirements of table 5.

SECTION 809.0. GLAZED MASONRY UNITS

All glazed masonry units shall have the following minimum compressive strengths on the gross area when tested as laid in the wall; with cells vertical, three thousand (3000) pounds per square inch; and with cells horizontal two thousand (2000) pounds per square inch.

SECTION 810.0. CONCRETE UNITS

810.1. Quality.—Cast concrete units shall be of sound, compact structure, uniform in shape and free from cracks, warpage or other defects that would impair their serviceability or strength when laid in the wall.

810.2. Hollow Load-Bearing Units.—Approved hollow load-bearing concrete units for use below grade or unprotected against the weather by stucco, brick or other approved facings or veneers shall have a minimum compressive strength on the gross area of one thousand (1000) pounds per square inch; and for protected exterior use and general interior construction not less than seven hundred (700) pounds per square inch.

810.3. Hollow Nonload-Bearing Units.—Approved hollow nonload-bearing concrete units shall have a minimum compressive strength on the average gross area of three hundred and fifty (350) pounds per square inch.

810.4. Solid Load-Bearing Units.—Approved solid load-bearing concrete masonry units when unprotected against the weather or subject to frost and water action shall have a minimum compressive strength of eighteen hundred (1800) pounds per square inch and for protected exterior use or general interior use, not less than twelve hundred (1200) pounds per square inch.

810.5. Concrete Brick.—Approved concrete brick for use when exposed to freezing in the presence of moisture, shall have a minimum compressive strength of twenty-five hundred (2500) pounds per square inch and when used as a back-up in exterior walls or for general interior construction, a compressive strength of not less than twelve hundred and fifty (1250) pounds per square inch.

810.6. Concrete Fireproofing and Furring Units.—Approved concrete block or tile used in fireproofing or furring, when not exposed to the weather, shall have a minimum compressive strength of three hundred (300) pounds per square inch of net area tested as laid in practice. When exposed to the weather, the compressive strength shall be not less than seven hundred (700) pounds per square inch of gross area. All nonbearing units shall be clearly marked to distinguish them from load-bearing units.

810.7. Concrete Floor Tile.

810.71. Structural Fillers.—Structural concrete filler-block or tile when included in strength calculations in ribbed floor construction shall have webs and shells not less than one (1) inch thick and shall develop an average compressive strength on the net area not less than that of the rib concrete.

810.72. Other Fillers.—Removable tile and permanent fillers which are not included in strength calculations shall be of adequate strength to insure integrity of the unit and safety in handling as approved by the building official.

SECTION 811.0. GYPSUM UNITS

No gypsum tile or block shall be used in bearing walls or in any location exposed to frequent or continuous wetting or in exterior walls unless protected from the weather. Approved gypsum units shall develop a compressive strength of not less than seventy-five (75) pounds per square inch on the gross area.

SECTION 812.0. STRUCTURAL GLASS BLOCK UNITS

Solid or hollow approved structural glass blocks shall not be used in fire walls, party walls or fire-division walls, or for load-bearing construction. All mortar-bearing surfaces of the block shall be precoated or prepared to insure adhesion between mortar and glass.

SECTION 813.0. ARCHITECTURAL TERRA COTTA

All approved architectural terra cotta units shall be formed with a strong, homogeneous body of hard-burned, weather-resisting clay which gives off a sharp, metallic ring when struck and shall meet the strength and durability requirements of accepted engineering practice. All units shall be formed to engage securely with and anchor to the structural frame or masonry wall.

SECTION 814.0. NATURAL STONE

Natural stone for masonry shall be sound and free from loose or friable inclusions; and shall meet the strength, fireresistance, durability and impact resistance for the intended use in accordance with accepted engineering practice.

SECTION 815.0. CAST STONE

All approved cast stone shall be fabricated of concrete or other approved materials of required strength, durability and fireresistance for the intended use and shall be reinforced where necessary to comply with section 842.

SECTION 816.0. MORTAR FOR MASONRY

816.1. Materials.—All portland, natural and masonry cements, quicklime and hydrated lime for use in masonry mortar and concrete shall meet the minimum strength and durability requirements of the standards listed in appendixes B and C.

816.2. Mortar Types and Proportions.—Mortar for masonry construction shall conform to one (1) of the following types and shall be mixed to a consistent workability in the specified proportions measured by volume with clean fresh water free from harmful amounts of acids, alkalis, oils or organic materials; and with approved aggregates composed of hard, strong, durable mineral particles well graded from fine to coarse, free from injurious amounts of acid, alkalis, oils, saline, organic and other deleterious substances in accordance with accepted engineering practice. Masonry mortars shall have a flow after suction of not less than seventy (70) per cent.

MORTAR PROPORTIONS (Parts By Volume)

Mortar Type	*Portland Cement*	*Masonry Cement Type II*	*Hydrated Lime or Lime Putty* Min.	Max.	*Damp Loose Aggregate*
M	1	—	—	¼	not less than 2¼ and not more than 3 times the sum of the volumes of the cements and lime used.
	1	1	—	—	
S	1	—	¼	½	
	½	1	—	—	
N	1	—	½	1¼	
	—	1	—	—	
O	—	1	—	—	
	1	—	1¼	2½	

816.3. Types of Mortar Permitted.—Unit masonry shall be laid in mortar of the following types:

Type of Masonry	*Types of Mortar Permitted*
Masonry in contact with earth	M or S
Grouted and filled cell masonry	M or S
Masonry above grade or interior masonry:	
Piers of solid units	M, S or N
Piers of hollow units	M or S
Walls of solid units	M, S, N or O
Walls of hollow units	M, S or N
Cavity walls and masonry bonded hollow walls	
Design wind pressure exceeds 20 psf	M or S
Design wind pressure 20 psf or less	M, S or N
Glass block masonry	S or N
Nonloadbearing partitions and fireproofing	M, S, N, O or Gypsum
Gypsum partition tile or block	Gypsum
Fire brick	Refractory air-setting mortar
Linings of existing masonry, above or below grade	M or S
Masonry other than above	M, S or N

816.4. Special Mortars.—The building official may approve other special masonry mortars in place of the mortar types listed in section 816.2, provided they develop the minimum compressive strengths specified for the respective mortars they replace. The strength classification of a special mortar or special mix may be determined by compressive strength tests with the materials and in the proportions representative of those to be used in actual practice. In no case shall the allowable unit working stresses in the masonry be more than one-fourth (¼) the average ultimate compressive strength of the assembled test samples.

816.5. Gypsum Mortar.—Gypsum mortar shall be composed of one (1) part of unfibered calcined neat gypsum to not more than three (3) parts sand by weight. Only gypsum mortar shall be used with gypsum tile and block units.

816.6. Mortars for Ceramic Wall and Floor Tile.—Mortars for installing ceramic wall and floor tile shall be of the following composition measured by volume:

Walls:	Scratch coat	1 cement: ⅛ hydrated lime: 4 sand
	Setting bed and leveling coat	1 cement: ½ hydrated lime: 4 sand. In West Coast States up to 7 parts sand may be used.
Floors:	Setting bed	1 cement: 5 sand
Ceilings:	Scratch coat and setting bed	1 cement: ½ hydrated lime: 3 sand

or other mortars of comparable adhesive strength and durability. Shear bond strength shall be at least fifty (50) pounds per square inch when four and one-quarter (4¼) inch glazed wall tile skim coated with pure cement paste are installed on four and three-eighths (4⅜) inch by four and three-eighths (4⅜) inch by two (2) inch mortar specimens, the assembly cured and tested by a compression load of fifty (50) pounds per second in accordance with commercial standard for adhesives for installations of clay tile listed in appendix C.

816.61. Dry-set Portland Cement Mortars.—Dry-set Portland Cement Mortars to be used in the installation of ceramic tile shall be in accordance with standard specification for dry-set portland cement mortar listed in appendix C.

816.7. Organic Adhesives.—Organic adhesives to be used in installing ceramic tile shall have a shear bond strength of not less than forty (40) pounds per square inch when applied in a one-sixteenth (1/16) inch minimum thickness layer between two four and one-quarter (4¼) inch glazed ceramic wall tile overlapping at ends by one-half (½) inch and dried to constant weight at one hundred ten (110) degrees F. and tested by compression loading at a rate of one-half (½) inch per minute. Adhesives also shall have a shear bond strength of not less than ten (10) pounds per square inch when applied as in the preceding sentence but dried seven (7) days at seventy-three and five-tenths (73.5) degrees F. followed by an additional seven (7) days immersion in water. Test shall be made in accordance with commercial standard for adhesives for installation of clay tile listed in appendix C.

SECTION 817.0. CONCRETE AGGREGATES

817.1. Aggregate Quality.—All concrete aggregates shall meet the standard specifications of accepted engineering practice for organic impurities, soundness, mortar strength, durability, weather-resistance, fire-resistance, and wearing qualities.

817.2. Fireresistance.—Coarse aggregate in concrete shall be rated in respect to the fireresistance of concrete made therewith on the basis of performance in fire test on building elements such as columns, floors, partitions and wall conducted in accordance with standard fire test specifications applicable to such test. Protective coverings of encasements of concrete for steel in fireresistive construction shall likewise be selected on the basis of performance in applicable standard fire tests. All concrete constructions shall meet the requirements of article 9 as regulated by the provisions of table 5.

817.21. Grade 1 Concrete.—Grade 1 concrete shall mean concrete made with aggregates such as blast-furnace slag, burned clays, and calcareous, igneous, and most silicate crushed stones and gravels and shales, as well as any other aggregates performing as required by the Basic Code for the appropriate construction when tested in accordance with standard methods of fire tests of building construction and materials listed in appendix G.

817.22. Grade 2 Concrete.—Grade 2 concrete shall mean concrete made with aggregates such as cinders and crushed stones and gravels composed essentially of quartz and quartzite cherts as well as any other aggregates performing as required by the Basic Code for the appropriate construction when tested in accordance with standard methods of fire tests of building construction and materials listed in appendix G.

817.3. Size of Aggregates.—Fine aggregates shall meet all the requirements of the approved rules and shall be well graded from fine to coarse. Coarse aggregates shall not exceed one-fifth (⅕) of the narrowest dimension between sides of the form nor three-fourths (¾) of the minimum clear spacing between reinforcing bars.

817.4. Special Aggregates.—Special aggregates, including among others, perlite, vermiculite and other processed mica, pumice, lava, tufa, volcanic glass, slag, coke, expanded clay and shale used in concrete and plaster construction shall meet all the requirements of the approved rules and shall be classified in their respective fireresistant grades as determined by test. When used for fire protection purposes only, the building official may waive mortar strength requirements for such aggregates providing the concrete is shown by test to have adequate strength for the intended use.

SECTION 818.0. READY-MIX CONCRETE

818.1. Control.—Ready-mixed concrete for use in ordinary or in controlled materials procedure shall conform to section 842 for reinforced concrete and to the applicable standards listed in appendix C.

818.2. Transportation.—Ready-mixed concrete shall be transported in approved conveyances which insure delivery of the concrete at the site in a plastic, workable and unhardened state. The maximum amount of concrete hauled in an agitator shall not exceed the approved rating of the conveyance; and the period of delivery shall not exceed the time in which loss of plasticity may occur and generally not more than one and one-half (1½) hours.

818.3. Ordinary Materials Procedure.—When ready-mix is used under the ordinary materials procedure, either the cement content in bags per yard of concrete together with the maximum allowable water content, or the compressive strength and maximum permissible slump shall be specified.

SECTION 819.0. STRUCTURAL WOOD GLUES

819.1. Quality of Glue.—Glues used in structural assemblies of built-up or laminated lumber sections shall develop the full strength of the wood, shall not produce decomposition or deleterious chemical reaction in the wood structure and shall not be attractive to vermin.

819.2 Manufacturers' Requirements.—Approved structural glues shall be handled, mixed and applied as prescribed by the manufacturer and the gluing shall be done only in accordance with the timber construction standards listed in appendix B.

819.3. Types of Glue.—Structural glues shall be classified as follows:

819.31. Group 1 Glues.—For general interior use or for exterior use protected against the weather shall include casein glue with mold-resistant preservative, urea-resin glue, phenol or phenol-resorcinol resin glue and any other glue meeting the requirements of the approved rules for such use;

819.32. Group 2 Glues.—For use under full exposure to the weather or for interior use when subjected to high humidity shall include resorcinol resin, phenol resin, melamine resin glues and any other glue meeting the requirements of the approved rules for such use.

SECTION 820.0. INTERIOR LATHING AND PLASTERING

All interior lathing and plastering shall conform to the standards of accepted engineering practice for lathing, furring and accessories and gypsum and portland cement plastering listed in appendixes B and C; except as may be otherwise provided by statute or in the Basic Code for specific materials.

820.1. Installation.

820.11. Inspection.—The building official shall be notified not less than twenty-four (24) hours in advance of all plastering work, and no plaster shall be applied until after the lathing or other plaster base has been inspected and approved by him.

820.12. Weather Protection.—When plastering work is in progress, the building or structure shall be temporarily enclosed and in freezing weather the enclosure shall be heated to protect the plaster from injury.

SECTION 821.0. EXTERIOR LATHING AND STUCCO

All exterior lathing, plastering and stucco work shall be installed of portland cement or other approved mortar as provided in the standards listed in appendixes B and C, in accordance with accepted engineering practice or as provided in the Basic Code for specific materials.

821.1. Reinforcement.—All stucco work shall be reinforced with approved metal lath or wire fabric except when applied directly to a masonry or concrete base, or when installed on a masonry base which is protected with bituminous surfacing.

821.2. Minimum Weight.—Metal lath, expanded metal and wire reinforcing fabric shall weigh not less than the following:

Type of Reinforcement	*Minimum U. S. gage*	*Maximum Mesh inches.*	*Minimum Weight Pounds per Square Yard*
Metal lath	—	—	3.4
Expanded metal	—	—	1.8
Woven wire	18	1	1.74
Woven wire	17	1½	1.41
Woven wire	16	2	1.47
Welded wire	18	4 sq. in.	0.67
Welded wire	17	4 sq. in.	0.82
Welded wire	16	4 sq. in.	1.10

821.3. Corrosion Resistance.—All metal lath and stucco reinforcing fabric shall be protected with a zinc, or other approved rust-resistive coating or rust-inhibitive paint, or shall be manufactured from approved corrosion-resistive alloys.

821.4. Sheathing.—Except in back-plastered construction, the studs shall be covered with approved sheathing complying with section 855; or not less than No. 18 U. S. gage galvanized wire shall be stretched horizontally at six (6) inch centers and shall be covered with not less than fourteen (14) pound waterproof felt or paper before applying the reinforced stucco; or an approved paper-backed wire fabric may be used of not less than No. 16 U. S. gage galvanized wire with stiffening ribs not more than five (5) inches on centers to which is attached a double layer of fibrous waterproof backing. The mesh opening shall not exceed two by two (2 x 2) inches.

821.5. Back-Plastered Construction.—In back-plastered construction, when spacing of studs exceeds sixteen (16) inches, approved horizontal noncombustible cross-furring at not more than sixteen (16) inch centers shall be first applied; unless approved stiffened lath is used and the frame is adequately stiffened as provided in section 855.

821.6. Application on Masonry Base.—When applied directly to masonry or monolithic concrete, the surfaces shall be roughened, hacked or bush-hammered to provide bond, or a preparatory dash coat of portland cement grout shall be applied. The dash coat shall be kept damp for at least two (2) days after application and before applying succeeding stucco coats.

821.7. Protection.

821.71. From Freezing.—At all times during application and for a period of not less than forty-eight (48) hours after application of each coat, provision shall be made to keep stucco work above fifty (50) degrees F.

821.72. From Moisture.—Stucco shall be kept a sufficient height above ground surfaces as provided in section 855 and all sills, coping and projecting courses shall be flashed and provided with drips as therein specified.

SECTION 822.0. PLASTERING MATERIALS

All sand, quick-lime, hydrated lime, hair binder, gypsum, keene and portland cements, pozzuolanic cements and aggregates and other materials used in plastering shall be stored, protected and applied in accordance with the standards of accepted engineering practice listed in appendixes B and C and the approved rules.

822.1. Special Cements and Plasters.—Approved cements used in plastering may have admixtures of approved plasticity agents added in the manufacturing process or when mixing the plaster at the site in the approved proportions. All premixed special plasters, cements and aggregates shall be packaged and identified with the approved label.

822.2. Lime Plaster.—Lime and hydrated lime plasters for use in base and finish coats shall be applied in accordance with the approved rules and the manufacturers' specifications.

822.3. Gypsum Plaster.—All gypsum plaster shall comply with the standard specifications listed in appendix C.

822.4. Gypsum Plasters with Special Aggregates.—When gypsum is used with manufactured aggregates in place of natural sand for plaster, the mixture shall be proportioned and applied in accordance with the manufacturer's recommendations and the applicable standard in appendix B.

SECTION 823.0. PLASTER BASES

823.1. Fiber Boards.—Approved fiber boards used as plaster bases shall comply with section 824. The surface of such boards shall be of a rough, fibrous texture to insure mechanical and suction bond; and the boards shall meet the bond and strength tests specified by the standards listed in appendix C and the approved rules.

823.2. Gypsum Lath.—Except when greater thickness is required for fireresistance under the provisions of article 9, or as herein specified, gypsum lath used for plastering shall be not less than three-eighths (⅜) inch thick and shall comply with the standards listed in appendix C.

823.3. Perforated Gypsum Lath.—Where required to provide specified time-temperature performance, perforated gypsum lath shall be not less than three-eighth (⅜) inches thick. The openings shall be equivalent to three-quarter (¾) inch diameter holes for each sixteen (16) square inches of lath surface; or the lath shall be perforated as determined by full size tests for load, strength and fireresistance ratings.

823.4. Metal Lath.—The dimensions and sizes of expanded, ribbed and sheet metal lath shall comply with accepted engineering practice and the standards listed in appendix B; and shall be fabricated from not less than No. 30 U. S. gage steel sheets. It shall be manufactured from copper-bearing steel, coated with rust-inhibitive paint after cutting, or cut from zinc-coated steel sheets.

823.5. Wire Lath.—All types of wire lath shall comply with accepted engineering practice and the standards listed in appendix B; and shall be fabricated from woven or welded wire of not less than No. 19 W & M gage with not more than two and one-half (2½) meshes to the inch. Woven or welded wire reinforcement shall be coated with zinc or rust-inhibitive paint.

823.6. Paper-Backed Lath.—Expanded metal or wire lath backed with integral approved paper shall be fabricated from the minimum gages and weights specified in sections 823.4 and 823.5.

823.7. Combustible Lath.—Wood lath shall be erected horizontally on walls and partitions and ceiling lath shall run in one direction only; but in neither case shall it extend through cross-partitions from room to room. Wood lath shall be not less than one (1) inch wide nor less than five-sixteenth (5/16) inches thick and shall comply with all the requirements of accepted engineering practice. The lath joints shall be staggered so that not more than seven (7) laths occur in any one continuous break.

SECTION 824.0. FIBER BOARDS

Insulating boards manufactured with wood or other vegetable fibers used as building boards for sheathing, roof decks, plaster bases, interior wall and ceiling finish, roof insulation or sound deadening, shall be vermin proof, resistant to rot-producing fungi and water-repellent and shall meet the strength and durability tests specified in the standards listed in appendix C. When required under the provisions of article 9, the boards shall be protected or treated to develop the required fireresistance or flameresistance as determined by test.

824.1. Jointing.—To insure tight-fitting assemblies, edges shall be manufactured square or shiplapped, beveled, tongue-and-grooved or U-jointed; and shall be installed in accordance with accepted engineering practice.

824.2. Plaster Base.—When used as a plaster base, fiber boards shall be permitted in fireresistive construction complying with the test provisions of article 9, except where specifically prohibited in fireproof (type 1) and noncombustible (type 2) construction.

824.3. Roof Insulation.—When used as roof insulation in all types of construction, fiber boards shall be protected with an approved type of roof covering.

824.4. Wall Insulation.—When installed and firestopped to comply with article 9, fiber boards may be used for wall insulation in all types of construction. In firewall and fire division construction, unless treated to be noncombustible, the boards shall be cemented directly to the masonry or other noncombustible base and shall be protected with an approved noncombustible veneer anchored to the base without intervening air spaces.

824.5. Dry Wall Construction.—Where fireresistance ratings are required, provision shall be made for interlocking, lapping or otherwise protecting the joints between adjacent boards to insure smoke and flame tightness.

824.6. Insulating Roof Deck.—When used as roof decking in open beam construction fiber board insulating roof deck shall have a minimum nominal thickness not less than one (1) inch.

SECTION 825.0. PLYWOOD

825.1. Quality.—All plywood when used structurally shall meet the performance standards and all other requirements of the applicable U. S. commercial standard listed in appendixes B and C for the type, grade, and species of plywood involved and shall be so identified by an approved agency. Working stresses shall conform to the standards of accepted engineering practice as listed in appendixes B and C.

825.2. Types.—Plywood for interior use may be either of the moisture resistant or exterior type; plywood for exterior use shall be of the exterior waterproof type. Exterior plywood may be applied directly to the framing as a siding, provided it has a nominal thickness of three-eighths (⅜) inch. Joints shall occur over framing members, unless wood or plywood sheathing is used or joints are lapped horizontally a minimum of one and one-half (1½) inches or otherwise made waterproof to the satisfaction of the building official. If plywood is used as lapped siding without sheathing, the wall framing to which it is attached shall be diagonally braced.

825.3. Spans and Thickness.—The maximum spans of plywood roof sheathing shall be limited by the allowable stresses and deflections for the design live load but shall have not less than the following thicknesses, provided it is continuous over two or more spans and laid with face grain perpendicular to the supports.

PLYWOOD ROOF SHEATHING
DOUGLAS FIR, WESTERN LARCH, SOUTHERN PINE
AND
GROUP 1 SHEATHING GRADES WESTERN SOFTWOOD PLYWOOD

	*Maximum Horizontal Span, Inches Center to Center of Supports**		
Thickness of Plywood	*20-Pound Load*	*30-Pound Load*	*40-Pound Load*
5/16 inch rough	20(a)	20	20
⅜ inch rough	24(a)	24	24
½ inch rough(b)	32(a)	32	30
⅝ inch rough(b)	42(a)	42	39
¾ inch(b)	48(a)	48	42

WESTERN SOFTWOOD PLYWOOD, GROUP 2 (c, d)

	*Maximum Horizontal Span, Inches Center to Center of Supports**		
Thickness of Plywood	*20-Pound Load*	*30-Pound Load*	*40-Pound Load*
5/16 inch rough	16(a)	16	16
⅜ inch rough	20(a)	20	20
½ inch rough(c)	26(a)	26	26
⅝ inch rough(c)	35(a)	35	34
¾ inch(c)	40(a)	40	37

Note a.—These spans shall not be exceeded for any load condition.

Note b.—Provide blocking or other suitable edge support when span exceeds twenty-eight (28) inches for one-half (½) inch; thirty-two (32) inches for five-eighths (⅝) inch; and thirty-six (36) inches for three-fourths (¾) inch.

Note c.—This table applies to all grades identified as Group 1, excepting the sheathing grades (C-D and C-C), which, if identified as Group 1, may be used as shown in upper portion of this table for Douglas fir plywood, etc.

Note d.—Provide adequate blocking or suitable edge support when span exceeds twenty-four (24) inches for one-half (½) inch; twenty-eight (28) inches for five-eighths (⅝) inch; and thirty-two (32) inches for three-fourths (¾) inch.

*For special case of two-span continuous beams spans can be increased six and one-half (6½) per cent except as noted under (a).

825.31. Plywood Sub-Flooring.—Where used as structural sub-flooring, plywood shall be of the minimum thicknesses set forth in table below:

MINIMUM THICKNESS OF PLYWOOD SUB-FLOORS
(Plywood continuous over 2 or more spans and face grain perpendicular to supports)
DOUGLAS FIR PLYWOOD, WESTERN LARCH, SOUTHERN PINE AND GROUP 1, SHEATHING GRADE, WESTERN SOFTWOOD PLYWOOD

Plywood Thickness	*Maximum Support Spacing (a)*
½" (b)	16"
⅝" (b)	20"
¾" (b)	24"

WESTERN SOFTWOOD PLYWOOD, GROUP 2*

Plywood Thickness	*Maximum Support Spacing (a)*
⅝" (b)	16"
¾" (b)	24"

Note a.—Spans shall be limited to values shown because of possible effect of concentrated loads. Allowable uniform load based on deflection of 1/360 is 100 psf.

Note b.—Blocking installed at edges unless separate underlayment of one-fourth (¼) inch minimum thickness, twenty-five thirty-seconds (25/32) inch wood strip flooring, or plywood with approved tongue and groove edges is used. If wood strips are perpendicular to supports, one-half (½) inch and five-eighths (⅝) inch can be used on twenty-four (24) inch span.

*This table applies also to all grades identified as Group 1, exceeding the sheathing grades (C-D and C-C), which, if identified as Group 1, may be used as shown in upper portion of this table for Douglas fir plywood, etc.

825.32. Vertical Maximum Stud Spacing.—Stud spacing for vertical sheathing and for use in stress-skin panel or other prefabricated constructions shall be determined by accepted engineering analysis or by the tests prescribed for prefabricated assemblies in section 803.

SECTION 826.0. WALLBOARDS AND SHEATHING

826.1. Sheathing.—Sheathing of gypsum, processed fiber and other approved materials shall conform to accepted engineering practice. When used in frame construction, they shall meet requirements of section 855.1 and 855.2. When required to meet fireresistance ratings the assembled construction shall comply with table 5 for structural elements and article 9 for trim and finishes.

826.2. Wallboards.—Wallboard of gypsum, processed fiber and other approved materials shall conform to accepted engineering practice. Wallboard shall conform to the standards of accepted engineering practice for gypsum or processed fiber wallboard interior finishes, listed in appendixes B and C. When required to meet fireresistance ratings the assembled construction shall comply with table 5 for structural elements and article 9 for trim and finishes.

ARTICLE 8—PART B
STEEL, MASONRY, CONCRETE, GYPSUM AND LUMBER CONSTRUCTION

SECTION 827.0. STRUCTURAL STEEL CONSTRUCTION

Structural steel construction used in all buildings and structures shall be fabricated from materials of uniform quality, free from defects that would vitiate the strength or stability of the structure. Workmanship, design, fabrication, transportation and erection shall conform to accepted engineering practice as defined by the standards listed in appendix B.

827.1. Plans.—Design plans drawn to appropriate scale shall show the size, section and relative locations of all structural members with floor levels, column centers and all offsets fully dimensioned; and the design loads shall be clearly indicated for all parts of the building or structure.

827.2. Temporary and Special Stresses.—Due provision shall be made in the design for temporary stresses occurring during erections and for the influence of special loads producing impact or vibrations as provided in section 710.4. Stresses caused by eccentric loading shall be fully provided for; and eccentric details shall be shown on the design and shop drawings.

827.3. Shop Drawings.—Complete shop drawings shall be prepared in conformity to best modern practice in advance of the actual fabrication. Such drawings shall clearly distinguish between shop and field rivets, bolts and welds in all connections and details.

827.4. Welding.—All welded construction shall be designed and supervised by engineers experienced and skilled in welded construction and the welded work shall be performed by qualified and approved operators in accordance with the standards of accepted engineering practice listed in appendix B.

827.5. Painting.—All painting shall comply with the specifications for design, fabrication and erection of structural steel for buildings listed in appendix B.

SECTION 828.0. FORMED STEEL CONSTRUCTION

828.1. Design.—The design of all light gage and formed steel members and assembled wall, floor and roof panels, used alone or in combination with other structural members, or with component materials, shall be based on allowable unit stresses and maximum deflections in accordance with the standards of accepted engineering practice listed in appendix B.

828.2. Deleted.—No requirements.

828.3. Secondary Structural Systems.—Formed steel floor, wall, and roof systems may be designed and constructed to resist all vertical and horizontal moments and shears resulting from lateral forces. Such members, when designed to transmit horizontal shears due to wind or other lateral forces, shall be connected to the supporting structure so as to adequately resist all primary and secondary stresses. When concrete topping or other approved decking is installed in a manner to insure composite action of the assembly, the strength of the composite member may be included in the calculations.

828.4. Roof Decking.

828.41. Deleted.—No requirements.

828.5. Protection.

828.51. Shop Coat.—All individual structural members and assembled panels of light gage and formed steel construction, except where fabricated of approved corrosion-resistive metallic steel or of steel having a corrosion-resistive or other approved coating, shall be protected against corrosion with an acceptable shop coat of paint, enamel, or other approved protection.

828.52. Field Coat.—After erection where directly exposed to the weather, except when encased in concrete made of non-corrosive aggregates, or where fabricated of approved corrosion-resistive steel, or of galvanized or otherwise adequately protected steel, individual structural members and assembled panels of light gage and formed steel construction shall be given an additional coat of acceptable protection.

828.53. Siding.—Exposed siding or sheathing shall be fabricated of approved corrosion-resistive steel or otherwise protected at the ground level for sufficient height above grade as determined by the depth of average snowfall in the locality, but in no case for a height of less than eight (8) inches.

828.54. Protection at Exterior Walls.—Floor or roof construction which extends into an exterior wall shall be adequately waterproofed and protected from the weather to prevent corrosion.

828.6. Tests.—When not capable of design by accepted engineering analysis, the building official shall require tests of the individual or assembled structural units and their connections as prescribed in sections 803 and 804. At least three (3) specimens truly representative of the construction to be used in practice shall be subjected to the prescribed test and the mean of the results shall determine the safe working value; provided that any individual test varying more than ten (10) per cent from the mean value shall cause rejection of the series.

SECTION 829.0. STEEL JOIST CONSTRUCTION

Steel joists may be used as secondary members in floor and roof construction, other than around stairwells, shafts and other floor openings in accordance with the standard for steel joist construction listed in appendix B.

829.1. Design.

829.11. Loads and Stresses.—Connections of all members shall be designed with the minimum possible eccentricity and all secondary stresses shall be included with primary stresses in the design. In buildings subject to heavy concentrations or moving loads, the construction shall be designed to resist the vertical and lateral components of such loads in addition to the live and dead loads specified in article 7.

829.12. Partitions.—The joists shall be designed to support the dead load of partitions wherever they occur in addition to all other imposed dead and live loads.

829.2. Protection.—Painting of steel joists shall be in accordance with the requirements of section 828 for formed steel construction; or the joists shall be dipped in an approved hot asphalt, or shall be protected by painting, dipping or spraying with approved cold asphalt at the place of manufacture.

829.3. Height and Area Limitations.—When the main structural frame is designed to resist all horizontal and vertical moments and shears due to lateral forces, and the secondary system consists of steel joists which are attached to the supporting beams and girders of the frame as specified in the standard, steel joist construction of the required fireresistance may be used in all buildings within the height limits of table 6.

829.4. Tests.—When not subject to accepted engineering analysis as regulated by the standard for steel joist construction, the assembly shall meet the load test requirements specified in sections 803 and 804.

SECTION 830.0. REINFORCING STEEL

Metal reinforcement for reinforced concrete, reinforced gypsum concrete, reinforced brickwork and reinforced hollow block construction shall comply with the applicable standards listed in appendix B.

830.1. Identification.—All reinforcing bars shall be rolled with raised symbols or letters impressed on the metal identifying the manufacturing mill. When required by the building official, the grade of material shall be identified by satisfactory mill tests. All bundles or rolls of cold-drawn steel wire reinforcement and of one-quarter (¼) inch rounds shall be securely tagged to identify the manufacturer and the grade of steel.

830.2. High Yield Steels.—When the yield point of reinforcing bar steel is fifty thousand (50,000) pounds per square inch or more, the building official shall approve tension stresses in bending and compression stresses in vertical column reinforcement not more than forty (40) per cent of the minimum yield point; but such stresses shall be not more than thirty thousand (30,000) pounds per square inch except as provided for one-way slabs in section 842.2 or when pre-stressed reinforcement is used.

830.3. Column Reinforcement.

830.31. Structural Steel Sections.—The allowable unit stress on structural steel column sections shall be not more than sixteen thousand (16,000) pounds per square inch.

830.32. Cast Iron Sections.—All cast iron used as reinforcement in combination with concrete shall be of pit-cast water pipe grade complying with the standards listed in appendix C; and the allowable unit stress shall be not more than ten thousand (10,000) pounds per square inch.

830.33. Steel Pipe Sections.—The allowable unit stress on steel pipe used in concrete-filled pipe columns shall be not more than forty-five (45) per cent of the yield point of the steel but in no case shall the combined stress in the shell be more than twenty thousand (20,000) pounds per square inch.

830.4. Tests.—When unidentified reinforcement is approved for use under ordinary material procedure, not less than three (3) tension and three (3) bending tests shall be made on representative specimens of the reinforcement from each shipment and grade of reinforcing steel proposed for use in the work.

SECTION 831.0. CAST STEEL CONSTRUCTION

831.1. Materials.—Carbon steel casting for building construction shall be cast from open hearth steel conforming to the requirements of accepted engineering practice. All castings shall be free from injurious blow holes or other defects which would impair the structural strength.

831.2. Higher Strength Cast Steel.—Higher strength cast steel may be used when approved under controlled material procedure.

831.3. Welding Cast Steel.—Cast steel designed for use in welding shall be of weldable grade complying with the approved rules.

SECTION 832.0. CAST IRON CONSTRUCTION

832.1. Materials.—Cast iron for building construction shall be a good foundry mixture providing clean, tough, gray iron, free from serious blow holes, cinder spots and cold shuts; conforming to the applicable standards listed in appendix C for medium gray iron castings.

832.2. Limitations of Use.—Cast iron columns shall not be used where subject to eccentric loads which produce a net tension in the section, nor in any part of a structural frame which is required to resist stress due to wind.

832.3. Multi-Story Columns.—Cores of superimposed columns shall be of the same dimensions above and below a splice. When a column of smaller diameter is superimposed over one of larger diameter, the larger column shall be tapered down to the smaller diameter over a length of not less than six (6) inches.

832.4. Thickness of Metal.—The minimum thickness of cast iron shall be not less than herein specified:

832.41. Columns.—In columns, the metal shall be not less than one-twelfth (1/12) the smallest dimension of the cross-section and in no case less than three-quarter (¾) inch.

832.42. Bases and Brackets.—In bases and flanges, the metal shall be not less than one (1) inch thick reinforced with fillets and brackets;

832.43. Lintels.—In lintels, the metal shall be not less than three-quarter (¾) inches thick and shall be limited to use on spans of not more than six (6) feet.

832.5. Inspection.—No cast iron column shall be erected in place before it has been inspected and approved by the building official. The use of any cast iron column in which blow holes or imperfections reduce the effective area of the cross-section more than ten (10) per cent shall be prohibited. Where required by the building official, three-eighth (⅜) inch round inspection holes shall be drilled in the section to expose the thickness of metal for inspection purposes.

SECTION 833.0. SPECIAL STEELS

833.1. Identification.—Silicon, nickel and other corrosion-resistive alloy and high strength steels used in the design and construction of buildings and structures shall conform to the standards of accepted engineering practice. Every such special steel shall be marked or otherwise identified to clearly distinguish it from all other classes of steel.

833.2. Design and Workmanship.—Design and fabrication methods shall conform to the requirements of the approved rules.

SECTION 834.0. LIGHT WEIGHT METAL ALLOYS

Aluminum and other approved light weight metals and alloys shall be used for structural purposes in buildings and structures in accordance with the applicable standards listed in appendix B.

SECTION 835.0. MASONRY WALL CONSTRUCTION

835.1. Design.—All masonry construction shall comply with the provisions of this article governing quality of materials and manner of construction; and shall be of adequate strength and proportions to support all superimposed loads within working stresses prescribed in the Basic Code and the standards of accepted engineering practice.

835.2. Wetting of Brick.—Brick (clay or shale) shall be wetted when laid unless their gain in weight resulting from partial immersion flatwise in one-eighth (⅛) inch of water for one (1) minute is less than twenty-five thousandths (0.025) ounce per square inch of immersed area.

835.3. Precautions Against Freezing.—All masonry shall be protected against freezing for not less than forty-eight (48) hours after installation; and shall not be constructed below twenty-eight (28) degrees F. on rising temperatures or below thirty-six (36) degrees F. on falling temperatures, without temporary heated enclosures or without heating materials or other precautions necessary to prevent freezing. No frozen materials shall be used nor shall frozen masonry be built upon.

835.4. Incorporation of Combustibles.—No lumber or other combustible materials, except nailing blocks and ornamental timber to an extent permitted by the chasing restrictions of section 838 and the provisions of section 900.2 shall be incorporated in masonry walls, except as approved for combustible aggregates or component materials after fire test.

SECTION 836.0 BONDING OF WALLS

Walls of solid, composite and hollow masonry and cavity and other hollow walls shall be bonded in accordance with accepted engineering practice.

836.1. Rubble Stone Walls.—All stones in rubble masonry shall be laid on their natural bed and the walls shall be bonded with not less than one (1) through bond stone for each nine (9) superficial square feet of area.

836.2. Buttresses and Piers.—All buttresses shall be bonded into the wall by a masonry bond. The piers and buttresses shall have sufficient strength and stability with sufficient bonding or anchorage between the walls and the supports to resist wind pressure and suction.

836.3. Intersecting Walls and Partitions.—Masonry walls and partitions shall be securely anchored or bonded at points where they intersect by one (1) of the following methods:

1.—Walls may be bonded by laying at least fifty (50) per cent of the units at the intersection in true masonry bond with alternate units having a bearing of not less than three (3) inches upon the unit below, or they may be anchored with not less than three-sixteenths (3/16) inch corrosion-resistant metal wire ties or joint reinforcement at vertical intervals not to exceed two (2) feet, or by other equivalent approved anchorage.

2.—Where walls are carried up separately the intersection shall be toothed or blocked with eight (8) inch maximum offsets and shall be provided with approved metal anchors at vertical intervals of not more than four (4) feet or, when approved, blocking may be eliminated and rigid steel anchors shall be provided, spaced not more than two (2) feet apart vertically.

3.—Interior nonloadbearing walls may be bonded or anchored as required by 1 or 2 above or they may be anchored at their intersection, at vertical intervals of not more than two (2) feet, with at least twenty-two (22) gage corrosion-resistant corrugated metal ties seven-eighths (7/8) inch in width, or other equivalent approved method of anchorage.

836.4. Erecting Precautions.—Where hollow walls decrease in thickness, a course of solid masonry or of concrete-filled units, or a continuous bearing plate shall be interposed between the thicker and thinner sections. No wall shall be built up more than twenty-five (25) feet in advance of other walls of the same building or structure unless supported independently at each floor; and all walls shall be temporarily braced during erection.

SECTION 837.0. LATERAL BRACING OF BEARING WALLS

All masonry bearing walls shall be laterally supported by horizontal bracing of floor and roof framing or vertical bracing of columns, buttresses or cross-walls at vertical or horizontal intervals as specified in the standard building code requirements for masonry listed in appendix B; and provision shall be made in the structure to transfer wind pressures and other lateral forces to the foundations.

837.1. Vertical Bracing.—In no case shall the length of bearing or nonbearing walls between cross-walls, piers, buttresses or other equivalent vertical bracing be more than seventy-five (75) times the wall thickness.

SECTION 838.0. CHASES AND RECESSES IN BEARING WALLS

838.1. Where Permitted.—Chases and recesses shall be prohibited in any wall less than twelve (12) inches thick or in the required area of piers and buttresses; except that eight (8) inch walls where permitted in residential buildings and the apron under window openings may be chased not more than four (4) inches in depth.

838.2. Maximum Size.—The maximum permitted depth of a chase in any wall shall be not more than one-third (1/3) the wall thickness, and the maximum length of a horizontal chase or the maximum horizontal projection of a diagonal chase shall not exceed four (4) feet except as provided in section 838.5; and except further that the length of the apron below window sills in all walls may equal the width of the window opening; and such aprons in eight (8) inch walls may be chased not more than four (4) inches in depth when waterproofed. The aggregate area of recesses and chases in any wall shall be not more than one-fourth (1/4) of the area of the face of the wall in any one story.

838.3. Fireresistive Limitations.—It shall be unlawful to have chases or recesses which reduce the thickness of material below the minimum specified in article 9 for fire walls, fire divisions, fire partitions or required fire-protective covering of structural members.

838.4. Hollow Walls.—When chases and recesses are permitted in hollow walls and walls constructed of hollow blocks or tile, they shall be built-in with the wall. It shall be unlawful to cut chases in such walls after erection.

838.5. Continuous Chases.—Horizontal chases for the bearing of reinforced concrete floor and roof slabs may be continuous, provided anchors are installed above and below the floor construction to resist the bending and uplift in the wall due to flexure of the slab.

SECTION 839.0. CORBELED AND PROJECTED MASONRY

839.1. Limitations.—No wall less than twelve (12) inches thick shall be corbeled except to support firestopping around floor framing; and except that eight (8) inch foundation walls may be corbeled to support brick-veneer frame and ten (10) inch cavity walls as provided in section 871. The maximum total horizontal projection of corbels shall be not more than

one-half (½) the thickness of the wall. The maximum projection of one (1) unit shall neither exceed one-half (½) the depth of the unit nor one-third (1/3) its width at right angles to the face which is offset.

839.2. Hollow Walls.—Corbeling of hollow masonry or masonry built of hollow units shall be supported on at least one full course of solid masonry.

839.3. Molded Cornices.—Unless structural support and anchorage is provided to resist the overturning moment, the center of gravity of all projecting masonry or molded cornices shall lie within the middle third of the supporting wall. Terra cotta and metal cornices shall be provided with a structural frame of approved noncombustible material anchored in an approved manner.

SECTION 840.0. BEARING ON HOLLOW UNIT WALLS

840.1. Bearing Area.—Beam, girder and other concentrated loads shall be provided with a bearing of solid masonry or filled cores of hollow unit masonry at least four (4) inches in height or with a bearing plate of adequate design and dimensions to distribute the load safely on the wall or pier.

840.2. Closure Tile.—All open cells in tiles or blocks at wall ends and at openings shall be filled solidly with concrete for a length of not less than twelve (12) inches, or reversed closure tile shall be used.

SECTION 841.0. PLAIN CONCRETE

Except for controlled materials, cast-in-place concrete masonry shall contain not more than seven and one-half (7½) gallons of water per sack of cement and not more than six (6) parts of aggregate for each one (1) part of cement by separate, dry volumetric measure.

841.1. Design Stress.—Plain concrete masonry shall conform to the applicable requirements of section 842 for reinforced concrete, but in no case shall the allowable working stress in compression exceed twenty-five (25) per cent of the compressive strength and the extreme fiber stress in bending shall not exceed three (3) per cent of the compressive strength.

SECTION 842.0. REINFORCED CONCRETE

842.1. Design.—The design of reinforced concrete construction shall be based on the generally accepted theory of flexure and elasticity of materials as applied to reinforced concrete and as specified in section 843 for controlled materials and in section 844 for ordinary materials and in accordance with the standards listed in appendix B.

842.2. One-Way Slabs.—In one-way slabs designed in accordance with accepted engineering practice of not more than twelve (12) foot span, the allowable tension in the reinforcement may be increased to fifty (50) per cent of the minimum yield point of the particular kind and grade of reinforcement used when the main reinforcement is three-eighth (⅜) inches or less in diameter; but in no case shall the allowable stress exceed thirty thousand (30,000) pounds per square inch.

842.3. Cinder Concrete.—Cinders shall not be used as coarse aggregate in reinforced concrete structural members except as provided in section 845.

842.4. New Systems.—Any system of construction which is not covered by or which conflicts with the requirements of the Basic Code, may be approved by the building official on the basis of satisfactory experience records and tests as prescribed by sections 803 and 804 and sections 903 and 904.

842.5. Embedded Mechanical Facilities.—Plumbing and heating piping and electrical conduits may be embedded in reinforced concrete floor and wall construction and in column fireproofing as provided in section 914.3. Piping for radiant heating purposes may be embedded in the structural floor or wall slabs, or may be installed in a separate concrete layer placed in addition to the required fireproof covering, as approved by the building official. In any case, the required area of reinforcement shall be provided in addition to such piping; and the conduits, pipes or other embedded mechanical facilities shall be so placed as to leave the strength and fireresistance of the construction undiminished.

SECTION 843.0. CONTROLLED CONCRETE

When controlled materials procedure is followed in the design and construction of a reinforced concrete building or structure, the allowable working stresses shall conform to accepted engineering practice in accordance with the building code requirements for reinforced concrete listed in appendix B. The ultimate compressive strength of the concrete shall not be limited in controlled concrete procedure, provided proper provision is made to limit deflections and cracking.

SECTION 844.0. ORDINARY CONCRETE

When ordinary material procedure is followed in the design and construction of a reinforced concrete building or structure, the allowable working stresses shall be as specified in appendix K and the design shall conform to accepted engineering practice.

SECTION 845.0. STRUCTURAL CINDER CONCRETE

845.1. Aggregates.—Approved cinder aggregates where permitted for use in structural and fireproofing concretes shall consist of clean, well burned cinders, containing a maximum of thirty-five (35) per cent of unburned carbon and not more than one and one-half (1½) per cent of sulphur nor more than a total of five (5) per cent of volatile materials.

845.2. Cinder Concrete Proportions.—Structural cinder concrete shall be mixed in the proportions of one (1) part portland cement and not more than seven (7) parts of fine and coarse aggregate measured separately with a compressive strength of not less than eight hundred (800) pounds per square inch at twenty-eight (28) days' age.

SECTION 846.0. SHORT SPAN FLOOR FILLING

For spans not exceeding ten (10) feet between steel flanges, the safe supporting capacity of concrete floor and roof slabs built as fireproof floor filling between steel beams shall be determined by the provisions of sections 842.2 or in accordance with the approved rules for stone and cinder concrete and other approved fireresistive floor filling.

SECTION 847.0. CONCRETE-FILLED PIPE COLUMNS

Concrete-filled pipe columns shall be manufactured from standard, extra strong, or double extra strong steel pipe and tubing, filled with concrete so placed and manipulated as to secure maximum density and to insure complete filling of the pipe without voids.

847.1. Design.—The safe supporting capacity of concrete-filled pipe columns shall be computed in accordance with the approved rules or as determined by test.

847.2. Connections.—All caps, base-plates and connections shall be of approved types and shall be positively attached to the shell and anchored to the concrete core. Welding of brackets without mechanical anchorage shall be prohibited. When the pipe is slotted to accommodate webs of brackets or other connections, the integrity of the shell shall be restored by welding to insure hooping action of the composite section.

847.3. Reinforcement.—To increase the safe load supporting capacity of concrete-filled pipe columns, the steel reinforcement shall be in the form of rods, structural shapes or pipe embedded in the concrete core with sufficient clearance to insure the composite action of the section, but not nearer than one(1) inch to the exterior steel shell. All structural shapes used as reinforcement shall be milled to insure bearing on cap and base plates.

847.4. Fireresistive Protection.—Pipe columns shall be of such size or so protected as to develop the required fireresistance ratings specified in table 5. When an outer steel shell is used to enclose the fireproof covering, it shall not be included in the calculations for strength of the column section. The minimum diameter of pipe columns shall be four (4) inches except that in frame structures not exceeding three (3) stories or forty (40) feet in height, three (3) inch columns may be used in the basement and as secondary steel members.

847.5. Approvals.—All details of column connections and their splices shall be shop-fabricated by approved methods and shall be approved only after tests in accordance with the approved rules. Shop-fabricated concrete-filled pipe columns shall be inspected by the building official or by an approved representative of the manufacturer at the plant.

SECTION 848.0. PNEUMATIC CONCRETE

Mortar or concrete deposited pneumatically shall be applied only with the approval of the building official and shall be protected and cured to prevent the temperature falling below fifty (50) degrees F. or from loss of moisture at the surface. Reinforcement for pneumatic mortar shall be adequate to meet structural requirements and shall consist of round bars or mesh not less than No. 12 U. S. gage in diameter, spaced not less than two (2) nor more than four (4) inches either way, with a gross area of not less than two-tenths (0.2) per cent of the cross-sectional area of the mortar layer.

848.1. General Requirements.—Pneumatically placed concrete shall consist of a mixture of fine aggregate and cement pneumatically applied by suitable mechanism, and to which water is added immediately prior to discharge from the applicator. Except as specified in the following sections, pneumatically placed concrete shall conform to the requirements of the Basic Code for reinforced concrete.

848.11. Proportions.—The proportion of cement to aggregate, in loose dry volume, shall not be less than one (1) to four and one-half (4½).

848.12. Water.—The water content at the time of discharge, including moisture in the aggregate, shall not exceed three and one-half (3½) gallons per sack of cement.

848.13. Mixing.—The cement and aggregate shall be thoroughly mixed prior to the addition of water. At the time of mixing the aggregate shall contain not less than three (3) percent moisture.

848.2. Rebound.—Any rebound or accumulated loose aggregate shall be removed from the surfaces to be covered prior to placing the initial or any succeeding layers of pneumatically placed concrete. Rebound may be re-used if it conforms to the requirements for aggregate, provided the amount of rebound material used shall not exceed twenty-five (25) percent of the total aggregate in any batch.

848.3. Joints.—Unfinished work shall not be allowed to stand for more than thirty (30) minutes unless all edges are sloped to a thin edge. Before placing additional material adjacent to previously applied work, these sloping edges shall be cleaned and wetted.

848.4. Damage.—Any pneumatically placed concrete which subsides after placement shall be removed.

848.5. Test Cylinders.—Test cylinders of pneumatically placed concrete shall be made in a manner that will permit the blast of air to firmly compact the materials and provide escapement of the air to eliminate possible back pressure. Such cylinders shall be cured and tested as required for reinforced concrete.

SECTION 849.0. MINIMUM CONCRETE DIMENSIONS

The protection of reinforced concrete structural elements in buildings of fireproof (types 1-A and 1-B) construction shall be adequate to meet the fire and strength tests of the Basic Code; but in no case less than the minimum dimensions established by the standards of accepted engineering practice. Any floor finish not placed monolithically with floor slabs, shall not be included in the calculations for structural strength.

SECTION 850.0. REINFORCED GYPSUM CONCRETE

Reinforced gypsum concrete for use in buildings and structures shall consist of a mixture of calcined gypsum and water, with or without the addition of wood chips, shavings, fiber or other approved aggregates. The wood aggregates and gypsum shall be pre-mixed at the mill, requiring only the addition of water at the job or site. The manufacture, design and construction shall comply with the requirements of the standards of accepted engineering practice listed in appendix B.

850.1. Limitations of Use.—Gypsum concrete shall not be used where exposed directly to the weather or where subject to frequent or continuous wetting. To prevent saturation or freezing, protection from the weather and from contact with moisture shall be furnished during shipment and storage of prefabricated units, and after erection or pouring at the site.

SECTION 851.0. REINFORCED BRICKWORK

All systems of brick masonry reinforced with steel in grouted mortar joints for use in the design and construction of buildings and structures shall conform to the requirements of this section and the standards of accepted engineering practice listed in appendix B. Reinforced brickwork shall be used only under controlled materials procedure.

851.1. Design.—The formulae and assumptions used in the design of reinforced concrete shall apply to reinforced brick masonry insofar as they are applicable.

SECTION 852.0. REINFORCED HOLLOW BLOCK CONSTRUCTION

Walls constructed of hollow block or other hollow unit masonry, filled solidly with concrete or grout and reinforced with steel rods shall be designed as specified for reinforced brick masonry in section 851.

SECTION 853.0. LUMBER AND TIMBER CONSTRUCTION

853.1. Design.—Structural lumber and timber and its fastenings shall be adequately designed and assembled to safely sustain all imposed loads. When stress-grade lumber is used and properly identified and controlled, working stresses may be in accordance with the accepted engineering practice standards listed in appendix B. All lumber used for load supporting purposes shall be identified by the grade mark of a lumber grading inspection agency approved by the building official. Grading practices and identification shall be in accordance with rules published by an agency recognized as being competent. In lieu of a grade mark on the material, a certificate of inspection as to species and grade issued by a lumber grading or inspection agency approved by the building official may be accepted for precut, remanufactured, or rough sawn lumber; also for sizes larger than three (3) inches nominal thickness.

853.2. Minimum Dimensions.

853.21. Sizes of Structural Members.—All lumber sizes specified in the Basic Code are nominal sizes. Nominal sizes may be shown on the plans.

Computations to determine the required size of members shall be based on the net dimensions (actual sizes).

853.22. Structural Posts.—All isolated structural posts shall have a minimum dimension of four (4) inches.

853.3. Fabrication.

853.31. Connections.—All connections shall be fabricated with approved timber connectors, bolts, lag screws, spikes, nails or gluing or other approved connecting devices in accordance with accepted engineering practice. Bolted connections shall be snugged up tightly without crushing wood fibers under the washers. All nailed connections shall meet the minimum requirements of appendix L.

853.32. Cambering.—Trusses and long span girders shall be designed with sufficient camber or other provision shall be made to counteract any possible deflection.

853.33. Cutting and Notching.—It shall be unlawful to notch, cut or pierce wood beams, joists, rafters or studs in excess of the limitations herein specified unless proven safe by structural analysis, or suitably reinforced to transmit all calculated loads. Notches in the top or bottom of joists shall not exceed one-sixth (⅙) the depth of the member and shall not be located in the middle one-third (⅓) of the span. Notches located closer to the supports than three (3) times the depth of the member shall not exceed one-fifth (⅕) the depth. Holes bored or cut into joists for piping or electrical cables shall not be closer than two (2) inches to the top or bottom of the joist and the diameter of the hole shall not exceed one-third (⅓) the depth of the joist. In studs of bearing walls or partitions, notches or bored holes made to receive piping, electrical conduit, air conditioning or heating duct work or for other fabricating purposes shall not be cut or bored more than one-third (⅓) the depth of the stud. When the stud is cut or bored in excess of one-third (⅓) its depth it shall be reinforced to be equal in load-carrying capacity to a stud notched not more than one-third (⅓) its depth.

853.4. Trimmer and Header Beams.—When determined necessary by stress analysis, trimmer and header beams shall be hung in approved metal or other approved noncombustible stirrups or hangers, unless supported on a masonry wall or girder. All such beams shall be spiked together.

853.5. Bearing and Anchorage on Girders.—All members framing into girders shall be anchored or tied to secure continuity. The ends of all wood beams or joists resting on girders shall bear not less than four (4) inches or shall be supported in approved metal stirrups, hangers or on wood clips or ribbon strips. Beams framing from opposite sides shall lap at least six (6) inches and be bolted or spiked together; and when framing end to end, they shall be secured together by metal ties, straps or dogs.

853.6. Maintenance.—All connections in the joints of timber trusses and structural frames shall be inspected periodically and bolts and other connectors shall be maintained tight.

SECTION 854.0. HEAVY TIMBER TYPE CONSTRUCTION

854.1. Wood.—All structural wood members sawn or glued laminated used in heavy timber type construction shall be stress-grade timbers identified as to grade and strength by authoritative manufacturing, testing or inspection agencies or bureaus. All structural timber members shall have the minimum dimensions specified in section 217 for type 3-A construction.

854.2 Other Structural Materials.—Structural steel or reinforced concrete members may be substituted for timber in any part of the structural frame, protected to develop the required fireresistance specified in table 5, but not less than three-quarter ¾ hour fireresistance. Structural members supporting walls shall be protected to afford the same fireresistance rating as the wall supported.

854.3. Columns.—Columns shall be continuous or superimposed throughout all stories by means of reinforced concrete or metal caps with brackets, or shall be connected by properly designed steel or iron caps, with pintles and base plates, or by timber splice plates affixed to the columns by means of metal connectors housed within the contact faces, or by other approved methods. Girders or trusses supporting columns shall have at least three-quarter (¾) hour fireresistance.

854.4. Floors.—The planks shall be laid so that no continuous line of joints will occur except at points of support and so that they are not spiked to supporting girders. Flooring shall not extend closer than one-half (½) inch to walls to provide an expansion joint, but the joint shall be covered at top or bottom to avoid flue action.

854.5. Beams and Girders.

854.51. Wall and Girder Supports.—Wall plate boxes of self-releasing type or approved hangers shall be provided where beams and girders enter masonry. An air space of one-half (½) inch shall be provided at the top, end and sides of the member unless approved durable or treated wood is used. Where intermediate beams are used to support a floor, they shall rest on top of the girders, or shall be supported by ledgers or blocks securely fastened to the sides of the girders, or they may be supported by approved metal hangers into which the ends of the beams shall be closely fitted. Wood beams and girders supported by walls required to have a fireresistance rating of two (2) hours or more shall have not less than four (4) inches of solid masonry between their ends and the outside face of the wall and between adjacent beams. Adequate roof anchorage shall be provided.

854.52. Column Connections.—Where intermediate beams are used to support a floor, they shall rest on top of the girders, or shall be supported by ledgers or blocks securely fastened to the sides of the girders, or they may be supported by approved metal hangers into which the ends of the beams shall be closely fitted.

SECTION 855.0. WOOD FRAME CONSTRUCTION

The exterior walls, interior partitions, floors and roofs of wood frame construction shall be designed and constructed to develop adequate strength to resist all vertical and lateral forces due to both dead and live loads. Standard balloon, braced, platform and post and beam types of construction shall be acceptable framing methods.

855.1. Wood-Stud Frame.

855.11. Bearing Walls.—Posts and studs in bearing walls and partitions shall be designed as columns, with due allowance for lateral support furnished by sheathing, intermediate bracing, horizontal bridging, wall coverings and the floor and roof assemblies. The walls shall be fabricated in such a manner as to provide adequate support for the material used to enclose the building and to provide for transfer of all lateral loads to the foundation, in accordance with section 804.3.

855.12. Non-Bearing Walls.—Studs in non-bearing walls and partitions shall not be spaced more than forty-eight (48) inches on centers, and may be erected with the long dimension parallel to the wall, unless otherwise approved after test as an integrated assembly.

855.13. Bracing.—In buildings more than one (1) story in height and where necessary for strength in one (1) story buildings, the corner posts shall be the equivalent of not less than three (3) pieces of two (2) by four (4) inch studs, braced by not less than one (1) piece of one (1) by four (4) inch continuous diagonal brace let into the studs. Bracing may be omitted when diagonal wood sheathing or plywood panels are used, or other sheathing specified in section 855.2 is applied vertically in panels of not less than four (4) feet by eight (8) feet in area with approved nailing complying with appendix L. Ledger or ribbon boards used to support joists shall be not less than one (1) by four (4) inches in size, cut into and securely nailed to each stud.

855.14. Mortise and Tenon Framing.—Where mortise and tenon framing is used, the vertical members of the frame shall be not less than four (4) by six (6) inches in size and shall be designed as a column.

855.15. Multiple Stories.—When the frame is more than one (1) story in height and studs and posts are not continuous from sill to roof, the members shall be secured together with approved clips, splices or other connections to insure a continuous, well integrated structure. Sheet metal clamps, ties or clips shall be formed of galvanized steel or other approved corrosion-resistive materials equivalent to No. 20 U.S. gage steel sheets for two (2) inch framing members and not less than No. 18 U.S. gage for three (3) inch structural members. For four (4) inch and larger members, column splices and beam and girder supports shall comply with section 854.

855.16. Framing Over Openings.—Headers, double joists, trusses or other approved assemblies of adequate size to transfer all superimposed loads to the vertical member shall be provided over all window and door openings in bearing walls and partitions.

855.2. **Wall Sheathing.**—Except as provided in section 855.3 for weather boarding or when stucco construction complying with section 821.5 is used, all enclosed buildings shall be sheathed with one of the materials of the following nominal thickness or any other material of equal strength and durability approved by the building official:

Reinforced cement mortar	1 inch
Wood sheathing	1 inch
Plywood	5/16 inch
Gypsum sheathing	½ inch
Fiber boards	½ inch

855.21. **Paper-Backed Lath Sheathing.**—In one- and two-family dwellings and one (1) story commercial buildings with brick or similar veneers the sheathing may consist of a layer of paper-backed lath complying with section 821.4 with a one (1) inch intermediate space which shall be mortar filled as each course of veneering is applied.

855.3. **Exterior Weather Boarding, Veneers and Condensation.**—To secure weather-tightness in framed walls and other unoccupied spaces, the exterior walls shall be faced with an approved weather-resisting covering properly attached to resist wind and rain. The cellular spaces shall be so ventilated as not to vitiate the firestopping at floor, attic and roof levels or shall be provided with interior non-corrodible vapor-type barriers complying with the approved rules; or other means shall be used to avoid condensation and leakage of moisture. The following materials shall be acceptable as approved weather coverings of the nominal thickness specified:

Brick masonry veneers	2 inches
Stone veneers	2 inches
Clay tile veneers	¼ to 1 inch
Stucco or exterior plaster	¾ inch
Precast stone facing	5/8 inch
Wood siding (without sheathing)	5/8 inch
Wood siding (with sheathing)	½ inch
Protected fiber board siding	½ inch
Wood shingles	3/8 inch
Exterior plywood (without sheathing)	See sec. 825.2
Exterior plywood (with sheathing)	5/16 inch
Asbestos shingles	5/32 inch
Asbestos cement boards	⅛ inch
Aluminum clapboard siding	.024 inch
Formed steel siding	28 gage
Hardboard siding	¼ inch

855.31. Masonry Veneers.—Veneers of unit masonry shall be attached to the wood frame with at least twenty-two (22) gage corrosion-resistive, corrugated metal ties not less than seven-eighths (⅞) inch in width at vertical intervals of not more than sixteen (16) inches and horizontal intervals of not more than thirty-two (32) inches.

855.32. **Metal Veneers.**—Veneers of metal shall be fabricated from approved corrosion-resistive materials or shall be protected front and back with porcelain enamel or shall be otherwise treated to render the metal resistant to corrosion. Such veneers shall be not less than No. 28 U.S. gage in thickness mounted on wood or metal furring strips or approved sheathing on the frame construction.

855.33. **Height of Veneers.**—The average height of four (4) inch brick veneer shall be not more than twenty-five (25) feet above its supports on foundation wall or on corbels of masonry or steel; and not more than eighteen (18) feet in height for two (2) inch veneers.

855.34. **Nailing.**—All weatherboarding and wall and roof coverings shall be securely nailed with aluminum, copper, zinc, zinc-coated or other approved corrosion-resistive nails in accordance with the recommended nailing schedule or the approved manufacturer's standards.

Shingles and other weather coverings shall be attached with appropriate standard shingle nails to furring strips securely nailed to studs, or with approved mechanically-bonding nails except when sheathing is wood not less than one (1) inch nominal thickness or plywood not less than five-sixteenths (5/16) inch thick.

Wood shingles or shakes attached with approved corrosion-resistive annular grooved nails may be applied over fiberboard shingle backer and fiberboard sheathing when the installation is in accordance with the approved manufacturer's standards listed in appendix C. Wood shingles or shakes and asbestos shingles or siding may be nailed directly to nail base fiberboard sheathing not less than one-half (½) inch nominal thickness with approved corrosion-resistive annular grooved nails when the installation is in accordance with the approved manufacturer's standards listed in appendix C.

855.4. **Foundation Anchorage.** — When required to resist wind uplift, wall sills shall be anchored to the foundation walls or piers at corners and at intermediate intervals of not more than eight (8) feet with one-half (½) inch bolts. The bolts shall be imbedded in the masonry foundations to a depth of not less than eight (8) inches in placed concrete, and not less than fifteen (15) inches in unit masonry. Sill plates shall be at least equivalent to a two (2) by six (6) inch member.

855.5. **At-Grade Protection.**

855.51. **Wood Framing.** — All exterior wood framework of buildings whether structural or nonload-bearing shall be supported on approved foundation walls at least eight (8) inches above the finished grade, and higher when necessitated by greater average snow fall. Where climatic conditions, or the geographical location require additional control measures to protect buildings and structures against decay and termite attack, the provisions of section 876.0 shall be complied with.

855.52. **Metal Siding.**—Exposed metal siding or sheathing shall be protected from corrosion at the ground level by supporting the foundation channel at sufficient height above grade on the concrete apron or other approved water-resisting foundation.

855.6. **Floors.**

855.61. Bridging.—Except as hereinafter noted, in all floor, attic and roof framing, there shall be not less than one (1) line of bridging for each eight (8) feet of span. The bridging shall consist of not less than one (1) by three (3) inch lumber, double-nailed at each end, or of equivalent metal bracing of equal rigidity. A line of bridging shall also be required at supports where adequate lateral support is not otherwise provided.

Midspan bridging is not required for floor, attic or roof framing in one- and two-family dwellings (use group L-3) where joist depth does not exceed twelve (12) inches nominal.

855.62. Flooring.—The flooring of wood frame construction shall be of adequate strength and stiffness to support required loads and, where necessary for strength and for lateral support of the building, subflooring shall be provided.

855.7. **Roofs.**

855.71. **Types of Decking and Sheathing.** — Roof deck sheathing shall consist of not less than one (1) inch boards or plywood of the thickness specified in section 825.3, or other approved materials of equivalent strength and rigidity. When open-deck sheathing is used on pitched roofs, it shall consist of not less than one (1) by four (4) inch roofers spaced not more than six (6) inches on centers or material of equivalent strength and rigidity.

855.72. Wood Shingles.—Wood shingles and handsplit shakes complying with the standards listed in appendix C may be used for roof covering where permitted in section 928.3, and may be installed on tight decking or on spaced roof boards.

855.8. Flashing.—Approved corrosion-resistive flashing shall be provided at top and sides of all exterior window and door openings in such manner as to be leakproof. Similar flashings shall be installed at the intersection of chimneys or other masonry construction with frame or stucco walls, with projecting lips on both sides under stucco copings; under and at the ends of masonry, wood or metal copings and sills; continuously above all projecting wood trim; at wall and roof intersections; under built-in gutters; at junction of chimneys and roofs; in all roof valleys and around all roof openings. When veneers of natural or artificial stone are used, fourteen (14) pound felt or paper shall be attached to the sheathing with flashing wherever necessary to prevent moisture penetration behind the veneer.

855.9. Interior Finish.—In all habitable spaces, interior wall and partition surfaces shall be finished with materials which do not exceed the combustible limitations of section 904.0 and are of adequate strength to resist a horizontal force of not less than five (5) pounds per square foot.

SECTION 856.0. STRESS SKIN PANELS.

856.1. **Integrated Assemblies.** — Approved panels or other integrated assemblies fabricated of dimension lumber with wood stress-coverings glued thereto, or consisting of structural units of metal-covered or molded plywood or other approved plastics, formed and molded into prefabricated load-bearing members shall be permitted for use in floors, roofs, walls, partitions and ceilings when designed in accordance with accepted engineering practice or meeting the test requirements of sections 803, 804 and 805.

856.2. **Splices.**—Splices and connections between panels shall be weathertight and of sufficient strength to resist two and one-half (2½) times the design live load to which they will be subjected in normal use. The fastenings of covering assemblies to structural studs, ribs or joists shall provide rigidity equivalent to approved gluing. Nailing shall not be acceptable for that purpose.

856.3. **Molded Plywood Units.** — Structural units of plywood or other approved plastics of similar combustible characteristics formed and molded into prefabricated load-bearing members shall conform to the approved rules and shall be identified by the approved label. The design shall be based on accepted engineering analysis confirmed by the tests prescribed in sections 803 and 804.

SECTION 857.0. GLUED, LAMINATED AND BUILT-UP LUMBER CONSTRUCTION

Buildings and structures may be designed and erected of glued, laminated structural members of standard commercial or stress grade lumber, or of composite members of plywood and dimension lumber.

857.1. **Glued Laminated Members.**—Fabricated units of laminated dimension lumber consisting of joists, planks or boards, in which all integrated units are assembled with primarily parallel grain shall be designed and constructed under the controlled material procedure to meet the requirements of timber construction standards listed in appendix B.

857.2. **Glued Lumber Members.** — Built-up beam and column sections consisting of one or more webs with glued lumber flanges and stiffeners shall be designed in accordance with accepted engineering analysis.

857.3. **Gluing Surfaces.** — In glued lumber constructions, the surfaces shall be worked to a smooth, flat surface without sanding and free from wax, grease or oil to insure a complete glue bond over the entire contact. Factory sanded plywood shall not be prohibited.

SECTION 858.0. Deleted. (See Section 508.0)

ARTICLE 8 – PART C

BUILDING ENCLOSURES, WALLS AND WALL THICKNESS

SECTION 859.0. ENCLOSURE WALLS

All buildings, except as may be provided for miscellaneous structures designed for special uses, shall be enclosed on all sides with independent or party walls of frame, masonry or other approved construction. Such walls shall be constructed to afford the fireresistance specified in table 5 and as required in the Basic Code for location, use and type of construction.

859.1. Projections.—Exterior enclosure walls shall be constructed entirely within property lines or building lines when established by law, except for authorized projections beyond the street lot line in accordance with the provisions of section 312.

859.2. Exterior Wall Pockets.—In exterior walls of all buildings and structures, wall pockets or crevices in which moisture may accumulate shall be avoided or protected with adequate caps or drips, or other approved means shall be provided to prevent water damage.

859.3. Gutters and Coping.—Unless constructed with parapet walls and coping as required by section 870, all exterior walls shall be provided with gutters and downspouts or leaders to dispose of roof drainage to comply with the Plumbing Code.

859.4. Exceptions.—The provisions of this article shall not be deemed to prohibit the omission of exterior walls for all or part of a story of a building in accordance with the provisions of section 906.1.

859.5. Glass in Walls.

859.51. Labeling.—Each light of glass shall be labeled with a removable paper label showing type, thickness and manufacturer. To qualify as glass with special performance characteristics each unit of laminated, heat strengthened, fully tempered, and insulating glass shall be permanently identified by the manufacturer. The identification shall be etched or ceramic fired on the glass and be visible when the unit is glazed.

Heat strengthened and tempered spandrel glasses are exempted from permanent labeling. This type of glass shall be labeled with a removable paper label by the manufacturer.

859.52. Glass Dimensional Tolerance.—Glass thickness tolerances shall comply with those established in the following table. Where thickness is to be controlled, nominal values are stated subject to these tolerances:

Nominal Thickness	*Plate Glass Min. Thickness (Inches)*	*Sheet Glass Min. Thickness (Inches)*
SS	.....	0.085
DS	.....	0.115
1/8	0.094	.....
3/16	0.156	0.182
13/64	0.172	.....
7/32	.....	0.205
1/4	0.218	0.240
5/16	0.281	.....
3/8	0.312	0.312
1/2	0.437	0.438
5/8	0.532	.....
3/4	0.625	.....
1	0.875	.....
1 1/4	1.125	.....

859.53. Glass Supports.—Where one or more sides of any light of glass is not firmly supported, or is subjected to unusual load conditions, detailed shop drawings, specifications and analysis by methods described in appendix K, or test data assuring safe performance for the specific installation, shall be prepared by engineers experienced in this work and approved by the building official.

859.54. Wind Loads.—Glass exposed to wind pressure shall be capable of safely withstanding the loads specified in table A in appendix K, acting inward or outward. The design factor relating the maximum working stress to breaking stress shall be not less than two and one-half (2½). Owners or tenants shall replace cracked lights promptly.

Glass which conforms to the required nominal thickness of table C in appendix K for the design wind loads of table A in appendix K shall be accepted.

859.55. Jalousies.—In jalousie windows and doors regular plate, sheet or rolled glass thickness shall be not less than three-sixteenths (3/16) inch; glass length shall be not more than thirty-six (36) inches; glass edges shall be smooth. Other types of glass may be used if detailed shop drawings, specifications and analysis by methods described in appendix K, or test data assuring safe performance for the specific installation, are prepared by engineers experienced in this work and approved by the building official.

859.56. Human Impact Loads.—Glass in prime and storm doors, interior doors, fixed glass panels which may be mistaken for means of egress or ingress, shower doors and tub enclosures shall meet the requirements set forth in the following table, or by comparative tests shall be proven to produce equivalent performance.

The following shall be used as criteria for determining the safety hazard:

a. glass in openings of regularly occupied spaces.
b. lowest point less than eighteen (18) inches above finished floor.
c. minimum dimension larger than eighteen (18) inches.

IMPACT LOADS—GLASS

Glass shall conform to these limits:

1. Glass less than single strength (SS) in thickness shall not be used.
2. If short dimension is larger than twenty-four (24) inches, glass must be double strength (DS) or thicker.

3.

Glass Type	*Individual Opening Area*	*Requirements*
Regular plate, sheet or rolled (annealed)	Over 6 square feet	Not less than 3/16 inch thick. Must be protected by a push-bar or protective grille firmly attached on each exposed side*, if not divided by a muntin.
Regular plate, sheet or rolled (annealed), surface sandblasted, etched, or otherwise depreciated	Over 6 square feet	Not less than 7/32 inch thick. Must be protected by a push-bar or protective grille firmly attached on each exposed side*.
Regular plate, sheet or rolled (annealed), obscure	Over 6 square feet	Not less than 3/16 inch thick. Must be protected by a push-bar or grille firmly attached on each exposed side*.
Laminated	Over 6 square feet	Not less than 1/4 inch thick. Shall pass impact test requirements of appendix K-12.
Fully-tempered	Over 6 square feet	Shall pass impact test requirements of appendix K-12.
Wired	Over 6 square feet	Not less than 1/4 inch thick. Shall pass impact test requirements of appendix K-12.
All Unframed Glass Doors (Swinging)		Shall be fully-tempered glass and pass impact test requirements of appendix K-12.

*Building owners and tenants shall maintain push-bars or protective grilles in safe condition at all times.

SECTION 860.0. PROTECTION OF WALL OPENINGS

860.1. Fire-Protected Openings.—Openings in exterior walls when required to be fire-protected shall comply with the provisions of article 9.

860.2. Area of Openings.—All openings facing on a street, yard, court, or public space which are required for light and ventilation shall comply with the provisions of article 5.

860.3. Structural Strength.

860.31. Against Wind Forces.—In all buildings required to resist wind pressure under the provisions of article 7, exterior window openings shall be designed to resist the specified wind load when such protectives are more than one hundred (100) square feet in area in the first story or more than fifty (50) square feet in area in the upper stories.

860.32. Sash or Frames.—The glass, or other approved glazing material shall be of adequate thickness or shall be provided with steel frames or otherwise reinforced to resist the wind loads specified in article 7 blowing both inwardly and outwardly.

SECTION 861.0. FIRE ACCESS PANELS

Completely enclosed buildings, without exterior openings in the enclosure walls, or without ready access for the purpose of fighting fire, shall be provided with access panels below the thirteenth (13) floor. Such access panels shall be not less than thirty-two (32) by forty-eight (48) inches in size, nor shall they be spaced more than one hundred (100) feet apart in each story, with a sill height of not more than thirty-six (36) inches. Access panels shall be readily opened from the outside, or shall be glazed with plain, flat glass; but when required to be fireresistive, they shall be equipped with approved opening protectives complying with article 9 which are readily opened from both the outside and the inside. The building official may approve alternate smaller access panels with closer spacing in buildings of moderate fire hazard such as schools and offices but in no case less than twenty-two (22) by forty-two (42) inches in area nor spaced more than thirty (30) feet apart. In one (1) story buildings not more than eighty-five (85) feet in height, roof vents and grade level doors shall be provided spaced not more than one hundred and twenty-five (125) feet apart.

SECTION 862.0. STRUCTURAL GLASS BLOCK WALLS

862.1. Exterior Wall Panels.—The maximum dimensions of glass block wall panels in exterior walls when used singly or in multiples forming continuous bands of structural glass blocks between structural supports shall be twenty-five (25) feet in length and twenty (20) feet in height between structural supports and expansion joints; and the area of each individual panel shall be not more than two hundred and fifty (250) square feet. Intermediate structural supports shall be provided to support the dead load of the wall and all other superimposed loads. When individual panels are more than one hundred and forty-four (144) square feet in area a supplementary stiffener shall be provided behind the panels, anchored thereto and to the structural supports.

862.2. Joint Materials.—Glass blocks shall be laid up in type S or N mortar with approved galvanized or other noncorrosive metal wall ties in the horizontal mortar joints of exterior panels. The sills of glass block panels shall be coated with approved asphaltic emulsion, or other elastic waterproofing material previous to laying the first mortar course and the perimeter of the panels shall be caulked to a depth of not less than one-half (½) inch with nonhardening caulking compound on both faces; or other approved expansion joints shall be provided. When laid up in joint materials other than mortars herein defined, no single panel shall be more than one hundred (100) square feet in area nor more than ten (10) feet in either length or height.

862.3. Wind and Earthquake Loads.—Exterior wall panels shall be held in place in the wall opening to resist both the internal and external pressures due to wind and earthquake loads specified in sections 713, 714 and 719.

862.4. Interior Wall Panels.—Structural glass blocks shall not be used in fire walls or party walls or for load-bearing construction. Such blocks shall be erected with mortar in metal frames or reinforcement as provided in this section for exterior walls or other approved joint materials, except that wood strip framing may be used in partitions not required to be fireresistive.

862.5. Fireresistance Rating.—Nothing herein contained shall be construed to prohibit the use of glass blocks in an opening protective assembly or nonbearing partition or wall when required to afford a specific fireresistance, provided approval of the building official is secured after satisfactory time-temperature performance under the prescribed test procedure of article 9.

862.6. Access Panels.—Access panels shall be provided in exterior glass block walls for fire department use to comply with section 861.

SECTION 863.0. WALL FACINGS AND VENEERS

863.1. Backing Surfaces for Veneers.—Veneers for other than frame buildings, shall be attached only to substantial, rigid, noncombustible surfaces which are plumb, straight and of true plane; and no wood backing surfaces shall be used except in frame construction. The backing shall provide sufficient rigidity, stability and weather resistance; and the veneer shall be installed and anchored as required in the Basic Code for the specific material.

863.2. Veneer Thickness.—No materials used for nonbearing veneers on masonry walls shall have less than the following thickness:

Ceramic veneer (architectural terra cotta—anchored type)	1 inch
Brick	2 inches
Stone (natural)	2 inches
Stone (cast artificial)	1½ inches
Clay tile (structural)	1¾ inches
Clay tile (flat slab)	¼ to 1 inch
Marble slabs	1 inch
Precast stone facing	⅝ inch
Structural glass	11/32 inch
Aluminum clapboard siding	.024 inch
Metal (approved corrosion-resistive)	28 U.S. Gage

Masonry or other approved noncombustible materials used as facing on bearing walls or partitions shall not be considered to have structural value and shall be excluded in the determination of required wall thickness.

SECTION 864.0. STRUCTURAL GLASS VENEERS

864.1. Dimensions.—The minimum thickness of glass veneer shall be eleven thirty-seconds (11/32) inch and the area of individual panels shall not exceed ten (10) square feet, with a maximum length of four (4) feet. The edge of each unit shall be ground square with a slight arris; and all exposed, external corners and angles shall be rounded to a radius of not more than three-sixteenths (3/16) inch.

864.2. Construction.

864.21. Backing Surface.—The glass veneer shall be set in mastic cement on a float coat of one (1) inch thick cement mortar reinforced with wire lath attached to noncombustible furring spaced not more than twelve (12) inches on centers.

864.22. Support of Veneer.—The base course of glass units shall be supported on a corrosion-resistive metal frame anchored to the backing and caulked with a waterproof compound at grade.

864.3. Reinforcement.—Metal reinforcing of cold formed corrosion-resistive angles of not less than No. 16 U. S. gage or other approved reinforcement shall be provided in all horizontal joints anchored into the masonry wall with expansion or toggle bolts.

864.4. Expansion Joints.—Expansion joints shall be provided at ends and intermediate sections caulked with an approved waterproofing compound as required by the approved rules. Where necessary for watertightness, exposed edges shall be protected with corrosion-resistive metal or other approved noncombustible flashing.

864.5. Other Loads.—No signs, awning brackets or other loads shall be hung directly from glass veneers, but shall be supported on framing anchored to or otherwise supported by the masonry wall, free from contact with the glass.

SECTION 865.0. THIN STONE AND TILE VENEERS

865.1. Size of Units.—In localities subject to frost and freezing temperatures, tile and terra cotta units shall be frost-proof and shall not be more than two hundred and eighty-eight (288) square inches in area; and where not subject to frost action, the size of the tile may be increased not more than fifty (50) percent in area.

865.2. Construction.—One (1) inch thick marble, granite, terra cotta, and similar materials; or ceramic tile facing one-quarter (¼) to one (1) inch in thickness shall be set in accordance with the applicable standards listed in Appendix B.

SECTION 866.0. METAL VENEERS

866.1. Materials.—Veneers of metal shall be fabricated from approved corrosion-resistive alloys, or shall be covered front and back with approved porcelain enamel, or otherwise treated to render the metal resistant to corrosion.

866.2. Construction.—The metal veneer shall be securely attached to the masonry or supported on approved metal framing protected by painting, galvanizing or other approved protection, or on wood studs and furring strips, treated with an approved preservative process.

866.3. Waterproofing.—All joints and edges exposed to the weather shall be caulked with approved durable waterproofing material or by other approved means to prevent penetration of moisture.

866.4. Grounding Metal Veneers.—Metal veneers on all buildings shall be made electrically continuous by bonding together each course when applied horizontally and each strip or panel when applied vertically.

866.41. Horizontally Applied Metal Veneers.—Electrical continuity between horizontally applied courses of metal veneer shall be assured by bonding each course at all inner and outer corners with a conductor having no greater resistance than the grounding conductor used for grounding the electrical system within the building on which such veneer is applied. All conductors grounding such veneer shall be joined together and attached in an approved manner to the same grounding electrode used to ground the electrical system in the building.

866.42. Vertically Applied Metal Veneers.—Electrical continuity between vertically applied metal veneer shall be assured by bonding each strip or panel at the lower edge with a conductor having no greater resistance than the conductor used for grounding the electrical system within the building on which such veneer is applied. All conductors grounding such veneers shall be joined together and attached in an approved manner to the grounding electrode used to ground the electrical system within the building.

866.43. Grounding In Cases Where There Is No Electrical Wiring System.—In cases where metal veneer is to be applied on a building with no electrical wiring system, grounding shall be by one of the methods outlined in Article 250 of the National Electrical Code, if deemed necessary by the building official.

866.44. Alternate Methods.—Alternate methods of grounding metal veneer may be used provided they are at least equal in performance to the methods prescribed herein, and further provided that such desired method is first submitted to and approved by the building official.

SECTION 867.0. PLASTIC VENEERS

Veneers of approved weather-resisting, non-combustible plastics shall be erected and anchored on a foundation coat, waterproofed or otherwise protected from moisture absorption and sealed with a coat of mastic or other approved waterproof coating in accordance with the approved rules.

SECTION 868.0. THICKNESS OF SOLID MASONRY WALLS

All masonry walls shall be of the minimum thickness specified in the building code standards for masonry listed in appendix B. In no case shall the combined stress due to all loads exceed the allowable working stresses specified in the Basic Code for the materials of construction.

SECTION 869.0. THICKNESS OF PANEL WALLS

869.1. Solid Panel Walls.—Panel, apron or spandrel walls as defined in the Basic Code supported at vertical intervals not exceeding thirteen (13) feet in height, shall not be limited in thickness, provided they meet the fireresistive requirements of article 9 and table 5, and are constructed of approved noncombustible weather-resisting materials of adequate strength to resist the wind loads specified in sections 713 and 714.

869.2. Hollow Panel Walls.—Unless constructed of the materials and thickness specified by the accepted engineering standards for masonry, hollow panel walls shall be tested and approved in the assembled unit as constructed in normal practice to develop the required fireresistance ratings specified in table 5 for exposure on both faces.

869.3 Weather Resistance.—When the construction as tested and approved for fireresistance does not possess the required weather resistance, it shall be covered on the exterior with approved corrosion-resistive metal facings or other approved noncombustible weather-resisting veneers.

869.4. Anchorage.—All panel walls shall be anchored to the structural frame to insure adequate lateral support and resistance to wind and to earthquake forces where subject to seismic disturbances.

SECTION 870.0. THICKNESS OF PARAPET WALLS

All masonry exterior walls shall be constructed with parapet walls extending not less than two (2) feet above the roof, except in one-and two-family dwellings and structures where the roof overhangs the wall, or in places where such walls are capped with cornices or gutters; and except as required for fire walls in section 907 or as herein specifically provided.

870.1. Minimum Thickness and Height.—Parapet walls shall be of the same thickness as the wall below; but in no case shall the required thickness exceed twelve (12) inches, nor shall the height be more than four (4) times the thickness unless laterally supported by noncombustible bracing or buttresses.

870.2. Party Walls With Flat Roofs.—Parapet walls erected between two (2) structures in residential use groups, with flat roofs not more than forty (40) feet in height, need not extend more than six (6) inches above the roof.

870.3. Party Walls With Pitched Roofs.—Party walls in buildings and structures in residential use groups, the roofs of which slope at an angle of thirty (30) degrees or more from the horizontal, may stop at the level of the top of the roof boards, provided no combustible material passes through the wall, and the junction of roof and walls is completely weatherproofed and firestopped.

870.4. Coping.—The top of all parapet walls exposed to the weather shall be coped with approved noncombustible and weather-resisting materials.

SECTION 871.0. FOUNDATION WALLS

871.1. Design.—Foundation walls shall be designed to resist frost action and to support safely all vertical and lateral loads as provided in article 7. The maximum stresses due to combined load shall be within the values specified for the materials used in the construction. Unless properly reinforced, tensile stresses shall not exceed those permitted in plain masonry.

871.2. Minimum Thickness.—The thickness of foundation walls shall be not less than the thickness of the wall supported and the minimum thickness shall be limited for the various materials of construction as herein specified. Eight (8) inch foundation walls shall be permitted under brick-veneered frame and under ten (10) inch cavity walls when the total height of wall supported including gables is not more than twenty (20) feet;

871.21. Reinforced Concrete.—When reinforced concrete is required to resist all stresses, foundation walls shall be not less than eight (8) inches thick;

871.22. Hollow and Solid Masonry and Mass Concrete.—The thickness of masonry foundation walls shall not be less than shown in the following table for the type of foundation and superstructure construction used. The combined height of eight (8) inch foundation wall and the wall supported shall not exceed thirty-five (35) feet.

THICKNESS OF FOUNDATION WALLS

Foundation Wall Construction		*Maximum Depth Below Grade (feet)* [1, 2]		
Type	Thickness (Inches)	Frame	Masonry Veneer	Masonry
Hollow masonry	8	4 (6)	4.5 (6)	5 (7)
	10	5 (7)	5.5 (7)	6 (7)
	12	7	7	7
Solid masonry	8	5 (7)	5.5 (7)	6 (7)
	10	6 (7)	6 (7)	6.5 (7)
	12	7	7	7
Mass concrete	8	7	7	7

Note 1. Depth below grade may be increased up to those shown in parentheses where such increase is warranted by soil conditions and local experience and is required by the building official.

Note 2. Where height of unbalanced fill (height of finish grade above basement floor or inside grade) exceeds seven (7) feet, foundation wall thickness shall be determined by structural analysis as required in section 871.1.

871.23. Hollow Unit Walls.—Foundation walls of approved hollow masonry units shall be provided with not less than four (4) inches of solid masonry at girder bearings or shall be strengthened with buttresses;

871.24. Rubble Stone.—Foundation walls of rough or random rubble stone shall be not less than sixteen (16) inches thick;

871.25. Bonding.—All foundation walls shall be bonded as required for superstructure walls in section 836.

871.3. Increased Thickness With Depth.—When any foundation wall, other than a wall that is designed as a retaining wall, extends more than twelve (12) feet below the top of the first floor beams, the thickness of the wall shall be increased four (4) inches for each additional twelve (12) feet or fraction thereof in depth.

871.4. Corbels on Eight Inch Walls.—Where an eight (8) inch wall is corbeled, the top corbel course shall be a full header course of headers at least six (6) inches in length, extending not higher than the bottom of the floor framing. The maximum projection of one (1) unit shall neither exceed one-half (½) the depth of the unit nor one-third (⅓) its width at right angles to the face which is offset.

871.5. Lateral Stability.—Foundation walls of buildings and structures which serve as retaining walls shall conform to the applicable requirements of section 872 or shall be strengthened with buttresses or additional wall thickness to resist lateral soil and hydrostatic pressure when subjected thereto.

SECTION 872.0. RETAINING WALLS

Walls built to retain or support the lateral pressure of earth or water or other superimposed loads shall be designed and constructed of approved masonry, reinforced concrete, steel sheet piling or other approved materials within the allowable stresses of accepted engineering practice.

872.1. Design.—Retaining walls shall be designed to resist the pressure of the retained material including both dead and live load surcharges to which they may be subjected, and to insure stability against overturning, sliding, excessive foundation pressure and water uplift.

872.2. Hydrostatic Pressure.—Unless drainage is provided, the hydrostatic head of water pressure shall be assumed equal to the height of the wall.

872.3. Coping.—All masonry retaining walls other than reinforced concrete walls shall be protected with an approved coping.

SECTION 873.0. ISOLATED PIERS

Isolated masonry piers shall be bonded as required for solid walls of the same thickness and shall be provided with adequate means for distributing the load on the top of the pier.

SECTION 874.0. WATERPROOFING

The exterior structural elements of all buildings herein specified shall be waterproofed in accordance with the approved rules.

874.1. Steel Frame.—Exterior steel columns and girders before embedment in masonry of the required fireresistance specified in table 5 shall be protected from moisture by approved waterproofing material, a parging coat of cement mortar or by a minimum of eight (8) inches of weathertight masonry.

874.2. Chases.—The backs and sides of all chases in exterior walls with less than eight (8) inches of approved masonry to the exterior surface shall be insulated and waterproofed.

874.3. Foundations.—Exterior walls below grade and the cellar floors of all buildings for institutional and residential uses (use groups H and L) enclosing habitable or occupiable rooms or spaces below grade shall be

made watertight, and when necessary shall be reinforced to withstand water pressure as prescribed in sections 710 and 871. The basement walls of buildings in the residential use groups and the walls of all habitable and occupiable rooms and spaces below grade shall be protected with not less than a one-coat application of approved waterproofing paint, or a one-half (½) inch parging coat of portland cement mortar or other approved dampproof covering.

874.4. Types of Waterproofing.—The processes and methods used to render buildings, structures or parts thereof watertight as herein required shall comply with accepted engineering practice covering types of waterproofing.

SECTION 875.0. RATPROOFING

All buildings and structures and the walls enclosing habitable or occupiable rooms and spaces in which persons live, sleep or work; or in which feed, food or foodstuffs are stored, prepared, processed, served or sold shall be constructed rat and vermin-proof in accordance with the provisions of this section.

875.1. Grade Protection.

875.11. Apron.—When required for protection against rodents, all exterior walls at and near grade shall be constructed or assembled of component materials, or chemically or otherwise treated to render the construction rat or vermin-proof. When not provided with a continuous masonry foundation wall, a masonry or reinforced concrete apron, not less than four (4) inches in thickness or of other approved noncombustible, water-resisting and rat-proofing material of required strength, shall be installed around the entire perimeter of the building.

875.12. Height of Apron.—The apron shall extend sufficiently above grade to provide for the average snow fall in the locality, but not less than eight (8) inches above, nor less than twenty-four (24) inches below grade level; and, if serving as a foundation bearing wall, to sufficiently greater depth to assure protection from frost action as required in section 729. When the superstructure walls are not constructed of masonry, the spaces between studs shall be filled to a height of two (2) feet above grade with concrete or other material indestructible by rats.

875.2. Grade Floors.—Where continuous concrete grade floor slabs are provided, no open spaces shall be left between slab and walls, and all openings in the slab shall be protected.

875.3. Opening Protection.

875.31. Wall Openings.—Openings in the apron required for ventilation or other purposes shall be guarded with corrosion-resistive rodent-proof shields of not less than No. 22 U. S. gage perforated steel sheets, or No. 20 B & S gage aluminum or No. 16 U. S. gage expanded metal or wire mesh screens, with no more than one-half (½) inch mesh openings.

875.32. Slab Openings.—Access openings in grade floor slabs shall be protected with concrete, masonry, metal or other corrosion-resistive noncombustible covers of adequate strength to support the floor loads.

875.33. Pipes and Conduits.—All openings for pipe, conduit, cable and similar purposes at or near grade shall have snugly-fitted collars to eliminate all open spaces.

SECTION 876.0. PROTECTION AGAINST DECAY AND TERMITES

The expression approval as used in the following statements means approval in accordance with the procedure established by the building code.

876.1. Where Conditions are Favorable to Decay.

876.11. Wood in Contact with the Ground.—All wood in contact with the ground and supporting permanent structures shall be approved treated wood.

876.12. Untreated Wood.—Untreated wood may be used where entirely below ground water level or continuously submerged in fresh water and may be used in contact with the ground for detached accessory buildings not intended for human occupancy, for temporary structures and for fences.

876.2. Wood Joists or the Bottom of Wood Structural Floors.—When wood joists or the bottom of wood structural floors without joists are closer than eighteen (18) inches, or wood girders are closer than twelve (12) inches, to exposed ground located within the periphery of the building over crawl spaces or unexcavated areas, they shall be approved durable or treated wood. Ventilation shall be provided as required in section 508.0.

876.3. Sills.—All sills which rest on concrete or masonry exterior walls and are less than six (6) inches from exposed earth shall be of approved durable or treated wood.

876.31. Sleepers and Sills.—Sleepers and sills on a concrete or masonry slab which is in direct contact with earth shall be of approved durable or treated wood.

876.32. Posts or Columns.—Posts or columns in cellars shall be supported by piers projecting at least two (2) inches above the finish floor and separated therefrom by an approved impervious barrier except when approved durable or treated wood is used. Posts or columns used in damp locations below grade shall be of approved durable or treated wood.

876.33. Wall Pockets.—Ends of wood girders entering masonry or concrete walls shall be provided with a one-half (½) inch air space on top, sides and end unless approved durable or treated wood is used.

876.34. Clearance Between Wood Siding.—Clearance between wood siding and earth on the exterior of a building shall be not less than six (6) inches.

876.4. **Wood Used in a Retaining Wall.**—Wood used in a retaining wall shall be approved durable or treated wood except as follows:

1—When the wall is not more than two (2) feet in height and is located on the property line.

2—When the wall is not more than four (4) feet in height and is separated from the property line by a minimum distance equal to the height of the wall.

3—A retaining wall of durable wood shall not exceed six (6) feet in height. A wood retaining wall shall be separated from any permanent building by a minimum distance equal to the height of the wall.

876.5. **Where Approved Durable or Treated Woods are Required.**—Where approved durable or treated woods are required in this code, the building official may require identification by an approved mark or certificate of inspection.

876.6. **Pressure Treatment.**—Where pressure treatment of wood members is required by the Basic Code, preservatives and methods of treatment shall conform to the standards for pressure treatment and preserving of lumber listed in appendix C.

876.61. **Geographical Areas.**—In those geographical areas where experience has demonstrated a need for greater protection, the requirements in the preceding items may be modified to the extent required by local conditions.

SECTION 877.0. FIRE PROTECTION AND FIRESTOPPING

To prevent the free passage of flame through concealed spaces or openings in event of fire, provision shall be made to trim all combustible framing away from sources of heat, to provide effective fire barriers against the spread of fire between all subdivisions and all stories of the building, to provide adequate fire separation against exterior exposure, and to firestop all vertical and horizontal draft openings as specified herein.

877.1. **Beam Separation in Ordinary Construction (types 3-B and 3-C).**—All wood and other combustible floor, roof and other structural members framing into masonry walls shall be cut to a bevel of three (3) inches in the depth and shall project not more than four (4) inches into the wall; and the distance between embedded ends of adjacent beams or joists entering into the wall from opposite sides shall be not less than four (4) inches.

877.2. **Girder Separation in Heavy Timber Construction (type 3-A).**—Wood girders framing into walls shall have at least eight (8) inches of masonry between their ends and the outside face of walls and at least eight (8) inches of masonry between adjacent beams entering the wall from opposite sides. The girders shall be fire-cut, supported in pockets or in self-releasing metal boxes, or otherwise supported to minimize destruction of the wall in the event of fire.

877.3. **Flues and Chimneys.**—Combustible framing shall be trimmed not less than two (2) inches away from all flues, chimneys and fireplaces, and six (6) inches away from flue openings.

877.4. **Fireplaces.**—Hearths of noncombustible construction and fireboards, mantels and other combustible trim shall comply with section 1013 governing fireplace construction.

877.5. **Concealed Roof Spaces.**—Concealed roof spaces enclosed by combustible ceiling and roof construction shall be subdivided into areas of not more than three thousand (3000) square feet as provided in section 219.0.

877.6. **Exterior Cornices.**—Exterior cornices where permitted of combustible construction in section 926, or when erected with combustible frames shall be firestopped at maximum intervals of twenty (20) feet. If noncontinuous, they shall have closed ends, with at least four (4) inches separation between adjoining sections.

877.7. **Wall Furring.**—In masonry wall construction (types 3-A, 3-B, and 3-C) and in frame construction (types 4-A and 4-B) where walls are furred, the space between the inside of the furring and the face of the wall for the full depth of the combustible floor or roof joists shall be firestopped.

877.8. **Combustible Trim and Finish.**—The space behind combustible trim and finish where permitted under the Basic Code and all other hollow spaces where permitted in fireresistive construction shall be back-filled with noncombustible materials or firestopped as required in section 921.0.

877.9. **Firestopping.**—Firestopping meeting the requirements of section 921 shall be provided in stud walls and partitions at each floor level and between the ceiling of the top story and roof space; in all furred spaces of frame walls and studded off spaces of masonry walls at maximum intervals of eight (8) feet; at the top and bottom and at least once in the middle of each run of stairs; in concealed wall pockets for sliding doors; at openings for pipes, belts, shafting, chutes and conveyors passing through combustible floors or partitions with close-fitting noncombustible caps or metal shutters or other approved noncombustible means; and in all other locations that would permit the free travel of flame.

SECTION 878.0. THERMAL INSULATING MATERIALS

Insulating batts, blankets, fills or similar types of materials, including vapor barriers and breather papers or other coverings which are a part of the insulation, incorporated in construction elements shall be installed and used in a manner that will not increase the fire hazard characteristics of the building or any part thereof.

878.1. **Installation in Type 1 and Type 2 Construction.**—Such materials when exposed as installed in buildings of fireproof or noncombustible (types 1 or 2) construction shall qualify as noncombustible materials when tested in accordance with section 904.

878.2. **Installation in Type 3 and Type 4 Construction.**—Such materials, when exposed as installed in attic spaces in buildings of ordinary or frame (types 3 or 4) construction may be of noncombustible or approved combustible material when tested in accordance with section 904.

878.3. Facings and Coverings.—Vapor barriers, breather papers or other coverings of insulating materials, when installed adjacent to or not more than one and one-half (1½) inches from the unexposed surface of ceiling or sidewall interior finish, or when installed in completely enclosed wall, ceiling joist or rafter spaces, firestopped as required in section 877, are not required to have a flame resistance rating.

ARTICLE 9

FIRERESISTIVE CONSTRUCTION REQUIREMENTS

SECTION 900.0. SCOPE

The provisions of this article shall govern the use and design of all materials and methods of construction in respect to required fireresistance and flameresistance as determined by the potential fire hazard of the use and occupancy of the building or structure and the location and function of all integral structural and other fire-protective elements of the building; and the installation of safeguards against the spread of fire to and from adjoining structures.

900.1. Performance Standards.—The requirements of this article shall constitute the minimum functional performance standards for fire-protection purposes; and shall not be deemed to decrease or waive any strength provisions or in any other manner decrease the requirements of the Basic Code in respect to structural safety.

900.2. Use of Combustibles.—All materials and forms of construction that develop the fireresistance required by the Basic Code shall be acceptable for fireproofing and structural purposes; except that the use of combustible component materials in structural units or structural assemblies shall be limited in types of construction specified in sections 215 and 216 and in the following:

900.21. Combustible Components.—Combustible aggregates may be incorporated in concrete mixtures approved for fireresistive construction as provided in section 811 and 850 for gypsum concrete, in section 845 for cinder concrete and any other approved component material or admixture may be used in assemblies that meet the fireresistive test requirements of the Basic Code; and wood nailing strips or any other material of similar combustible characteristics may be embedded in concrete and masonry construction for securing trim and finish;

900.22. Filler Units.—When not included in strength calculations, filler units that contain component combustible materials may be used in all fireresistive floor construction provided the complete assembly meets the required fire test performance.

900.3. Reinforced Concrete.—All reinforced concrete mixtures which meet the requirements of section 817 for concrete aggregates and the provisions of this article for time-temperature performance shall be accepted in fireresistive construction and shall be classified in accordance with the degree of fireresistance required in article 2 and in tables 5 and 6.

SECTION 901.0. DEFINITIONS

automatic fire door. A fire door equipped with a heat actuated closing device which will operate at a predetermined temperature of not more than one hundred and sixty-five (165) degrees F. or equipped with a rate of rise of temperature operating device.

combustible. This is a general relative term. Its precise meaning is defined in the Basic Code for specific applications.

conflagration hazard. The fire risk involved in the spread of fire by exterior exposure to and from adjoining buildings and structures.

fire division. The interior means of separation of one part of a floor area from another part together with fireresistive floor construction to form a complete fire barrier between adjoining or superimposed floor areas in the same building or structure.

fire door. A door and its assembly, so constructed and assembled in place as to give protection against the passage of fire.

fire door assembly. The assembly of a fire door and its accessories, including all hardware and closing devices and their anchors; and the door frame, when required, and its anchors.

fire grading. The posted fire hazard classification of a building or structure in hours or fractions of an hour as established for its use group and occupancy in table 16.

fire hazard. The potential degree of fire severity existing in the use and occupancy of a building and classified as high, moderate or low;

—high. All uses which involve the storage, sale, manufacture or processing of highly combustible, volatile flammable or explosive products which are likely to burn with extreme rapidity and produce large volumes of smoke, poisonous fumes, gases or explosions in the event of fire.

—moderate. All uses which involve the storage, sale, manufacture or processing of materials which are likely to burn with moderate rapidity and a considerable volume of smoke, but which do not produce either poisonous fumes or explosions in the event of fire.

—low. All uses which involve the storage, sale or manufacture of materials that do not ordinarily burn rapidly, nor produce excessive smoke, poisonous fumes, or explosions in the event of fire.

fire partition. A partition which subdivides a story of a building to provide an area of refuge or to restrict the spread of fire.

fire prevention. The preventive measures which provide for the safe conduct and operation of hazardous processes, storage of highly combustible and flammable materials, conduct of fire drills, and the maintenance of fire detecting and fire-extinguishing service equipment and good housekeeping conditions.

fire protection. The provision of safeguards in construction and of exit facilities; and the installation of fire alarm, fire-detecting and fire-extinguishing service equipment to reduce the fire risk and the conflagration hazard.

fireresistance. That property of materials or their assemblies which prevents or retards the passage of excessive heat, hot gases or flames under conditions of use.

fireresistance rating. The time in hours or fractions thereof that materials or their assemblies will resist fire exposure as determined by fire tests conducted in compliance with recognized standards.

fireresistive partition. A partition other than a fire partition which is required to subdivide the floor area of a fireresistive building for the purpose of restricting the spread of fire.

fireretardant construction. Fabricated units or assemblies of units of construction which have a fireresistance rating of not less than one-third (⅓) hour.

fireretardant lumber. Wood so treated by a recognized impregnation process as to reduce its combustibility.

fire safety. The measure of protection of a building or structure against interior and exposure fire hazards through fireresistive construction and the provision of safe exitways and fire-detecting and extinguishing equipment.

fire separation. (exterior fire exposure.) The distance in feet measured from any other building on the site, or from an interior lot line, or from the opposite side of a street or other public space to the building.

fire wall. A wall having adequate fireresistance and structural stability under fire conditions to accomplish the purpose of completely subdividing a building or of completely separating adjoining buildings to resist the spread of fire.

fire window. A window constructed and glazed to give protection against the passage of fire.

flameresistance. The property of materials or combinations of component materials which restricts the spread of flame as determined by the flameresistance tests specified in the Basic Code.

flame spread. The propagation of flame over a surface.

flame spread rating. The measurement of flame spread on the surface of materials or their assemblies as determined by tests conducted in compliance with recognized standards.

noncombustible. (incombustible.) This is a general, relative term. Its precise meaning is defined in the Basic Code for specific applications.

party wall. A wall on an interior lot line used or adapted for joint service between two buildings.

self-closing. A fire door or other opening protective which is normally closed and equipped with an approved device to insure closing after having been opened for use.

shaft. A vertical opening or passage through two or more floors of a building or through floors and roof.

—covered. An interior enclosed space extending through one or more stories of a building, connecting a series of two (2) or more openings in successive floors, or floors and roof, and covered at the top.

—open. An exterior, enclosed space extending through one or more stories of a building, enclosed with walls of the required weather and fireresistance for exterior walls, and open to the sky at the top.

standard fire test. The standard controlled furnace test formulated under the procedure of the American Society for Testing Materials and designated ASTM E119 as listed in appendix G.

SECTION 902.0. FIRE HAZARD CLASSIFICATION

The degree of fire hazard of buildings and structures for each specific use group as defined by the fire grading in table 16 shall determine the requirements for fire walls, fire divisions and the segregation of mixed uses as prescribed in section 213 and all structural members supporting such elements.

902.1. Unclassified Uses.—The building official shall determine the fire hazard classification of a building or structure designed for a use not specifically provided in table 16 in accordance with the fire characteristics and potential fire hazard of the use group which it most nearly resembles; or its designation shall be fixed by the approved rules.

TABLE 16.—FIRE GRADING OF USE GROUPS

Class	Use group	Fire grading in hours
A	High hazard	4
B-1	Storage—Moderate hazard	3
B-2	Storage—Low hazard	2
C	Mercantile	3
D	Industrial	2
E	Business	3
F-1	Assembly—Theatres	3
F-2	Assembly—Night clubs	2
F-3	Assembly—Recreation centers, lecture halls, terminals, restaurants	1½
F-4	Assembly—Churches, schools	3
H-1	Institutional—Restrained occupants	2
H-2	Institutional—Incapacitated occupants	2
L-1	Residential—Hotels	1½
L-2	Residential—Multifamily dwellings	¾
L-3	Residential—1 and 2 family dwellings	

SECTION 903.0. FIRERESISTANCE TESTS

All fire tests of building materials and construction shall be conducted in accordance with the standard fire test procedure; except that the hose-stream test therein prescribed for one (1) hour construction shall be required for all assemblies and constructions approved for a fireresistance rating of three-quarter (¾) hours.

903.1. Structural Building Assemblies.—Built-up masonry units and composite assemblies of structural materials including walls, partitions, columns, girders, beams and slabs and assemblies of slabs and beams or other combinations of structural units for use in floor and roof construction shall be regulated by the fireresistance ratings of table 5.

903.2. Ceiling Construction.—Ceiling specimens shall include all the structural members and component details used in normal construction; and the conduct of the test shall conform to the standard procedure for ceiling fire tests listed in appendix G.

903.3. Column, Beam and Girder Protection.—To evaluate column, beam and girder protection for structural units when the fireproofing is not a structural part of the element, in lieu of full size tests of loaded specimens, the structural sections encased in the material proposed for use as insulation and fire protection may be subjected to the standard test procedure without load.

903.4. Roof Coverings.

903.41. Size of Specimen.—Roof coverings shall be tested in a complete assembly of roof deck and roof covering constructed and applied as in practice with a panel area of not less than twelve (12) square feet and no dimension less than thirty-two (32) inches.

903.42. Test Procedure.—The tests shall be conducted to determine ability to resist ignition, duration of flaming and susceptibility to fire spread.

903.5. Classification of Roof Coverings.—Roofing materials shall be classified in accordance with the severity of exposure to exterior fire and ability to resist the spread of fire to surrounding buildings and structures as provided by accepted engineering practice and the provisions of section 928.

903.51. Class 1 Roofings shall be effective against severe fire exposure and shall be permitted for use on fireproof (type 1), noncombustible (type 2) and heavy timber mill (type 3-A) buildings and structures;

903.52. Class 2 Roofings shall be effective against moderate fire exposure and shall be permitted as the minimum for use on fireproof (type 1) buildings and structures;

903.53. Class 3 Roofings shall be effective against light fire exposure and shall be permitted as the minimum for use on noncombustible (type 2), masonry enclosed (type 3) and protected frame (type 4-A) buildings and structures;

903.54. Class 4 Roofings shall be limited to use in areas outside of the fire limits where the exterior fire exposure hazard is reduced by required fire separations as provided in section 928.3 and on frame (type 4-B) construction.

903.6. Opening Protectives.

903.61. Structural Integrity.—Fire door and fire window assemblies shall not develop any through openings in the specimen itself or openings markedly in excess of the initial clearances at the outside or meeting edges; except that small portions of glass dislodged by the hose stream shall not be considered sufficient weakness to nullify the acceptance and approval of doors or windows when constructed in accordance with accepted standards, provided the dislodged portions do not exceed twenty-five (25) per cent of the total glass area. The door frames and anchorage shall remain structurally intact without excessive distortion that would prevent operation of the door or window.

903.62. Smoke and Flame Barrier.—Tests of door and window assemblies shall be considered unsuccessful unless the assembly prevents the passage of smoke or flames in considerable volume and remains securely in the opening during the fire exposure and following the hose stream test.

903.63. Labeled Fire Doors.—Opening protective assemblies including the frames, hardware and operation which comply with the standards and accepted practice, including shop inspection, of the Underwriters' Laboratories, Inc., or other accredited testing authorities shall be deemed to meet the requirements of the Basic Code for their recommended and approved locations and use as listed in section 917.

903.64. Door Openings More Than 120 Square Feet.—Labeled fire doors for openings which are more than one hundred and twenty (120) square feet in area may be approved as conforming to all the standard construction requirements of tested and approved fire door assemblies except as to size.

903.65. Labeled Fire Windows and Shutters.—Fire window assemblies and shutters which comply with section 918, and the standards and accepted practice of the Underwriters' Laboratories, Inc., or other accredited testing authorities shall be deemed to meet the requirements for their recommended and required locations under the Basic Code.

903.7. Combustibility Tests.—Where the behavior of materials under exposure to fire is specified in the Basic Code the characteristics of materials shall be determined by the following tests and criteria.

903.71. Noncombustible Materials.—A noncombustible material is one which, in the form in which it is used, meets any of the following requirements:

1—Materials which pass the test procedure for defining noncombustibility of elementary materials listed in appendix G when exposed to a furnace temperature of thirteen hundred eighty-two (1382) degrees F. for a period of five (5) minutes, and do not cause a temperature rise of the surface or interior thermocouples in excess of fifty-four (54) degrees F. above the furnace air temperature at the beginning of the test and which do not flame after an exposure of thirty (30) seconds.

2—Materials having a structural base of noncombustible material as defined in paragraph 1, with a surfacing not more than one-eighth (⅛) inch thick which has a flamespread rating not greater than fifty (50) when tested in accordance with the method of test for surface burning characteristics of building materials listed in appendix G.

3—Materials other than defined in paragraphs 1 and 2, having a flamespread rating not greater than twenty-five (25) without evidence of continued progressive combustion, and of such composition that surfaces that would be exposed by cutting through the material in any way would not have a flamespread rating greater than twenty-five (25) when tested in accordance with the method of test for surface burning characteristics of building materials listed in appendix G.

The term noncombustible does not apply to the flamespread characteristics of interior finish or trim materials. No material shall be classed as noncombustible building construction material which is subject to increase in combustibility or flamespread rating beyond the limits herein established through the effects of age, moisture or other atmospheric conditions.

903.72. Fire-Retardant Treated Wood Tests.—Where permitted for use as a structural element, Fire-Retardant Treated Wood shall be tested in accordance with the standard method of test for surface burning characteristics of building materials (tunnel test) listed in appendix G and shall show a flame spread rating not greater than twenty-five (25) when exposed for a period of not less than thirty (30) minutes, with no evidence of significant progressive combustion. The material shall bear the identification of an accredited authoritative testing agency showing the performance rating thereof.

903.8. Fire-Retardant Treated Wood.—Wood that has been pressure-treated with fire-retardant chemicals in accordance with the standards for pressure treatment of lumber or plywood in buildings listed in appendix C may be used in Type 1 and 2 constructions for partitions, structural elements, and roof framing and sheathing as indicated by note (j) in table 5; provided that the assembly in which such material is used shall produce the required fire resistance when tested in accordance with the standard method of fire test for building construction and materials listed in appendix G. Such material shall not be used on the exterior of buildings where it will be exposed directly to the weather. Where used as a structural element, such material shall meet the requirements of section 903.72. Where used as interior finish such material shall meet the requirements of section 904.1.

SECTION 904.0. FLAMERESISTANCE TESTS

All materials which are required to restrict the spread of flame or to be flameresistant under the provisions of the Basic Code, including but not limited to interior finish materials, fireretardant treated wood, tents and tarpaulins, and interior hangings and decorations, shall meet the requirements for their respective use and classifications as determined by the applicable test procedures listed in appendix G.

904.1. Interior Finish Materials.—All materials used for interior finish shall be classified within the classifications listed in table 16A. Interior finish materials shall be tested in accordance with one of the methods of test for surface burning characteristics of building materials as listed in appendix G. For class D material the flame from the test specimen shall not reach the angle frame at any point in five (5) minutes or less when tested under the federal specification.

TABLE 16A.—INTERIOR FINISH CLASSIFICATION

Class of material	Federal specification test	Surface burning characteristics test (Tunnel test)
I	A	0 to 25
II	B or C	26 to 75
III	D (5 min. limit)	76 to 200
IV	Note a	Over 200

Note a.—All materials in this class shall be tested and classified in accordance with test for surface burning characteristics.

904.2. Tents and Tarpaulins.—Where required by section 423, canvas for tents and by section 1319, canvas for tarpaulins shall meet the test requirements of the federal vertical flame test specification listed in appendix G and the field check test herein prescribed.

904.21. Field Test for Tent Canvas.—Dry specimens of the canvas shall be subjected for twelve (12) seconds to the flame of a three-quarter (¾) inch paraffin candle applied at the lower end of test specimens, two (2) inches wide and six (6) inches long, held in a vertical position. After removal of the test flame, the material shall not support a sustained flame for more than two (2) seconds and the average length of char shall be not more than two and one-half (2½) inches.

904.3. Interior Hangings and Decorations.

904.31. Acceptance Criteria.—Where required to be flameresistive under the provisions of the Basic Code, all materials specified or required for artistic enhancement or use for decorations, draperies, curtains, scenery and hangings shall comply with this section for noncombustible or fireretardant materials; or if treated to be flameresistant shall not generate smoke or gases more than those given off by untreated wood or paper burning under comparable conditions when tested in the vertical flame test listed in appendix G. The test criteria for acceptance of flameresistant materials shall be as follows:

For materials which weigh eight (8) ounces or more per square yard the length of char shall not exceed four and one-half (4½) inches;

For materials which weigh five (5) ounces or more but less than eight (8) ounces per square yard, the length of char shall not exceed five (5) inches;

For materials which weigh less than five (5) ounces per square yard, the length of char shall not exceed five and one-half (5½) inches.

In no case shall the specimen continue flaming for more than two (2) seconds after removal of the test flame.

904.32. Limitation of Approval.—All approvals of organic decorative materials shall be limited to one (1) year. The owner or his authorized agent shall file an affidavit with the building official certifying that the process and materials used comply with the Basic Code and stating the date of treatment and the warranted period of effectiveness of the process.

904.33. Field Test for Decorative Materials.—The building official shall subject decorative materials where required to be flameresistant to a field test consisting of the application of the flame from a three-quarter (¾) inch paraffin candle for a period of one (1) minute. The material shall not flash, nor support combustion, nor continue to flame for more than two (2) seconds or glow for more than thirty (30) seconds after removal of the test flame.

904.34. Replacement of Defective Materials.—All treated hangings, draperies, canvas and other decorative and tent materials that fail to meet the check test requirements shall be retreated or replaced by an approved installation.

SECTION 905.0. SPECIAL FIRERESISTIVE REQUIREMENTS

In buildings or parts thereof of the uses and types of construction herein specified, the general fireresistive requirements of table 5 and the height and area limitations of table 6 shall be subject to the following exceptions and modifications:

905.1. Public Garages.—All existing buildings and structures altered or converted for use to a garage, motor vehicle repair shop or gasoline service station, more than one (1) story in height, unless of fireproof (type 1) construction, or heavy timber (type 3-A) construction, shall have the partitions, columns and girders and all floor and roof construction protected and insulated with noncombustible materials or assemblies of component

materials having a fireresistance rating of not less than three-quarter (¾) hours; except that existing roof trusses shall be exempt from all fireproofing requirements.

905.2. Parking Structures.—Parking structures may be erected as follows without enclosure walls except that an enclosure wall with not less than two (2) hours fireresistance, without openings therein, shall be provided when located within six (6) feet of interior lot lines. A continuous wall or protective guard rail not less than three and one-half (3½) feet in height of sufficient strength and design to restrain the vehicles shall be provided around the outside perimeter of the structure on each parking level and a wheel guard, not less than six (6) inches in height, shall be located so as to prevent any vehicle from striking the wall or guard rail.

Heights and areas of parking structures shall not exceed the limits in the following table. The area of structures facing on more than one (1) street may be increased as provided in note "a" of table 6 and section 308.1.

HEIGHT AND AREA LIMITATIONS FOR PARKING STRUCTURES

Type of Construction	Height	Area in Square Feet
1-A and 1-B	Unlimited	Unlimited
2-A	7 Stories	30,000
2-B	5 Stories	30,000
2-C	3 Stories	30,000
2-C Primary frame hot-rolled structural steel	4 Stories	30,000
2-A, 2-B and 2-C	2 Stories	Unlimited

Note. The above limits of height permit parking on top level of structure.

905.21. Below Grade.—If a parking structure extends below the grade that portion of the building below the ground floor shall comply with the requirements of section 415.

905.22. Gasoline Dispensing.—Areas used for dispensing of gasoline in parking structures shall be located on the grade floor and shall comply with the requirements of section 416.

905.23. Mechanical Parking.—Structures in which vehicles are parked by mechanical means shall comply with the requirements for parking structures, except that modifications of exit stairs and facilities may be allowed because of the limited number of personnel in the structure. Buildings of protected noncombustible (type 2-B), construction or unprotected noncombustible (type 2-C) construction in which the primary structural frame is of hot rolled steel may be not more than eighty-five (85) feet in height.

905.24. Electrical Wiring.—Electrical wiring, equipment and appliances in such structures shall not be required to be of explosion type unless located below grade or within twenty (20) feet horizontally of gasoline dispensing pumps.

905.3. Petroleum Bulk Storage Buildings.—Warehouses for the bulk-storage of not more than fifty thousand (50,000) gallons of lubricating oils with a flash point of not less than three hundred (300) degrees F. in approved sealed containers may be erected outside the fire limits of masonry wall (type 3) construction not more than five thousand (5000) square feet in area and not more than one (1) story or twenty (20) feet in height; or to proportionate areas in other types of construction as regulated by table 6. Not more than one motor vehicle may be stored in such buildings unless separately enclosed with a fire division of two (2) hours fireresistance.

905.4. Packing and Shipping Rooms.—Every packing or shipping room located on or below a floor occupied for mercantile uses shall be separated therefrom by fire divisions of not less than the fireresistance of the type of construction of the building but in no case less than three-quarter (¾) hours fireresistance.

905.5. Truck Loading and Shipping Areas.—Truck loading and shipping areas shall be permitted within any business building provided such areas are enclosed in construction of not less than the fireresistance of the type of construction of the building but in no case less than three-quarter (¾) hours; and direct access is provided therefrom to the street.

905.6. Residential Buildings.

905.61. Protected Ordinary Construction.—Multi-family dwellings (use group L-2) of protected ordinary (type 3-B) construction may be increased to six (6) stories or seventy-five (75) feet in height when the first floor above the basement or cellar is constructed of not less than three (3) hour fireresistive construction, the floor area is subdivided by two (2) hour fire walls into fire areas of not more than three thousand (3000) square feet, and the stairways, public hallways and exitways are enclosed in two (2) hour fireresistive construction.

905.62. Protected Noncombustible Construction.—When of three-quarter (¾) hour protected noncombustible (type 2-B) construction, multi-family dwellings (use group L-2) may be increased to nine (9) stories or one hundred (100) feet in height when separated not less than fifty (50) feet from any other building on the lot and from interior lot lines, the exitways are segregated in a fire area enclosed in a continuous fire wall of two (2) hour fireresistance and the first floor is not less than one and one half (1½) hours fireresistive construction.

905.63. Retail Business Use.—Subject to the restrictions of the zoning laws, the first floor of buildings of unprotected noncombustible (type 2-C), masonry wall (type 3-C) or frame (type 4-B) construction may be occupied for retail store use, provided the ceilings and enclosure walls are protected to afford three-quarter (¾) hour fireresistance and the exitways from the residence floors are separately enclosed in accordance with the requirements of section 909.5 and article 6.

905.7. Grade Floor Protection.

905.71. Non-Fireproof Construction.—In all buildings other than one- and two-family dwellings (use group L-3) and other than fireproof (types 1-A and 1-B) construction with habitable or occupiable stories or basements below grade, the ceilings, partitions and supports below the grade floor shall be protected with noncombustible materials or assemblies of component materials having a fireresistance rating of not less than three-quarter (¾) hours or shall be of heavy mill (type 3-A) construction, or shall be equipped with automatic sprinklers; but in no case less than the required fireresistance of the use group and type of construction required by tables 5 and 6.

905.72. Protected Noncombustible Construction.—In all buildings of one and one-half (1½) hour protected noncombustible (type 2-A) construction, more than four (4) stories or fifty (50) feet in height, in other than residential use groups, the floor above the basement or cellar shall be constructed with a fireresistance of not less than two (2) hours.

905.73. One- and Two-Family Dwellings.—One- and two-family dwellings (use group L-3), not more than two (2) stories and attic or thirty-five (35) feet in height, shall be exempt from the requirements of this section.

905.74. Basement Assembly Uses.—No dance hall, skating rink or similar places of public assembly for amusement, entertainment, instruction, or service of food or refreshment shall be located in stories or rooms below grade unless the floor construction above and below is of not less than one and one-half (1½) hour fireresistance.

SECTION 906.0. ENCLOSURE WALLS

All exterior masonry and other enclosure walls shall comply with the structural provisions of articles 7 and 8 and with the fireresistance requirements of table 5 as regulated by the location and type of construction.

906.1. Exceptions.—The provisions of the Basic Code shall not be deemed to prohibit the omission of enclosure walls for all or part of a story when required for special uses and occupancies; except that when so omitted, the open areas shall be separated from the rest of the area and from the upper and lower stories of the building by wall and floor construction of the fireresistance required in table 5; and except as otherwise specifically permitted in the Basic Code, the piers, columns and other structural supports within the open portion shall be constructed with the fireresistance required for exterior bearing walls in table 5.

906.2. Stone Masonry Piers.—In buildings of fireproof (types 1-A and 1-B) construction, stone masonry shall not be used for interior isolated piers, columns, arches or vaultings, that support loads in addition to their dead weight except in church and similar monumental buildings; but this shall not prohibit the use of stone facings on load-bearing piers installed in accordance with the provisions of sections 863 and 873.

SECTION 907.0. FIRE WALLS AND PARTY WALLS

Fire walls shall be constructed of solid or hollow masonry units or of mass or reinforced concrete or any other approved noncombustible materials or form of construction of the required strength and fireresistance rating specified in table 5 for the type of construction, but not less than the fire grading of the use group specified in table 16; except as herein provided for frame construction. The construction shall comply with all the structural provisions for bearing or non-bearing walls of the Basic Code.

907.1. Solid Brick.—In other than frame buildings, when constructed of solid brick masonry, the wall thickness shall conform to the requirements of section 868; except that in all buildings more than twenty-five (25) feet in height used for moderate fire hazard storage (use group B-1) and all high hazard uses (use group A), no part of an unplastered masonry fire wall shall be less than twelve (12) inches thick.

907.2. Reinforced Concrete.—When constructed of reinforced concrete, the wall thickness shall be not less than six (6) inches for the uppermost twenty-five (25) feet or portion thereof and shall increase two (2) inches for each additional twenty-five (25) feet or portion thereof measured down from the top of the wall; except that in buildings more than twenty-five (25) feet in height used for storage of moderate fire hazard (use group B-1) and high hazard (use group A), no part of an unplastered reinforced concrete fire wall shall be less than eight (8) inches thick.

907.3. Frame Dwellings.—In one- and two-family dwellings (use group L-3), of frame (type 4) construction, party walls shall be not less than three-quarter (¾) hour fireresistive construction and shall extend through intersecting walls of frame construction to the outside of all combustible wall and roof sheathing.

907.4. Other Frame Buildings.—In frame buildings, in use groups other than one- and two-family dwellings, all party and fire walls shall be not less than two (2) hour fireresistive construction, but in no case less than the equivalent fire grading of the use group as specified in table 16.

907.5. Cutting Fire Walls.—No fire wall, eight (8) inches or less in thickness, shall be cut for chases or socketed for insertion of structural members subsequent to erection.

907.6. Hollow Fire Walls.—When combustible members frame into hollow fire walls or fire walls of hollow units, all hollow spaces shall be solidly filled for the full thickness of the wall and for a distance of not less than four (4) inches above, below and between the structural members, with noncombustible materials approved for firestopping in section 921.

907.7. Combustible Insulation.—The building official may permit the application of cork or fiber board or other combustible insulation if laid up without intervening air spaces and cemented or attached directly to the face of the fire wall and protected on the exposed surface as provided in section 824.

907.8. Continuity of Fire Walls.—In all buildings and structures of other than fireproof (types 1-A and 1-B) construction, fire walls and party walls shall be continuous from foundation to two (2) feet, eight (8) inches above the roof surface; except that in residential buildings (use groups L-1, L-2, and L-3), fire walls may be stopped six (6) inches above the top of the roof framing if thoroughly firestopped and no combustible materials extend through the wall. Walls extending through the roof shall be coped as provided in section 870.4 and separate flashing shall be provided on each side.

907.9. Offset Fire Walls.—If fire walls are offset at intermediate floor levels in fire-protected skeleton frame construction, the offset floor construction and the intermediate wall supports shall be constructed of noncombustible materials with a fireresistance rating not less than that required for the fire wall.

SECTION 908.0. FIRE WALL OPENINGS

Openings in fire walls shall not exceed the limits in size and area herein prescribed and the opening protectives shall conform to the provisions of sections 903, 904 and 917.

908.1. Size of Opening.—Except in sprinklered buildings, no opening through a fire wall shall exceed one hundred and twenty (120) square feet in area, and the aggregate width of all openings at any floor level shall not exceed twenty-five (25) per cent of the length of the wall.

908.2. First Story Exceptions.—In buildings of all types of construction, when the entire areas on both sides of a fire wall are protected with an approved automatic sprinkler system complying with article 12, openings designed for the passage of trucks may be constructed not more than two hundred and forty (240) square feet in area with a minimum distance of three (3) feet between adjoining openings. Such openings shall be protected with approved automatic opening protectives of three (3) hour fire resistance and provided with an approved water curtain for such openings in addition to all other requirements.

908.3. Opening Protectives.—Every opening in a fire wall shall be protected on both sides with an approved automatic protective assembly having a combined three (3) hour fireresistance, or the approved labeled equivalent, except when approved as a horizontal exit.

908.4. Horizontal Exit.—Door openings in a fire wall serving as a horizontal means of egress shall be protected with an approved one and one-half (1½) hour self-closing swinging fire door or its labeled equivalent when designed as an exitway from one side. When serving as a dual exitway, there shall be adjacent openings with swinging fire doors opening in opposite directions. Signs shall be provided indicating as an exit, the door which swings in the direction of travel from that side. The size of openings shall comply with section 616. An automatic fire door, fire curtain, or water curtain shall be provided on the opposite side of each such opening.

SECTION 909.0. FIRE PARTITIONS

909.1. Construction.—Fire partitions required for the enclosure of exitways and areas of refuge shall be constructed of approved masonry, reinforced concrete or other approved noncombustible materials having the minimum fireresistance prescribed by table 5; except that partitions constructed of combustible materials to provide the required fireresistance may be accepted for use in exitways of buildings of types 3 and 4 construction as regulated by table 5 and the provisions of section 618.9.

909.2. Bearing Partitions.—When fire partitions are used as bearing walls, they shall comply with all the structural provisions of article 8, governing height and thickness.

909.3. Continuity.—When fire partitions around vertical shafts are not continuous from floor to floor, the offset in the floor construction shall be of construction with a fireresistance rating not less than that of the partition construction, nor less than that of the fire grading defined in table 16 for the specific use group.

909.4. Openings.

909.41. Size.—No other openings shall be permitted in fire partitions except exitway doors, and the aggregate permissible width of such doorways shall not exceed twenty-five (25) per cent of the length of the wall, nor shall the maximum area of any individual opening exceed forty-eight (48) square feet.

909.42. Protectives.—All opening protectives in fire partitions in other than one- and two-family dwellings shall comply with the provisions of sections 903 and 918 for construction, except as provided in section 618.93 for buildings not more than three (3) stories in height.

909.5. Combustible Stair Enclosures.

909.51. Construction.—Stair enclosures constructed of approved combustible assemblies protected with component materials to afford the required fireresistance ratings shall be continuous through combustible floor construction and shall provide an unbroken fire barrier in combination with protected floors, ceilings and fire doors, separating the exitways from the unprotected areas of the building. Such enclosures shall be firestopped to comply with sections 877.9 and 921.

909.52. Openings for Lighting.—Openings for the purpose of providing light in such enclosures may be protected with wired glass with single panes not more than three hundred and sixty (360) square inches in area and a total area in one story of not more than seven hundred and twenty (720) square inches. Such light panels shall comply with the provisions of section 919 and shall be contained in stationary sash and frames of steel or other approved noncombustible materials.

SECTION 910.0. FIRERESISTIVE PARTITIONS

910.1. Construction.—All permanent partitions designated as fireresistive for subdividing purposes other than providing required areas of refuge shall be constructed of noncombustible materials when designed for use in buildings and structures of fireproof or noncombustible (types

1 and 2) construction, except as provided in section 910.4.

910.2. Supports.—All fireresistive partitions shall extend from the top of the fireresistive floor below to the fireresistive ceiling above, and shall be securely attached thereto. They shall be supported on fireproofed steel or reinforced concrete construction; except that the supporting beams and girders of fireresistive partitions constructed of combustible materials shall be protected with component materials or assemblies to afford the required fireresistance of the partitions supported. All hollow vertical spaces shall be firestopped at every floor level as required in sections 877 and 921.

910.3. Openings.—Door openings shall not exceed one hundred and twenty (120) square feet in area and where required to be fire protected, they shall comply with the provisions of sections 904 and 917.

910.4. Exceptions.

910.41. Nonfireproof Construction.—In buildings and structures of masonry enclosed (type 3) and frame (type 4) construction, protected wood studs or other combustible assemblies constructed with component materials to afford the required fireresistance specified in table 5 shall be approved for enclosures of exitways where permitted in section 618.93 and for all nonbearing partitions.

910.42. Fireproof Construction.—In all buildings and structures of other than institutional (use group H) and residential (use groups L-1 and L-2) of fireproof (type 1) or of protected noncombustible (type 2) constructions, partitions of a single thickness of wood or approved composite panels, and glass or other approved materials of similar combustible characteristics, may be used to subdivide rooms or spaces into offices, entries, or other similar compartments, provided they do not establish a public corridor or a private corridor serving an occupant load of fifty (50) or more in areas occupied by a single tenant and not exceeding five thousand (5,000) square feet between fireresistive or fire partitions, fire walls and fireresistive floors. Larger areas may be subdivided with fireretardant wood or with materials of similar combustible characteristics when complying with section 903.72, but not to exceed fifty (50) per cent increase in area.

SECTION 911.0. VERTICAL SHAFTS AND HOISTWAYS

The provisions of this section shall apply to all vertical shaft enclosures, except as provided for stairway enclosures in section 618, flue enclosures in section 1008, incinerator chutes in sections 1016 and 1017, duct shafts in sections 1018 and 1019, pipe shafts in section 1117 and elevator and dumbwaiter hoistways in section 1610.

911.1. Open Shaft Enclosures.—The enclosing wall of shafts that are open to the outer air at the top shall be constructed of materials specified in article 8 for exterior walls of buildings and structures of the required fireresistance specified in table 5.

911.2. Covered Shaft Enclosures.—The enclosing walls and the top of interior covered shafts shall be constructed of approved masonry, reinforced concrete or other approved construction with a fireresistance rating of not less than two (2) hours, except as provided in section 911.3.

911.3. Shafts in Residential Buildings.—In one- and two-family dwellings of other than fireproof or noncombustible construction, shafts may

be supported on and constructed of combustible materials or assemblies having a fireresistance rating of not less than three-quarter (¾) hours, and shall extend not less than three (3) feet above the roof with a ventilating skylight of noncombustible construction as specified in section 928.

911.4. Top Enclosure.

911.41. Not Extending to Roof.—A shaft that does not extend into the top story of the building shall be enclosed with top construction of the same strength and fireresistance as the floors of the building or structure in which it occurs, but in no case less than that of the fireresistance rating of the shaft enclosure. Such shafts shall be provided with noncombustible vents for the relief of smoke and gases in the event of fire, with an area not less than ten (10) per cent of the shaft area.

911.42. Extending to Roof.—All shafts that extend to the roof of the building shall be covered at the top with a thermostatically controlled skylight of not less than three-fourths (¾) of the area of the shaftway, constructed in accordance with the requirements of section 928. The automatic operation of the skylight may be controlled by fusible links designed to operate at a fixed temperature of not more than one hundred and sixty (160) degrees F. or by electric or pneumatic operation under a rapid rise in temperature at a rate of fifteen (15) to twenty (20) degrees F. per minute or by other approved methods.

911.43. Alternate Shaft Ventilation.—The skylight herein required may be replaced by a window of equivalent area in the side of the shaft, provided the sill of such window is not less than two (2) feet above the adjoining roof and is equipped with an automatic vent opening, does not face on an interior lot line or within ten (10) feet thereof, and is not located within twenty (20) feet of an opening in adjacent walls.

911.5. Bottom Enclosure.—All shafts that do not extend to the bottom of the building or structure shall be enclosed at the lowest level with construction of the same strength and fireresistance as the lowest floor through which it passes, but in no case with a fireresistance rating less than that of the shaft enclosure.

911.6. Existing Shaftways.—In all existing shaftways of buildings of assembly (use groups F-1, F-2, F-3 and F-4), institutional (use groups H-1 and H-2) and residential (use groups L-1 and L-2) classifications, which are not already enclosed as herein required, the building official shall direct such construction as he may deem necessary to insure the safety of the occupants, subject to review by a board of survey as provided in section 127.

911.7. Shaft Openings.—No openings other than necessary for the purpose of the shaftway shall be constructed in shaft enclosures; and all openings shall be protected with approved fire doors, curtains, shutters or fixed metal sash with wired glass complying with the provisions of sections 917, 918 and 919.

SECTION 912.0. WALL LINTELS

912.1. Fire Protection.—Unless supported or suspended from structural

wall girders protected with insulating materials of the required fireresistance, or when the opening is spanned by a masonry arch of the required strength, all lintels over openings in masonry walls more than eight (8) feet in length shall be protected as required for wall girders of the specified type of construction.

912.2. Stone Lintels.—Except when otherwise approved by the building official in controlled material procedure, the use of stone lintels on spans exceeding four (4) feet shall be prohibited unless supplemented by fireproofed structural members or masonry arches of the required strength to support the superimposed wall load.

SECTION 913.0. BEAMS AND GIRDERS

All beams and girders shall be protected with noncombustible materials or assemblies of component materials to afford the fireresistance specified in table 5.

913.1. Fireresistive Ceiling Protection.—When a ceiling is used to fire-protect noncombustible floor and roof assemblies, floor beams and girders need not be individually fire-protected, except when such members support loads from more than one floor or one floor and roof. Such fireresistive ceiling shall be continuous except as provided in section 913.2.

913.2. Installation of Ceiling Fixtures.—Fireresistive ceilings which constitute an essential part of a floor or roof assembly to meet a required fireresistance rating may have openings to accommodate noncombustible piping, ducts or electric outlets. The aggregate area of such openings in the ceiling shall be not greater than one hundred (100) square inches in any one hundred (100) square feet of ceiling area. The fixtures and attachments shall be installed so as not to decrease the fireresistance of the assembly. All duct openings shall be protected with approved noncombustible fire dampers.

913.3. Firestopping of Ceiling Spaces.—Floor and roof construction in which the secondary structural members are not individually encased in fireresistive materials or assemblies of component materials, shall be firestopped in areas of not more than three thousand (3000) square feet with noncombustible materials. Such firestopping shall comply with section 921, or solid web structural members may be substituted for such firestops. Where floor and roof construction with accompanying ceilings is made entirely of noncombustible or fireproof construction, subdivision may be omitted, as provided in section 219.0.

913.4. Firestopping of Wood Joist Construction.—Where the ceilings are suspended below wood joist floor construction, the space between the ceiling and the floor above shall be firestopped in areas of not more than one thousand (1000) square feet with materials meeting the requirements of section 921.

913.5. Wall Beams.—Beams and girders which support masonry walls shall be protected to afford not less than the fireresistance of the wall construction supported thereon.

SECTION 914.0. COLUMNS

All steel, iron and other approved metal columns and reinforcement in concrete columns shall be protected with noncombustible materials or assemblies of component materials to afford the fireresistance specified in table 5 and as herein modified.

914.1. Exterior Columns.—Columns located in exterior walls or along the outer lines of a building or structure shall be fireproofed as required for the type of construction as regulated by table 5; and shall be protected against corrosion by cement parging, waterproofing, or other approved methods complying with section 874. The interior faces of exterior columns shall be protected and insulated with coverings of the required fireresistance rating specified for interior columns in table 5.

914.2. Lugs and Brackets.—The extreme outer edge of brackets, wind bracing angles, gussets and other connection details may extend to within one (1) inch of the outer face of the required fireprotective covering.

914.3. Embedded Mechanical Facilities.—Plumbing and heating pipes and vent ducts and similar service equipment shall be installed outside of the required protective column covering; except that plumbing pipes, wires, conduits and cables may be embedded in the required fireproof protection when they occupy not more than one-quarter (¼) of the fireproofed surface of a rectangular column face nor more than one-quarter (¼) of the perimeter of a round column.

914.4. Mechanical Protection.—Where the fireresistive covering on columns is subject to injury from moving vehicles or handling of merchandise, the fireproofing shall be jacketed for a height of not less than five (5) feet from the finished flooring with an approved metal or other noncombustible covering of adequate strength.

914.5. First Story Columns.—In buildings of exterior masonry wall (type 3) construction, required fire protection may be omitted from first story columns supporting enclosure walls located on the street lot line.

914.6. Anchors, Bands and Ties.

914.61. Concrete Reinforcement.—Concrete fire protection on structural metal columns shall be reinforced and anchored by wire mesh, metal caging, metal clips or spirally wound wire of approved types. Wire fabric shall be not less than No. 12 U. S. gage, four (4) by four (4) inch mesh or its equivalent; spirally wound wire shall be not less than No. 10 U. S. gage with not over four (4) inch pitch or equivalent heavier wire at a maximum pitch of eight (8) inches.

914.62. Gypsum Concrete Reinforcement.—Poured-in-place gypsum fire protection shall be reinforced and anchored by wire fabric of not less than No. 16 U. S. gage, two (2) by two (2) inch mesh or No. 14 U. S. gage, four (4) by four (4) inch mesh.

914.63. Masonry Unit Ties.—Block and tile fireproofing units shall be securely anchored or bounded by wall ties, metal mesh or metal u-clips in the horizontal joints, or by outside tie wires not less than No. 16 U. S. gage with at least one (1) tie around every block course; or shall consist of special masonry units designed to furnish positive anchorage to the structural member and to each other.

914.64. Exposed Ties.—When outside tie wires are used, they shall be protected by not less than one-half (½) inch of cement mortar, or gypsum plaster or the equivalent fireresistive covering.

914.7. Reinforced Concrete Columns.—The thickness of protection required outside of reinforcing steel in concrete columns shall be proportioned by test to meet the fireresistive requirements of table 5 based on the fireresistive classification of concrete aggregates.

SECTION 915.0. TRUSSES

915.1. Individual Encasement.—Where trusses are required to be protected in table 5, the individual truss members shall be entirely encased in materials or assemblies having the specified fireresistance ratings; except that individual protective coverings may be omitted, including the protection of roof beams and purlins, when a continuous ceiling of the specified fireresistance rating is provided below the lower chord of the truss. The enclosed truss space shall have an access doorway with maximum dimensions of three (3) by three (3) feet, equipped with an opening protective of the same fireresistance rating as the required truss protection. When the trusses or the roof decking are permitted to be constructed of combustible materials, the space above the required fire resistive ceiling shall be subdivided into maximum areas of three thousand (3000) square feet as required for attic spaces in section 219.

915.2. One Story Buildings.—In all one (1) story buildings required to be of fireresistive construction, no protection shall be required for the members of roof trusses, purlins or roof beams when the height to the lowest chord is twenty (20) feet or more from the floor.

915.3. Roofs Less Than 20 Feet High.—In multi-story buildings of types of construction in which fire protected coverings of the structural framework are required by table 5 and the provisions of the Basic Code, the fire protection of individual members of the roof truss may be omitted when the clear height of the lower chord of the truss is more than fifteen (15) and less than twenty (20) feet above the floor, gallery or balcony immediately below and a three-quarter (¾) hour continuous ceiling is installed.

915.4. Roofs 20 Feet or Higher.—When every part of the structural framework is twenty (20) feet or more above the floor immediately below, all fire protection of the structural members may be omitted, including the protection of roof beams and purlins.

915.5. Roof Slabs and Arches.—Where the omission of fire protection from roof trusses and purlins is permitted, the horizontal or sloping roofs in fireproof (type 1) and noncombustible (type 2) constructions, immediately above such trusses, shall be constructed of noncombustible materials of the required strength without a specified fireresistance rating, or of mill type construction in buildings not over five (5) stories or sixty-five (65) feet in height.

SECTION 916.0. EXTERIOR OPENING PROTECTIVES

Where specified herein, the exterior openings of all buildings and structures more than three (3) stories or forty (40) feet in height, other than churches (use group F-4), residential buildings (use groups L-2 and L-3) and buildings of frame (type 4) construction, shall have approved fire windows, shutters, curtains, doors or other approved opening protectives meeting the requirements of the Basic Code and the provisions of article 4 for special uses and occupancies.

916.1. Horizontal Exposure.—Approved protectives shall be provided in every opening facing a street thirty (30) feet or less in width, or within thirty (30) feet horizontally in a direct line not in the same plane of any unprotected noncombustible (type 2-C), unprotected frame (type 4-B) structure, or within thirty (30) feet horizontally of any opening in another building of any type of construction.

916.2. Vertical Exposure.—Approved protectives shall be provided in every opening which is less than fifty (50) feet vertically above the roof of an adjoining structure within a horizontal distance of thirty (30) feet of the wall in which the opening is located, unless such roof construction affords a fireresistance of not less than one and one-half (1½) hours.

916.3. Interior Lot Line Exposure.—Opening protectives shall be provided in every permissible wall opening in buildings of high hazard (use group A) within eleven (11) feet of an interior lot line; in buildings of moderate hazard (use group B-1) within six (6) feet of such lot lines; and in wall openings of frame buildings which are erected within six (6) feet of interior lot lines, except for store fronts and window and door openings in dwellings of use groups L-2 and L-3.

916.4. First Story Openings.—The required fireresistive opening protectives may be omitted in first story openings facing on a street or other public space not less than thirty (30) feet wide, when not extending more than twenty-five (25) feet above grade.

916.5. Non-Automatic Protectives.—Required protective assemblies in exterior openings, unless self-closing or provided with approved automatic closing devices, operative from either side, shall be closed at the end of business hours and at all times when not required for light and ventilation under the provisions of article 5.

SECTION 917.0. FIRE DOORS

917.1. Fire Door Assemblies.—Approved fire door assemblies as defined in the Basic Code shall be constructed of any material or assembly of component materials which meet the test requirements of sections 903 and 904 and the fireresistance ratings herein required.

Location	Fireresistance Rating in Hours
Fire walls and fire divisions of 3 or more hour construction.....	3
Fire walls and fire divisions of 2 hour construction.....	1½
Shaft enclosures and elevator hoistways of 2 hour construction.....	1½
Stairway and exitway enclosures except fire towers and grade passageways	¾

Doors in exitways of residential and business use buildings not more than three (3) stories or forty (40) feet in height with an occupancy load of not more than forty (40) below or seventy-five (75) above grade and doors from hotel rooms (use group L-1), from hospital rooms (use group H-2), and from school rooms (use group F-4) to public corridors may be of noncombustible construction or of one and three-quarter (1¾) inch solid-core wood doors. Plywood face veneers not more than one twenty-eighth (1/28) inch thick shall be permitted on such doors.

917.2. Labeled Protective Assemblies.—Labeled protective assemblies meeting the requirements of sections 903.63 and 903.65, and the applicable standards listed in appendix I, including shop inspection, shall be approved for use in the following typical and special situations:

917.21. Typical Situations.

Class A Doors—Fire wall openings in accordance with section 908.

Class B Doors—Vertical shafts and openings in fire partitions in accordance with sections 909 and 911.

Class C Doors—Openings in corridor, room and fireresistive partitions in accordance with section 910.

Class D Doors and Windows—Openings in exterior walls in exposing and exposed buildings of high hazard use (use group A) in accordance with article 4 and along exterior stairways in accordance with section 621.

Class E Doors and Windows—Openings in exterior walls and along fire escapes except where class D protectives are required in accordance with section 624.

917.22. Special Situations.—Approved labeled opening protective assemblies shall be accepted as complying with the required time-temperature performance ratings specified in the Basic Code including the following special situations:

Class A Doors—High pressure boiler room walls in accordance with sections 618 and 1115.

Volatile flammables, film, pyroxylin products and fur storage vaults in accordance with sections 403, 408 and 409.

Grinding and grain processing rooms in accordance with section 411.

Paint and flammable storage rooms in accordance with section 412.

Dry cleaning rooms of high and moderate hazard in accordance with section 413.

Proscenium walls of theatres in accordance with section 418.

Transformer room walls in accordance with the National Electrical Code.

Class B Doors—Motion picture studios in accordance with section 409.

Dressing rooms in accordance with section 418.

Show rooms in public garages in accordance with section 415.

Theatre exits and property rooms in accordance with section 418.

Fire and smokeproof towers in accordance with section 620.

Horizontal exits in accordance with sections 616 and 908.

Class C Doors—Projection and trial exhibition rooms in accordance with section 409.

Paint spray rooms in accordance with section 412.

Service stations and repair shops in accordance with sections 416 and 417.

Kitchen and service pantries in places of assembly in accordance with section 419.

Corridor rooms and all fireresistive partitions in accordance with section 910.

Class D Doors—Attached garages in accordance with sections 414 and 917.

Switchboard rooms where required in the Basic Code.

917.3. Multiple Doors.

917.31. Fire Walls.—Two (2) doors of one and one-half (1½) hour fireresistance each, installed on opposite sides of the same opening, shall be deemed equivalent in fireresistance to one three (3) hour door.

917.32. Fire Partitions.—Two (2) doors of three-quarter (¾) hour fireresistance each, installed on opposite sides of same opening shall be deemed equivalent in fireresistance to a one and one-half (1½) hour fire door; except that when used in an exitway as permitted by section 1614 in elevator corridors and as required in section 919, the use of wired glass panels shall be limited to one hundred (100) square inches.

917.4. Glass Panels.—Wired glass panels shall be permitted in fire doors within the limitations of section 919 and as herein specifically prescribed.

917.5. Alternate Closing Devices.—Except as may be otherwise provided for openings in fire and fire division walls, all fire doors shall be self-closing and shall be closed during occupancy of the building or part thereof; except that the building official may accept the use of rate of rise heat actuated devices meeting the requirements of the approved rules on doors that are normally required to be open for ventilation or other specified purposes when the safety of the occupants is not endangered thereby.

SECTION 918.0. FIRE WINDOWS AND SHUTTERS

918.1. Fireresistance Rating.—Approved assemblies of fire windows and fire shutters shall meet the test requirements of sections 903 and 904, or shall be approved labeled assemblies meeting the requirements of section 903.65.

Steel window frame assemblies of one-eighth (⅛) inch minimum solid section or of not less than No. 18 U.S. gage formed sheet steel members fabricated by pressing, mitering, riveting, interlocking or welding and having provision for glazing with one-quarter (¼) inch wired glass as required in section 919.0, when securely installed in the building construction and glazed with one-quarter (¼) inch wired glass, shall be deemed to meet the requirements for a three-quarter (¾) hour fire window assembly.

918.2. Window Mullions.—All metal mullions which exceed a nominal height of twelve (12) feet shall be protected with insulating materials to afford the same fireresistance as required for the wall construction in which the protective is located.

918.3. Swinging Fire Shutters.—When fire shutters of the swinging type are used in exterior openings, not less than one (1) row in every three (3) vertical rows shall be arranged to be readily opened from the outside and shall be identified by distinguishing marks or letters not less than six (6) inches high.

918.4. Rolling Fire Shutters.—When fire shutters of the rolling type are used, they shall be of approved counterbalanced construction that can be readily opened from the outside.

918.5. Vertical Separation of Windows.

918.51. Where Required.—In all buildings and structures designed for storage, mercantile, industrial and business uses (use groups A, B, C, D and E), exceeding three (3) stories or forty (40) feet in height, openings located vertically above one another in exterior walls which are required to have a fireresistance rating of more than three-quarter (¾) hours shall be separated by apron or spandrel walls not less than three (3) feet in height extending between the top of any opening and the bottom of the opening next above.

918.52. Firesistance Rating.—The apron or spandrel walls shall be constructed with the same fireresistance required for the exterior wall in which located as specified in table 5; except that when such required rating exceeds three-quarter (¾) hours, approved wired glass construction in fixed noncombustible sash and frames not exceeding one-third (⅓) of the area of such apron or spandrel may be located therein, and except further that in exterior nonbearing enclosure walls which are not required to be of more than three-quarter (¾) hour fireresistance, the provisions of this section in respect to apron or spandrel walls shall not apply.

SECTION 919.0. WIRED GLASS

Wired glass in approved opening protective assemblies shall be not less than one-quarter (¼) inch thick and shall be limited in area and location as herein required.

919.1. Fire Wall Protectives.—Wired glass in fire doors located in fire walls shall be prohibited, except when serving as horizontal exits, the self-closing swinging door may be provided with a vision panel of not more than one hundred (100) square inches with no dimension exceeding twelve (12) inches.

919.2. Fire Partition Protectives.—Wired glass vision panels may be used in fire doors of one and one-half (1½) hour fireresistance rating intended for use in fire partitions; but in no case shall the glass panels be more than one hundred (100) square inches in area with no dimension exceeding twelve (12) inches.

919.3. Fireresistive Partition Protectives.—Wired glass panels in three-quarter (¾) hour fire doors shall not exceed a total exposed area of one thousand two hundred and ninety-six (1296) square inches; except as provided in section 917.32.

919.4. Wired Glass in Labeled Doors and Windows.—One-quarter (¼) inch wired glass may be used in approved labeled opening protectives with the following maximum sizes:

LIMITING SIZE OF WIRED GLASS PANELS

	Area in square inches	*Height in inches*	*Width in inches*
Class A door per opening	0	0	0
Class B door per opening	100	12	12
Class C door per light	1296	..	..
Class D door per light	0	0	0
Class E door per light	720	54	44
Class E window per light	720	54	54
Class F window per light	2916	54	54

919.5. Exitway Protectives.—Unless specifically required in article 4 to be solid in such locations where unusually hazardous conditions prevail, fire doors in elevator and stairway shaft enclosures may be equipped with vision panels which shall be so located as to furnish clear vision of the passageway or approach to the elevator or stairway. Such vision panels shall not exceed the size limitations specified for class B doors.

SECTION 920.0. FIRERESISTIVE REQUIREMENTS FOR PLASTER

920.1. Thickness of Plaster.—The required thickness of fireresistive plaster protection shall be determined by the prescribed fire tests for the specified use and type of construction and in accordance with the provisions of section 820 for interior plastering and section 821 for exterior plastering. The thickness in all cases shall be measured from the face of the plaster base when applied directly to masonry walls or from the face of the lath when applied to fiber board, wood, or gypsum lath and from the back of metal lath.

920.2. Plaster Equivalents.—For fireresistive purposes, one-half (½) inch of unsanded gypsum plaster shall be deemed equivalent to three-quarter (¾) inches of one (1) to three (3) sanded gypsum or one (1) inch portland cement plaster.

920.3. Noncombustible Furring.—In fireproof (type 1) and noncombustible (type 2) construction, plaster shall be applied directly on masonry or on an approved noncombustible plastering base and furring.

920.4. Double Reinforcement.—Except in solid plaster partitions, or when otherwise determined by the prescribed fire tests, plaster protections more than one (1) inch in thickness shall be reinforced with an additional layer of approved lath imbedded at least three quarter (¾) inch from the outer surface and fixed securely in place.

920.5. Plaster Alternates for Concrete.—In reinforced concrete construction, gypsum or portland cement plaster may be substituted for one-half (½) inch of the required poured concrete protection, except that a minimum thickness of three-eighth (⅜) inches of poured concrete shall be provided in all reinforced concrete floors and one (1) inch in reinforced concrete columns in addition to the plaster finish and the concrete base shall be prepared in accordance with section 821.6.

SECTION 921.0. FIRESTOPPING

921.1. Where Required.—Firestopping shall be designed and constructed to close all concealed draft openings and to form effectual fire barriers against the spread of fire between stories of every building and in all open structural spaces therein, including the following locations: for the subdivision of attic spaces in section 219; for combustible wall, partition and floor framing in section 877; for ceiling spaces in section 913; for open spaces behind acoustical and other finishes in section 923; for floor sleeper spaces in section 924; for pipe, duct and flue openings in section 1119 and for fire dampers and curtains in section 1812.

921.2. Firestopping Materials.—All firestopping shall consist of noncombustible materials including asbestos, brick, terra cotta, concrete, fibrous glass, gypsum, mineral wool, rock wool, steel, iron, metal lath and cement or gypsum plaster, formed steel of not less than No. 20 U. S. gage, or other approved noncombustible materials, securely fastened in place; except that firestops of two (2) thicknesses of one (1) inch lumber with broken lap joints or of two (2) inch lumber installed with tight joints shall be permitted in open spaces of wood framing.

921.3. Inspection of Firestopping.—No firestopping shall be concealed or covered from view until inspected and approved by the building official.

SECTION 922.0. INTERIOR FINISH AND TRIM

Interior finish and interior trim of buildings shall conform to the requirements of this section. Interior finish shall include all wainscoting and paneling or other finish applied structurally or for acoustical treatment. insulation, decoration, or similar purposes. The use of a surface finish of paper or of material of no greater fire hazard than paper shall not be prohibited provided such finish does not exceed one twenty-eighth (1/28) of an inch in thickness, and is applied directly to a noncombustible base. Show windows in the first story of buildings may be of wood or of unprotected metal framing.

These requirements shall not be considered as requiring the installation of interior finish, but where construction or fire protection materials are exposed in rooms or spaces used for the occupancies specified the hazard from rate of flamespread of such exposed materials shall be no greater than that of the interior finish permitted for such occupancy or use. Exposed portions of structural members complying with the requirements for heavy timber type construction in sections 217 and 854 shall not be subject to interior finish regulations.

Interior finish materials that give off smoke or gases more dense or more toxic than that given off by untreated wood or untreated paper under comparable exposure to heat or flame shall not be permitted.

Where no restrictions are otherwise established in the Basic Code, interior finish is not controlled, except that no pyroxylin or similar finishes shall be applied which, as dry films, produce excessive smoke or toxic fumes when exposed to fire.

Material may be used for interior finish and trim only as specifically provided in the Basic Code for the occupancy or use of the space in which it is installed. Use of any material for floor finish, interior finish, and trim in a building of type 1 or type 2 construction within the scope permitted in this section or section 924 shall not declassify the building with respect to its type of construction.

922.1. Interior Finish.—Interior finish of walls and ceilings shall have a flamespread rating not greater than that designated by the class prescribed for the various occupancy groups listed in table 16B when tested in accordance with the requirements of section 904.

TABLE 16B.—INTERIOR FINISH REQUIREMENTS

Class	Use group	*Required vertical exitways and passageways (f)*	*Corridors providing access to exitways*	*Rooms or Enclosed Spaces (a)*
A	High Hazard	I	II	III
B-1	Storage—Moderate Hazard	I	II	III
B-2	Storage—Low Hazard	I	II	III
C	Mercantile	I	II	III
D	Industrial	I	II	III
E	Business	I	II	III
F-1	Assembly—Theatres	I	I	II(b)
F-2	Assembly—Night Clubs	I	I	II(b)
F-3	Assembly—Halls, Terminals, Restaurants	I	II(c)	III
F-4	Assembly—Churches, Schools	I	II(c)	III
H-1	Institutional—Restrained	I	I	I(d)
H-2	Institutional—Incapacitated	I	I	I(d)
L-1	Residential—Hotels	I	II(b)	III
L-2	Residential—Multi-family dwellings	I	II(b)	III
L-3	Residential—1- and 2-family dwellings	IV(e)	IV(e)	IV

Note a.—Requirements for rooms or enclosed spaces are based upon spaces enclosed in partitions of the fireresistance required for partitions in the type of construction of the building or structure, and where fireresistance is required for the structural elements the enclosing partitions shall extend from the floor to the ceiling. Partitions which do not comply with this shall not be considered as enclosing spaces and the rooms or spaces on both sides thereof shall be counted as one. In determining the applicable requirements for rooms or enclosed spaces, the specific use or occupancy thereof shall be the governing factor, regardless of the occupancy group classification of the building or structure. When approved full sprinkler protection is provided, interior finish of class II or III materials may be used in place of class I or II materials respectively, where required in the table, except in exitways or public hallways.

Note b.—Class III interior finish materials may be used in enclosed spaces complying with note (a) for wainscoting not more than eight (8) feet in height and not more than two thousand (2000) square feet in applied surface area; and shall be applied over a noncombustible backing as required in section 923.0.

Note c.—Class III interior finish materials may be used in one (I) story buildings or for ceilings which are twenty (20) feet or more in height to the lowest part of the ceiling construction in multi-story buildings.

Note d.—Class III interior finish may be used in administrative areas.

Note e.—Class IV finish having a flamespread rating not greater than five hundred (500) is permitted in one- and two-family dwellings, except that material of no greater flamespread than class III finish shall be used in exitways from the upper story of a two-family dwelling.

Note f.—Class III interior finish materials may be used for wainscoting or paneling for not more than one thousand (1000) square feet of applied surface area in the grade lobby when applied directly to a noncombustible base or over furring strips applied to a noncombustible base and firestopped as required by section 923.

922.2. Interior Trim.—Baseboards, chair-rails, mouldings, trim around openings and other interior trim, not more than twelve (12) inches in width, may be of class I, II or III materials except trim around fire windows and fire doors shall comply with the requirements of section 917 and section 918 and except that only class I or II materials shall be used for interior trim where interior finish is restricted to class I material.

Class IV trim having a flamespread rating not greater than five hundred (500) shall be allowed for trim only where class IV material is permitted for interior finish.

SECTION 923.0. APPLICATION OF INTERIOR FINISH

Where interior finish is regulated by the requirements of the Basic Code, interior finish materials shall be applied or otherwise fastened in such a manner that they will not readily become detached when subjected to room temperatures of two hundred (200) degrees F. or less for thirty (30) minutes, or otherwise become loose through changes in the setting medium from the effects of time or conditions of occupancy.

923.1. Application to Structural Elements.—Interior finish materials applied to walls, ceilings or structural elements of a building or structure which are required to be fireresistive or to be constructed of noncombustible component materials, shall be applied directly against the exposed surface of such structural elements, or to furring strips attached to such surfaces with all concealed spaces created thereby firestopped where in excess of ten (10) square feet in area or eight (8) feet in any dimension.

923.2. Furred Construction.—Where walls, ceilings or other structural elements are required to be fireresistive or to be constructed of noncombustible component materials and interior finish is set out or dropped distances greater than one and three-quarter (1¾) inches from the surface of such elements, only material of which both faces qualify as class I shall be used, unless the finish material is protected on both sides by automatic sprinklers (see note (a) to table 16B) or is attached to a noncombustible backing complying with section 923.5 or to furring strips applied directly to such backing as provided in section 923.1.

923.3. Heavy Timber Construction.—Interior finish materials may be applied directly to the wood members and decking of heavy timber (type 3-A) construction, where permitted, or to furring strips applied to such members or wood decking as provided in section 923.1.

923.4. Class II and III Material.—Interior finish materials, other than class I material, which are less than one-quarter (¼) inch in thickness shall be applied directly against a noncombustible backing unless the tests under which such material has been classified were made with the materials suspended from the noncombustible backing.

923.5. Noncombustible Backing.—Noncombustible backing for interior finish materials shall be a continuous surface with permanently tight joints, equal in area to the area of the finish, and extending completely behind such finish in all directions; and may be of any materials meeting the requirements of the Basic Code for noncombustible classification of material under section 903.71 or of fireretardant treated wood. When the non-

combustible backing does not constitute an integral part of the structural elements or system, it shall be attached directly to the structural elements or to furring strips as required for the application of finish according to section 923.1, or may be suspended from the structural members at any distance provided concealed spaces created thereby shall be firestopped in accordance with the applicable requirements of the Basic Code. Where class III interior finish is applied to a continuous noncombustible backing beneath wood joist construction, the allowable area for firestopping required in section 913.4 may be increased to three thousand (3000) sq. ft.

SECTION 924.0. COMBUSTIBLE MATERIALS PERMITTED IN TYPE 1 AND TYPE 2 BUILDINGS

In all buildings and structures of fireproof (types 1-A and 1-B) and noncombustible (types 2-A, 2-B and 2-C) construction, except in stair enclosures and required exitways as provided in section 922, the use of combustible interior finish shall be permitted as herein provided; and except as specified in section 418 for theatres and similar places of public assembly (use group F-1 and F-2).

924.1. **Sleepers, Bucks and Grounds.**—Floor sleepers, bucks, nailing blocks and grounds may be constructed of combustible materials, provided the space between the fireresistive floor construction and the flooring is solidly filled with noncombustible materials; or the space under the flooring shall be firestopped in areas of not more than one hundred (100) square feet, provided no such open spaces shall extend under or through permanent partitions or walls.

924.2. **Flooring on Sleepers.**—Wood finish floorings may be attached directly to the embedded or firestopped wood sleepers.

924.3. **Flooring on Fireresistive Arches.**—Wood finish flooring, and wearing surfaces of other approved materials including cork, rubber composition, linoleum, asphalt and composition tile and other materials of similar combustible characteristics one-half (½) inch or less thick shall be permitted when cemented directly to the top surface of approved fireresistive construction or cemented directly to a subfloor of wood backed up solidly with noncombustible materials. Combustible insulating boards not more than one-half (½) inch thick may be used for sound deadening or heat insulating when attached directly to a noncombustible floor assembly or to wood subflooring which is backed up solidly with fireresistive construction and covered with approved finish flooring.

SECTION 925.0. DECORATIVE MATERIAL RESTRICTIONS

In places of public assembly, all draperies, hangings and other decorative materials suspended from walls or ceilings shall be noncombustible or flameresistant meeting the requirements of section 904 as herein specified:

925.1. **Noncombustible.**—The permissible amount of noncombustible decorative hangings shall not be limited.

925.2. **Flameresistant.**—The permissible amount of flameresistant decorative hangings shall not exceed ten (10) per cent of the total wall and ceiling area.

SECTION 926.0. EXTERIOR TRIM RESTRICTIONS

926.1. **Gutters and Leaders.**—All gutters and leaders hereafter placed on buildings and structures other than frame (type 4) buildings, one- and two-family dwellings and private garages and similar accessory buildings shall be constructed of noncombustible materials.

926.2. **Cornices and Half Timbering.**

926.21. **Noncombustible Cornices.**—All cornices, including those on show windows on the exterior of any building or structure, except buildings of frame (type 4) construction, shall be constructed of metal or metal-covered wood or other approved noncombustible materials and shall be secured to the wall with metal or other approved noncombustible anchors and brackets; except that outside the fire limits, such cornices may be of frame construction when the building does not exceed three (3) stories or forty (40) feet in height.

926.22. **Combustible Cornices.**—Continuous exterior cornices constructed of wood or other materials of similar combustible characteristics shall be firestopped as required in section 877.

926.23. **Combustible Half-Timbering.**—In buildings of masonry enclosed (type 3) construction that do not exceed three (3) stories or forty (40) feet in height, exterior half-timbering and similar architectural decorations may be constructed of wood or other equivalent combustible materials, provided such trim is backed up solidly with approved noncombustible materials.

926.3. **Balconies and Bay Windows.**—All balconies, bay and oriel windows attached to or supported by walls of other than frame construction shall be of noncombustible construction, framed with brackets of steel, concrete or other approved noncombustible material, unless specifically exempted in sections 303 and 304.

926.4. **Existing Combustible Construction.**—Any existing cornice or other exterior architectural elements constructed of wood or similar combustible materials may be repaired with the same material to the extent of fifty (50) per cent of its area in any one year if the public safety is not thereby endangered.

SECTION 927.0. ROOF STRUCTURES

All construction, other than aerial supports, clothes dryers and similar structures less than twelve (12) feet high, water tanks and cooling towers as hereinafter provided and flag poles, erected above the roof of any part of any building or structure located within the fire limits or of any building or structure more than forty (40) feet in height outside the fire limits shall be constructed of noncombustible materials.

927.1. Scuttles.

927.11. Size.—Unless provided with other approved means of access to the roof, every building and structure more than three (3) stories in height, except dwellings with peak roofs and all other buildings having roofs with a pitch greater than twenty (20) degrees, shall have an access trap door not less than two (2) by three (3) feet in area, securely attached or anchored to the roof framing, with ladder leading thereto from the top story.

927.12. Construction.—The trap door or scuttle shall be of fireresistive construction in fireproof (types 1-A and 1-B), and noncombustible (types 2-A, 2-B and 2-C) buildings; and of approved noncombustible materials, or of wood covered on top and edges with sheet metal in masonry enclosed (type 3) and protected frame (type 4-A) buildings.

927.2. Skylights.

927.21. Sash and Frames.—Skylights which are inclined more than thirty (30) degrees from the vertical hereafter constructed on all buildings and structures except frame (type 4-B) buildings and all skylights on fireproof and noncombustible (types 1 and 2) buildings shall have the sash and frames thereof constructed of metal or other approved noncombustible materials. In foundries or buildings where acid fumes, deleterious to metal are incidental to the use of the building, treated wood or other approved noncorrosive materials shall be permitted.

927.22. Plain Glass.—Skylights placed over elevator and dumbwaiter shaftways shall be glazed with plain glass not more than one-eighth (⅛) inch thick. Skylights over shaftways other than for elevators and dumbwaiters shall be glazed with plain glass not more than three-sixteenth (3/16) inches thick, and the top of such shafts shall be vented as required in section 911.0.

927.23. Wired Glass.—Skylights in all locations other than over shafts shall be glazed with wired glass conforming to section 919 or of approved glass block construction conforming to sections 812 and 862. No single pane of wired glass shall exceed seven hundred and twenty (720) square inches in area or forty-eight (48) inches in any dimension.

927.24. Screens.—Plain glass skylights shall be protected by substantial corrosion-resistive metal or other approved noncombustible screens having a mesh not less than three-quarter (¾) by three-quarter (¾) inches nor larger than one (1) by one (1) inches, constructed of not lighter than No. 12 B and S gage wires. The screen shall be erected at a distance of not less than four (4) nor more than ten (10) inches above all glazed portions of the skylight and shall project on all sides for a distance of not less than the height of the screen above the glass. A similar screen shall be placed

below the skylight to afford protection to the occupants of the building. The provisions for wired glass or screen protection shall not apply to glass block skylights or to greenhouse construction.

927.3. Penthouses.

927.31. Additional Story.—Penthouses occupying more than one-third (⅓) of the roof area shall be considered a story of the building and the enclosure shall conform to the requirements for exterior walls of the building type as regulated by table 5 and article 8.

927.32. Recessed Walls.—When the exterior wall of a penthouse is recessed five (5) feet or more from the exterior wall of the next lower story which is required to have a greater fireresistance, it may be constructed with a fireresistance rating of not less than one and one-half (1½) hours, covered on the outside with noncombustible, waterproof material and supported on protected steel or reinforced concrete construction.

927.33. Doors, Frames and Sash.—Doors, frames and window sash except where otherwise specifically required to be fireproof or fireresistive under the Basic Code, shall be constructed the same as other similar elements in the building or structure.

927.4. Other Roof Structures.—Roof structures other than penthouses as defined in article 2 shall comply with the following provisions:

927.41. Noncombustible Materials.—Unless constructed of masonry or reinforced concrete in accordance with article 8, roof structures erected on buildings and structures of fireproof and noncombustible (types 1 and 2) construction shall be enclosed in walls of noncombustible materials having a fireresistance rating of not less than three-quarter (¾) hours, protected with weather-resistive roof and wall coverings complying with section 929.

927.42. Combustible Materials.—Roof structures erected on the roof of masonry enclosed buildings (type 3) and protected frame (type 4-A) may be constructed of combustible materials protected to afford a three-quarter (¾) hour fireresistance rating covered on the outside with approved roofing materials.

927.5. Mansards and Sloping Roofs.

927.51. Noncombustible Materials.—Every mansard or other sloping roof having a pitch of more than sixty (60) degrees to the horizontal hereafter erected on any building or structure over forty (40) feet in height shall be constructed of noncombustible materials with a fireresistance rating of not less than three-quarter (¾) hours; except that when the building is more than seven (7) stories or eighty-five (85) feet in height, such mansards shall afford the same fireresistance required for the exterior walls of the building but need not exceed one and one-half (1½) hour fireresistance.

927.52. Combustible Materials.—When the pitch is less than sixty (60) degrees to the horizontal, the mansard or sloping roof located on any nonfireproof building may be constructed of the same materials as the roof of the building; and the face and back of the mansard shall be protected with approved roof coverings complying with section 928.

927.6. Dormer Windows.—All dormer windows hereafter erected shall be of the same type of construction as the roof and side walls of the building on which they are located. They shall be protected with approved

roof coverings of the same type and fireresistance as the roofing of the building.

927.7. Water Tanks.

927.71. Supports.—Water tanks having a capacity of more than five hundred (500) gallons placed in or on a building for the storage of potable water supplies and for use in the building services including air conditioning and fire prevention purposes, shall be supported on masonry, reinforced concrete, steel or other approved noncombustible framing or on timber conforming to heavy timber mill construction (type 3-A); provided that when such supports are located within the building, they shall be fireprotected as required for fireproof (type 1-A) construction.

927.72. Emergency Discharge.—A pipe or outlet shall be located in the bottom, or in the side close to the bottom, or the tank shall be fitted with a quick-opening valve to enable the contents to be discharged in an emergency to a suitable drain complying with the Plumbing Code.

927.73. Location.—No tank shall be located over or near a stairway or elevator shaft unless a solid roof or floor deck of the necessary strength is constructed underneath the tank.

927.74. Tank Cover.—All unenclosed roof tanks exposed to the weather shall have approved covers sloping toward the outer edges.

927.75. Hoop and Strap Protection.—When metal hoops are used in the construction of wood tanks, they shall be protected with acceptable corrosion-resistive coatings or shall be manufactured from approved corrosion-resistive alloys.

927.8. Cooling Towers.

927.81. Located in Fire Districts.—Within Fire District Nos. 1 and 2, cooling towers erected on the roofs of buildings shall be constructed of noncombustible materials, except that drip bars may be of wood.

927.82. Located Outside Fire Districts.—Outside the fire limits cooling towers may be constructed of wood or other approved materials of similar combustible characteristics; except that when the base of the tower is more than fifty-five (55) feet above grade and the tower is located on a building, the drip bars only may be fabricated of combustible materials as herein provided.

927.9. Miscellaneous Roof Structures.—Except as herein specifically provided, all towers, spires, dormers or cupolas shall be erected of the type of construction and fireresistance rating required for the building to which they are accessory as regulated by tables 5 and 6; except that when the height of such appurtenant structures exceeds eighty-five (85) feet above grade or when the area at any horizontal section of the tower, spire, dormer or cupola exceeds two hundred (200) square feet or when it is used for any purpose other than as a belfry or architectural embellishment, the structure and its supports shall be of fireproof (type 1) construction or noncombustible (type 2) construction. Radio and television towers and antennae shall be constructed to comply with sections 427 and 428.

SECTION 928.0. ROOF COVERINGS

All approved roof coverings shall meet the applicable standards cited in appendix C for quality and character and the test specifications of appendixes F and G. The standards and accepted practice of the Underwriters' Laboratories, Inc., governing class A, B and C roof coverings or other accredited testing authorities shall be deemed to meet the requirements of the Basic Code for their recommended and approved uses.

928.1. Existing Roofs.—The repair of existing roofs shall comply with the provisions of section 106 but in no case shall more than twenty-five (25) per cent of the roof covering of any building be replaced in a period of twelve (12) months unless the entire roof covering is made to conform to the requirements for new roofing.

928.2. Within the Fire Limits.—Within the limits of Fire District Nos. 1 and 2, all roof coverings shall be of asbestos, brick, concrete, metal, slate, tile, prepared asphalt, asbestos felt or laminated felt roofing finished with asphalt, slag, gravel or similar noncombustible, moisture-resistant materials or approved combinations of materials, complying with the requirements of section 903.5 for class 1, 2 or 3 roof coverings or their approved equivalent.

928.3. Outside Fire Limits.—Roof coverings which are classified as class 4 under section 903.5 and the approved rules including wood shingles and handsplit shakes as specified in section 855.72, shall be deemed to meet the requirements for use on all one- and two-family dwellings of frame (type 4-B) construction, not exceeding two (2) stories and attic or thirty-five (35) feet in height and four thousand (4,000) square feet in area when the distance of the building from any other building is not less than twelve (12) feet; and on private garages or airplane hangars and structures for similar accessory uses outside the fire limits and in Fire District No. 2, located on the same lot with a dwelling, not exceeding one (1) story or twenty-five (25) feet in height and twenty-five hundred (2500) square feet in area and with a fire separation of not less than twelve (12) feet; and on storage buildings of moderate or low fire hazard (use groups B-1 and B-2) not exceeding one (1) story or twenty-five (25) feet in height and six thousand (6,000) square feet in area when separated not less than twenty (20) feet from any other building.

928.4. Roof Decking and Sheathing.

928.41. Combustible Decking.—Unless attached directly to noncombustible framework, all roof coverings shall be applied to a closely fitted deck; except as provided in section 855.72 for wood shingles and handsplit shakes.

928.42. Fire and Party Wall Restrictions.—No wood planking, sheathing, or other combustible decking when used in roof construction shall extend through or over any party wall or fire wall or across any lot line.

928.5. Roof Insulation.—The use of cork, fiber board and other combustible roof insulation shall be permitted provided it is covered with approved roof coverings directly applied thereto.

928.6. Grounding of Metal Roofs.—Whenever, because of hazard resulting from electrical equipment or apparatus located thereon, or because of proximity to power lines, or for any other reason, it is deemed necessary by the building official, metal roofs shall be grounded by bonding together each course or strip and the bonding conductor or conductors shall be extended to and attached in an approved manner to the grounding electrode used to ground the electrical system within the building on which such metal roofing is applied. The conductors used to bond courses or strips of metal roofing together, or any conductor extended for grounding to the grounding electrode, shall have no greater resistance than the conductor used to ground the electrical system within the building.

928.61. Alternate Methods of Grounding Metal Roofing.—Alternate methods of grounding metal roofing may be used provided they are at least equal in performance to the methods prescribed herein, and further provided that such desired method is first submitted to and approved by the building official.

ARTICLE 10

CHIMNEYS, FLUES AND VENT PIPES

SECTION 1000.0. SCOPE

The provisions of this article shall control the design and construction of all chimneys and gas vents hereafter erected or altered in all buildings and structures.

1000.1. Other Standards.—Unless otherwise specifically provided herein, conformity to the applicable standards for chimney construction and gas vents listed in appendix B shall be deemed to meet the requirements of the Basic Code.

1000.2. Minor Repairs.—Minor repairs for the purpose of maintenance and upkeep which do not increase the capacity of heating apparatus or appliances or which do not involve structural changes in the permanent chimney and gas vents of a building may be made without a permit.

SECTION 1001.0. DEFINITIONS

chimney. A primarily vertical enclosure containing one or more passageways. (See section 1005.0.)

—factory-built chimneys. A chimney that is factory-made, listed by an accredited authoritative testing agency, for venting gas appliances, gas incinerators, and solid or liquid fuel burning appliances.

—masonry chimney. A field constructed chimney built in accordance with nationally recognized code or standards.

—metal chimney. A chimney made of metal of adequate thickness, (see section 1009.0) galvanized or painted unless suitably corrosion-resistant, properly welded or riveted and built in accordance with nationally recognized codes or standards.

chimney connector. A pipe or breaching which connects the heating appliance to the chimney.

draft hood. A device placed in and made part of the vent connector from an appliance, or in the appliance itself, which is designed to (1) insure the ready escape of the products of combustion in the event of no draft, back-draft or stoppage beyond the draft hood; (2) prevent a back-draft from entering the appliances; (3) neutralize the effect of stack action of the chimney flue upon the operations of the appliance.

draft regulator. A device which functions to maintain a desired draft in the appliance by automatically reducing the draft to the desired value.

duct. A tube, pipe, conduit or continuous enclosed passageway used for the conveying of air, gases or vapors.

flexible tubing. A gas conduit other than that formed by a continuous one-piece metal tube.

forced and induced draft fuel burning appliances. Fuel burning appliances listed as exhausting low temperature flue gases and listed for use with type L venting systems.

gas vents. Type B. Listed factory-made gas vents for venting listed or approved appliances, equipped to burn only gas, except those specifically listed for use with chimneys only.

gas vents. Type B-W. Listed factory-made gas vents for venting listed or approved gasfired vented recessed heaters.

gas vents. Type C. Vents constructed of sheet copper not less than No. 24 U.S. standard gage or galvanized steel of not less than No. 20 U.S. standard gage, or other approved noncombustible corrosion-resistant materials.

gas vents. Type L. Low-Temperature Venting Systems. A venting system consisting of listed factory made piping and fittings for use with fuel burning appliances listed as exhausting low temperature flue gases and approved for use with a type L venting system.

hood. A canopy or similar device connected to a duct for the removal of heat, fumes or gases.

metal chimney (smokestack) (See chimney)

vent. A passageway, vertical or nearly so, for removing vent gases to the outer air.

vent connector. (vent connector pipe.) That portion of the vent system which connects the gas appliance to the gas vent or chimney.

vent system. The gas vent or chimney and vent connector, if used, assembled to form a continuous unobstructed passageway from the gas appliance to the outside atmosphere for the purpose of removing vent gases.

SECTION 1002.0. PLANS AND SPECIFICATIONS

The structural plans and specifications shall describe in sufficient detail, the location, size and construction of all chimneys, gas vents and ducts and their connections to boilers, furnaces, gas appliances and fireplaces. The thickness and character of all insulation materials, clearances from walls, partitions and ceilings and proximity of heating devices and equipment to wall openings and exitways shall be clearly shown and described.

1002.1. Methods of Venting.—Chimney or gas vent systems shall be so engineered and constructed as to develop a positive flow adequate to remove all flue gases to the outside atmosphere.

1002.11. Gas Appliances.—All gas appliances required to be vented shall be connected to a gas vent or chimney except as provided in section 1011.34 and as provided in the standards listed in appendix B for special gas venting arrangements.

1002.2 Engineered Vent System. — The requirements specified in the following sections: 1003.0 through 1012.0 shall not necessarily govern where standard engineering methods have been used to design the chimney or vent system.

SECTION 1003.0. PERFORMANCE TEST AND ACCEPTANCE CRITERIA

The building official may require a test or tests of any chimney or gas vent to insure fire safety and the removal of smoke and products of combustion.

1003.1. Acceptance Criteria.—The system shall be accepted if the following three (3) conditions are fulfilled:

1. There shall be no continuous spillage at the draft hood when any one or combination of appliances connected to the system is in operation;
2. Temperature on adjacent combustible surfaces shall not be raised more than limits acceptable to accredited authoritative testing agency; and
3. Condensation shall not be developed in a way that would cause deterioration of the vent or drip from joints or bottom end of vent.

1003.11. Approved Installations.—Factory-built chimneys and gas vents which have been tested and approved by an accredited authoritative testing agency shall be accepted as complying with the requirements of item 2 of section 1003.1 when installed in accordance with their specified clearances.

SECTION 1004.0. KINDS OF CHIMNEYS

Chimneys as used in this article shall be classified as:

1. Factory-built chimney.
2. Masonry chimneys.
3. Metal chimneys (smokestacks).

SECTION 1005.0. APPLIANCES REQUIRING CHIMNEYS

All heating appliances, except electric and gas-fired appliances specifically exempted by the provisions of section 1011, shall be connected to chimneys which conform to the provisions of this article. Chimneys shall be used for venting the following types of appliances:

1. Incinerators, except as noted in section 1005.1;
2. Appliances which may be converted readily to use solid or liquid fuels;
3. Combination gas-oil burning appliances;
4. Appliances listed for use with chimneys only;
5. Oil-fired appliances and equipment except as exempted in section 1011.

1005.1. Exception.—Metal pipe not less than No. 20 U.S. standard gage galvanized steel or other equivalent noncombustible corrosion-resistant material may be used for venting incinerators installed in locations such as open sheds, breezeways, or carports, provided the metal pipe is exposed and readily examinable for its full length and suitable clearances are maintained.

SECTION 1006.0. EXISTING BUILDINGS

1006.1. Raising Existing Chimneys.—Whenever a building is hereafter erected, enlarged or increased in height so that a wall along an exterior lot line, or within three (3) feet thereof, extends above the top of an existing chimney or gas vent of an adjoining existing building, the owner of the building so erected, enlarged or increased in height shall carry up at his own expense, with the consent of the adjoining property owner, either independently, or in his own building, all chimneys connected to liquid or solid fuel burning appliances. Gas vents within six (6) feet of any portion of the wall of such adjoining building shall be extended two (2) feet above the roof or parapet of the adjoining building.

1006.2. Size of Extended Chimneys.—The construction of an extended chimney shall conform to the requirements of this article for new chimneys, but in no case shall the internal area of such extension be less than that of the existing chimney.

1006.3. Notice of Adjoining Owner.—It shall be the duty of the owner of the building which is erected, enlarged or increased in height to notify in writing and to secure the consent of the owner of existing chimneys affected, at least ten (10) days before starting such work.

1006.4. Existing Chimneys.—No existing chimney, except one which does not endanger the fire safety of a building or structure and is acceptable to the building official, shall be continued in use unless it conforms to all requirements of this article for new chimneys.

1006.5. Cleanouts and Maintenance.—Whenever a new chimney is completed or an existing chimney is altered, it shall be cleaned and left smooth on the inside. If the chimney is constructed of masonry or tile the interior mortar joints must be left smooth and flush. Cleanouts or other approved devices shall be provided at the base of all chimneys to enable the passageways to be maintained and cleaned.

SECTION 1007.0. FACTORY-BUILT CHIMNEYS

1007.1. Factory-built Chimneys. — Factory-built chimneys that have been tested and approved by an accredited authoritative agency shall be installed in accordance with the clearance and details of their approval and the manufacturer's instructions.

SECTION 1008.0. MASONRY CHIMNEY

1008.1. Classification.—For the purpose of determining the requirements for the construction of a masonry chimney, chimneys shall be classified according to the following subsections.

1008.11. Low Temperature.—Chimneys constructed to safely remove products of combustion having a temperature not more than one thousand (1000) degrees F., and for use only with residential heating appliances, low temperature heat producing appliances and low-heat industrial appliances, shall be classified as low temperature chimneys.

1008.12. Medium Temperature.—Chimneys constructed to safely remove products of combustion having a temperature not more than two thousand (2000) degrees F., and for use with medium-heat or low-heat industrial appliances, shall be classified as medium temperature chimneys.

1008.13. High Temperature.—Chimneys constructed to safely remove products of combustion having temperatures above two thousand (2000) degrees F., and for use with high-heat, or other industrial appliances, shall be classified as high temperature chimneys.

1008.2. Masonry Chimney Construction.

1008.21. Masonry Chimneys.—Masonry chimneys for solid and liquid fuel-fired equipment and appliances shall be constructed of masonry, reinforced concrete, or other approved noncombustible materials; and may be erected as free standing or as constituting an integral part of a wall, or may be enclosed within a structure without constituting a component part thereof. In every case a chimney shall be wholly supported on fireresistive construction or on approved foundations complying with article 7 and shall not be designed to support any direct load other than its own weight.

1008.3. Low Temperature Chimneys.

1008.31. Solid Masonry.—When constructed of solid masonry, the walls shall be not less than eight (8) inches thick, except as herein provided in dwellings and small business buildings.

1008.32. Reinforced Concrete.—When constructed of reinforced concrete the walls shall be not less than six (6) inches thick, except as provided for dwellings.

1008.33. Dwellings.—In residential buildings (use groups L-2 and L-3), the walls of a chimney in which the area of the flue is not more than two hundred (200) square inches may be of solid masonry or reinforced concrete not less than four (4) inches thick when provided with a fire clay lining.

1008.34. Lining.—Low temperature masonry chimneys with less than eight (8) inch walls shall be lined with an approved flue lining that conforms to the requirements of this section and the outside face of interior walls shall be smoothly parged or stuccoed so as to be gas tight, or the flue walls within the building shall be eight (8) inches thick.

1008.35. Flue Lining Materials.—Flue linings shall be made of fire clay or other approved refractory materials other than shale, capable of withstanding the action of flue gases and of resisting the temperatures to which they are subjected but not less than two thousand (2000) degrees F. without softening or cracking. The thickness of the shell of flue linings shall be not less than five-eighth (⅝) inches.

1008.36. Flue Lining Construction.—Flue linings shall be constructed in advance of the chimney and shall start from a point not less than eighteen (18) inches below the inlet of the smokepipe or throat of a fireplace. The lining shall be constructed as nearly vertical as possible and shall extend not less than four (4) inches above the top or cap of the flue.

1008.4. Medium Temperature Chimneys.

1008.41. Solid Masonry.—When constructed of solid masonry, the walls shall be not less than eight (8) inches thick and shall be lined as provided in this section.

1008.42. Reinforced Concrete.—When constructed of reinforced concrete the walls shall be not less than six (6) inches thick with approved lining.

1008.43. Lining.—Medium temperature masonry chimneys shall be lined with not less than four and one-half (4½) inches of fire brick laid up in fire clay mortar from at least two (2) feet below to not less than twenty-five (25) feet above inlet opening to the chimney; or the walls shall be of double-wall construction with an intervening air space of not less than two (2) inches.

1008.5. High Temperature Chimneys.—All high temperature masonry chimneys shall be built with double masonry or double reinforced concrete walls, each of the same thickness required for medium temperature chimneys, with an intervening air space of not less than two (2) inches; or of a single wall with an interior metal chimney and intervening air space. The inside face of the interior wall of double-wall construction shall be of fire brick at least four and one-half (4½) inches thick laid in fire clay or approved high temperature cement mortar; and the interior metal chimney shall be lined as specified in section 1009.5.

1008.6. General Requirements.

1008.61. Chimney Height.—All chimneys shall extend at least three (3) feet above the adjacent roof, and at least two (2) feet above any roof ridge within ten (10) feet thereof. If the height above the roof is more than four (4) times the minimum dimension, the chimney shall be braced and anchored to the roof framing.

1008.62. Chimney Caps.—All masonry chimneys shall be capped with concrete, terra cotta tile or other approved noncombustible weatherproof material; or a sloped wash shall be provided from the outside of the chimney to the projecting lining specified in section 1008.36.

1008.63. Chimney Supports. — All masonry chimneys shall rest on a foundation located on permanently undisturbed soil or shall be supported on fireresistive construction; and no such chimney shall rest on or be hung or otherwise supported from combustible floor or wall construction except as provided in section 1007.0. No masonry chimney shall be corbeled from hollow or cavity wall construction, nor from a wall built to hollow masonry units; and the corbeling of chimneys shall conform to the requirements of section 839.1. Masonry chimneys erected outside of frame dwellings shall be anchored to the stud walls at each floor level or at vertical intervals of not more than ten (10) feet.

1008.64. Clearances.—Combustible framing shall be trimmed away from all flues and chimneys, and no combustible material shall be placed within two (2) inches of any chimney, nor within six (6) inches of any inlet opening to such chimney. Finished flooring shall have not less than one-half (½) inch clearance from the chimney walls.

1008.65. Size.—The passageway within the chimney shall be ascertained to be open to the exterior and shall be of adequate size to remove all the products of combustion of the appliances attached thereto.

1008.66. Thickness and Shape.—For chimneys larger than one hundred and twenty (120) square inches, except as specified in section 1008.33, the walls shall be not less than eight (8) inches thick in any case. No change in the size or shape of a chimney shall be made within six (6) inches of the roof framing through which it passes.

SECTION 1009.0. METAL CHIMNEYS

1009.1. Thickness of Metal.

1009.11. Exterior Metal Chimneys.—Exterior metal chimneys shall be of adequate thickness to resist all wind stresses specified in article 7 but shall be not less than one-eighth (⅛) inch thick for diameters up to three (3) feet, three-sixteenths (3/16) inch thick for diameters up to four (4) feet and not less than one-quarter (¼) inch thick for larger diameters.

1009.12. Interior Metal Chimneys.—Interior metal chimneys shall be constructed of metal not less than No. 16 U. S. gage for areas not more than one hundred and fifty-five (155) square inches; No. 14 U. S. gage for areas not more than two hundred (200) square inches; No. 12 U. S. gage for areas not more than two hundred and fifty-five (255) square inches; and not less than No. 10 U. S. gage for greater areas.

1009.2. Construction.—All metal chimneys shall be riveted or welded construction and all exterior metal chimneys shall be securely guyed, braced, anchored and supported. They shall be galvanized, painted with an approved paint, or constructed of approved corrosion-resistive alloys.

1009.3. Opening.—A cleanout shall be provided at the base of every metal chimney.

1009.4. Metal Chimney Foundation.—A metal chimney erected on the exterior of a building or structure shall be supported on an independent substantial masonry or reinforced concrete foundation. Interior metal chimneys may be supported on fireproof (type 1-A) construction at intermediate levels.

1009.5. High Temperature Lining.—When metal or masonry chimneys are used to remove high temperature combustion gases they shall be lined with four and one-half (4½) inches of fire brick laid in fire clay mortar. Such lining shall extend at least twenty-five (25) feet above the smoke-pipe entrance.

1009.6. Height of Metal Chimney.—All metal chimneys shall extend to a height of not less than four (4) feet above any roof within twenty-five (25) feet, or any roof ridge within ten (10) feet horizontally thereof, except as provided in section 1014 for high temperature chimneys.

1009.7. Metal Chimney Clearances.—Every metal chimney or part thereof erected on the exterior of a building, shall have a clearance from a wall of frame or combustible construction of not less than twenty-four (24) inches and of not less than four (4) inches if the wall is of noncombustible construction. No such stack shall be located less than twenty-four (24) inches in any direction from a wall opening or required exitway, or fire escape.

1009.8. Interior Metal Chimney Enclosures.—Every interior metal chimney or part thereof, erected within a multi-story building shall be enclosed with walls of not less than three (3) hours fireresistance in all stories above that in which the appliance served thereby is located. Where the metal chimney passes through a combustible roof, it shall be guarded by a galvanized metal or other approved noncombustible, ventilating thimble that extends at least nine (9) inches below and above the roof construction. The thimbles shall be of a size to provide clearance on all sides of the metal

chimney of not less than six (6) inches for low heat appliances and not less than eighteen (18) inches for medium and high heat appliances as defined in article 11, unless the metal chimney is insulated and protected to prevent a temperature of more than two hundred and fifty (250) degrees F. on the exterior surface.

1009.9. Prohibited Location.—No interior metal chimney shall be carried up inside a ventilating duct unless such ducts are constructed as required by this article for metal chimneys; and only when such duct is used solely for venting the room or space in which the appliance served by the metal chimney is located. Metal chimneys shall not be installed in air supply ducts.

SECTION 1010.0. CHIMNEY CONNECTOR (SMOKEPIPES)

The chimney connector from every heating appliance, except for vent connectors from gas-fired appliances, shall connect to a chimney conforming to the provision of article 10.

1010.1. Chimney Connectors.—Chimney connectors shall be constructed of galvanized iron, or other approved noncombustible, corrosion-resistive materials having a melt point of not less than two thousand (2000) degrees F. No tile pipe shall be used as a chimney connector.

1010.2. Thickness of Metal.—The minimum thickness of metal for chimney connectors shall comply with the requirements of section 1019 for vent construction.

1010.3. Length of Chimney Connector.—All chimney connectors shall be as short and as straight as possible consistent with their use and the required draft conditions. No chimney connector shall pass through a floor or ceiling construction.

1010.4. Chimney Connection.—In entering a passageway in a masonry or metal chimney, the chimney connector shall be installed above the extreme bottom to avoid stoppage. Means shall be employed which will prevent the chimney connector from entering so far as to restrict the space between its end and the opposite wall of the chimney. The chimney connector shall be firmly attached or inserted into a thimble or slip joint to prevent it from falling out. All connections shall fit tightly. Chimney connections to any one passageway shall be limited to one floor, except as provided in section 1002.2.

1010.5. Number of Chimney Connectors.—Two (2) or more chimney connectors may be joined to a single connection provided that the chimney connectors are on one floor level and the passageway is of sufficient size to serve all of the appliances thus connected.

1010.6. Chimney Connector Clearances.

1010.61. From Combustible Construction.—Unless a chimney connector is covered on the exterior with at least one (1) inch of approved insulating noncombustible material, the following clearances shall be maintained from all combustible material or construction:

Diameter Inches	Clearance Inches
0 - 12	12
12 - 36	20
More than 36	36

1010.62. Reduced Clearances.—The clearances specified herein may be reduced one-half (½) when an approved metal or other approved noncombustible enclosing shell is installed so as to provide a continuous one (1) inch ventilated air space around the chimney connector with access openings for inspecting purposes; or the exposed combustible construction shall be protected with metal or other noncombustible materials as provided in section 1114. In no case shall the chimney connector of a medium or high heat appliance pass through any wall or partition of combustible construction.

1010.7. Low Heat Chimney Connector Clearance.—Chimney connectors from a low heat appliance may pass through combustible walls or partitions when protected at the point of passage by approved thimbles, firestopped with noncombustible material; or when such partition is constructed to afford a fireresistance of not less than three-quarter (¾) hours for a distance corresponding to the required clearance in section 1010.6 with noncombustible materials.

1010.8. Connections to Incinerator Chimney.—The chimney connector of a heating appliance shall not be connected to the flue of an incinerator which has a rubbish chute identical with the flue.

SECTION 1011.0. VENT SYSTEMS

For the purpose of determining vent requirements gas-fired and oil-fired appliances shall be classified as "listed" or "unlisted". A listed appliance is one that is shown in a list published by an accredited authoritative testing agency, qualified and equipped for experimental testing of such appliances, and maintaining an adequate periodic inspection of current production of listed models and whose listing states either that the appliance or accessory complies with nationally recognized safety requirements or has been tested and found safe for use in a specific manner. Compliance may be determined by the presence on the appliance or accessory of a label of the testing agency stating that the appliance or accessory complies with nationally recognized safety requirements. An unlisted appliance or accessory is one that is not shown on such a list or does not bear such a label. In cases where no applicable standard has been developed for a given class of appliance or accessory, approval of the authority having jurisdiction should be obtained before the appliance or accessory is installed.

1011.1. Appliances Required to be Vented.—Appliances of the following types shall be connected to a listed venting system or provided with other means for exhausting the flue gases to the outside atmosphere:

1—Central heating appliances, including steam and hot water boilers, warm air furnaces, floor furnaces, and vented recessed heaters;
2—Duct furnaces and self-contained unit heaters;
3—Gas incinerators;
4—All water heaters;
5—Built-in domestic cooking units listed and marked as vented units;
6—Room heaters listed for vented use only as required in section 1011.2;

7—Appliances equipped with gas conversion burners;
8—Appliances which have draft hoods supplied by the appliance manufacturer, except room heaters not required by section 1011.2 to be vented;
9—Unlisted appliances.

1011.2. Exemption.—Connections to vent systems shall not be required for electric, gas and industrial appliances of such size or character that the absence of such connection does not constitute a hazard to the fire safety of the building or its occupants. The following appliances are not required to be vented:

1—Listed gas ranges;
2—Built-in domestic cooking units listed and marked as unvented units;
3—Listed hot plates and listed laundry stoves;
4—Listed domestic clothes dryers;
5—Listed gas refrigerators;
6—Counter appliances;
7—Room heaters listed for unvented use;
8—Other appliances listed for unvented use and not provided with flue collars.
9—Specialized equipment of limited input such as laboratory burners or gas lights.

When any or all of the appliances listed in items 5, 6, 7 and 8 above are installed so that the aggregate input rating exceeds thirty (30) B.T.U. per hour per cubic foot of room or space in which they are installed, one or more of them shall be vent connected or provided with approved means for exhausting the vent gases to the outside atmosphere so that the aggregate input rating of the remaining unvented appliance does not exceed thirty (30) B.T.U. per hour per cubic foot of room or space in which they are installed. Where the room or space in which they are installed is directly connected to another room or space by a doorway, arch, or other opening of comparable size, which cannot be closed, the volume of such adjacent room or space may be included in the calculations.

1011.3. Types of Gas Vents.

1011.31. Type B Gas Vents.—Type B gas vents may be used to vent listed gas appliances except as provided in sections 1005.0, 1011.32 and 1012.6; and they shall be installed in accordance with their listings and the manufacturer's instructions.

1011.32. Type B-W Vents.—Type B-W gas vents shall be used with listed vented recessed heaters; and they shall be installed in accordance with their listings and the manufacturer's instructions.

1011.33. Type C Vents.—Type C gas vents may be used to vent listed gas appliances except as provided in section 1005.0, and shall be constructed of not less than No. 24 U.S. gage sheet copper, or No. 20 U.S. gage galvanized steel or of other approved noncombustible corrosion-resistive material of equivalent strength and durability. Type C vents may pass directly through the roof or exterior wall to outer air; but shall not pass through any attic or other concealed space nor through any intermediate floor construction.

1011.34. Type L Low-temperature Venting Systems.—Type L low-temperature venting systems shall be used only with fuel burning appliances listed as exhausting low-temperature flue gases and listed for use with Type L low-temperature venting systems. Type L low-temperature venting systems shall be installed in accordance with the terms of their listing and manufacturer's instructions.

1011.35. Ventilating Hoods.—Ventilating hoods and exhaust systems may be used to vent commercial appliances.

1011.36. Chimneys.—Chimneys shall be constructed in accordance with the requirement of article 10.

1011.37. Existing Chimneys.—Where an existing masonry chimney is unlined and where local experience indicates that vent gas condensate will be a problem, an approved liner or another vent shall be installed. Where inspection reveals that an existing chimney is not safe for the intended application it shall be rebuilt to conform to the requirement of this code, or relined with a suitable liner or replaced with a gas vent or chimney suitable for the appliances to be attached.

1011.38. Cleanouts.—Cleanouts shall be of such construction that they will remain tightly closed when not in use. Tee fittings used as cleanouts or condensate drains shall have tight fitting caps to prevent entrance of air into the chimney or gas vent at that point.

1011.39. Gas Appliances Connected to Chimneys.—An automatically controlled gas appliance connected to a chimney which also serves equipment for the combustion of solid or liquid fuel shall be equipped with an automatic pilot. A gas appliance vent connector and a chimney connector from an appliance burning another fuel may be connected into the same chimney through separate openings, or may be connected through a single opening if joined by a suitable fitting located as close as practical to the chimney. If two (2) or more openings are provided into one (1) chimney they should be at different levels.

1011.4. Installation Requirements.

1011.41. Size of Vents.—The gas vent or chimney when connected to a single appliance shall not be less than the size of the draft hood outlet.

When more than one appliance is connected to a gas vent or chimney, the area shall be not less than the area of the largest vent connector plus fifty (50) percent of the areas of additional vent connectors.

In lieu of the above, the gas vent or chimney may be sized in accordance with section 1002.2.

Any shape gas vent may be used provided its venting capacity is equal to the capacity of round pipe for which it is substituted and the minimum internal dimension of the gas vent is not less than two (2) inches.

1011.42. Gas Vent Termination.—The gas vent or chimney shall extend high enough above the building or other neighboring obstruction so that wind from any direction will not create a positive pressure in the vicinity of the gas vent or chimney termination. Except as provided in section 1008.61, gas vents or chimneys shall extend at least two (2) feet above the highest point where they pass through a roof of a building and at least two (2) feet higher than any portion of a building within ten (10) feet; provided the following conditions are met:

1—No gas vent or chimney shall terminate less than four (4) feet in vertical height above the highest connected appliance draft hood outlet or flue collar;

2—No type B-W gas vent serving a vented recessed heater shall terminate less than twelve (12) feet in vertical height above the bottom of the heaters.

1011.43. Exception.—A listed gas vent equipped with a listed or approved top may be terminated below the peak of a pitched roof in accordance with the terms of the listing or approval.

1011.44. Top Assembly.—Gas vents and factory-built chimneys shall extend above the roof surface and through the flashing and shall terminate in a top or roof assembly with a venting capacity not less than that of the vent. The top shall prevent rain and debris from entering the vent.

1011.45. Support of Gas Vents.—All portions of gas vents and chimneys shall be adequately supported for weight and design of materials employed. Listed gas vents and factory-built chimneys shall be supported and spaced in accordance with their listings and manufacturer's instructions and section 1007, 1008 and 1009.

1011.46. Gas Vents Serving More Than One Appliance.—Where two (2) or more vent connectors enter a common vertical gas vent or chimney, the smaller connector should enter at the highest level consistent with available headroom or clearance to combustible material. Two (2) or more gas appliances may be vented through a common vent connector or manifold located at the highest level consistent with available headroom or

clearance to combustible material. The manifold, all junction fitting, and the common vent connector shall be of a size adequate for the combined volume of the vent gases.

1011.47. Outside Gas Vents.

1011.48. Materials.—Outside gas vents and chimneys shall not be used in exposed locations except when permitted by the building official. When they are permitted to be used, the material shall possess high insulation qualities or be adequately insulated.

1011.49. Condensate Drain.—Where local experience with gas vent materials indicates that the condensate may be a problem, a capped tee and drain pipe shall be installed at the base of the riser to drain off condensate.

1011.5. Prohibited Installations.

1011.51. Prohibited Termination.—Natural draft vents extending through outside walls shall not terminate below eaves adjacent to such walls or parapets.

SECTION 1012.0. VENT CONNECTORS

1012.1. Construction.—Vent connectors used for conversion burners without draft hoods, incinerators and unlisted appliances shall be constructed of materials having resistance to corrosion and heat not less than that of No. 24 U. S. standard gage galvanized steel.

Vent connectors used for listed gas appliance having draft hoods and for listed conversion burners having draft hood, shall be constructed of listed type B gas vent material or materials having resistance to corrosion and heat not less than that of No. 26 U. S. standard gage galvanized steel.

1012.2. Length and Pitch.—The vent connector between the appliance and the vertical gas vent or chimney shall have the greatest possible initial rise consistent with the headroom available in the appliance area, and required clearance to combustible material. The horizontal run of the vent connector shall be as short as possible and the appliance shall be located as near the gas vent or chimney as practicable. The maximum length of an uninsulated horizontal run of vent connector shall not exceed seventy-five (75) percent of the height of the gas vent or chimney.

1012.3. Clearances.—Minimum clearances at vent connectors to combustible materials shall comply with applicable provisions of section 1012 but shall not be less than the following:

VENT CONNECTOR CLEARANCES FOR GAS APPLIANCES

Appliance	Minimum Distances from Combustible Materials	
	Listed Type B Gas Vent Material	Vent Connectors of other than Type B Materials
Listed Boiler	As listed	6 inches
Listed Warm Air Furnace	As listed	6 inches
Listed Water Heater	As listed	6 inches
Listed Room Heater	As listed	6 inches
Listed Floor Furnace	As listed	6 inches
Listed Incinerator	Not permitted	18 inches
Listed Conversion Burner (with draft hood)	6 inches	9 inches
Unlisted Appliances having draft hoods	6 inches	9 inches
Unlisted Appliances without draft hoods	Not permitted	18 inches

1012.4. Reduced Clearances.—The clearances specified in section 1012.3 may be reduced when the combustible construction is protected as herein provided:

Type of Protection	*Reduced Clearance*
¼-inch asbestos millboard with 1-inch noncombustible furring	6 inches reduced to 3 inches 9 inches reduced to 6 inches 18 inches reduced to 12 inches
No. 28 U. S. gage metal on ¼-inch asbestos millboard spaced out with noncombustible spacers.	6 inches reduced to 2 inches 9 inches reduced to 4 inches 18 inches reduced to 12 inches
No. 28 U. S. gage sheet metal spaced out 1-inch with noncombustible spacers.	6 inches reduced to 2 inches 9 inches reduced to 4 inches 18 inches reduced to 9 inches

1012.5. Size of Connectors.—The vent connector shall be not smaller than the size of the flue collar or the draft hood outlet of the gas-fired equipment. Where the appliance has more than one draft hood outlet, and in the absence of the manufacturer's specific instructions, the vent connector shall equal the combined area of the draft hood outlets for which it acts as a common connector to the gas vent or chimney.

In lieu of the above, vent connectors may be sized in accordance with section 1002.2.

1012.6. Labeling Gas Vents.—Gas vent systems installed and approved for use with gas appliances, but which are not suitable for solid or liquid fuel-fired equipment shall be plainly and permanently labeled to that effect. They shall be plainly and permanently identified by a label reading:

"This gas vent is for appliances which burn gas only. Do not connect to incinerator or solid or liquid fuel burning appliance."

This label shall be attached to the wall or ceiling at a point near where the gas vent system enters the wall, ceiling or chimney.

1012.7. Special Venting Arrangements.

1012.71. Appliances with Sealed Combustion Chambers.—The provisions of draft hoods as shown in article 10, do not apply to listed appliances having sealed combustion chambers and which are so constructed and installed that all air for combustion is derived from outside the space being heated and all flue gases are discharged to the outside atmosphere. Such appliances, having integral venting, shall be considered as being properly vented when they are installed in accordance with their listings and the manufacturer's instructions.

1012.72. Gas Vent and Chimney Exhausters.—Gas vent and chimney exhausters may be used with gas appliances in lieu of natural draft vents, except for incinerators. Where an exhauster is used with gas appliances requiring venting, provisions shall be made to prevent the flow of gas to the main burner in the event of failure of the exhaust system. A vent connector serving a gas appliance vented by natural draft shall not be connected into the discharge side of a power exhauster.

1012.73. Ventilating Hoods and Exhaust Systems.—Ventilating hoods and exhaust systems may be used to vent gas appliances installed in commercial applications. When automatically operated appliances, such as water heaters, are vented through natural draft ventilating hoods, dampers shall not be installed in the ventilating system. When the ventilating hood or exhaust system is equipped with power means of exhaust, the appliance control system shall be so interlocked as to permit appliance operation only when the power means of exhaust is in operation. When required or used, ventilating hoods shall be built and installed in accordance with section 1127.1.

SECTION 1013.0. FIREPLACES

1013.1. Construction.—The back and jambs of fireplaces shall be constructed of solid masonry or reinforced concrete not less than eight (8) inches thick, with a lining of fire brick, soapstone, cast iron or other approved noncombustible material not less than two (2) inches thick. Such lining may be omitted when the solid masonry or reinforced concrete is not less than twelve (12) inches thick, or the equivalent insulation is provided integrally in approved heating equipment or firing devices installed in the fireplaces. In one- and two-family dwellings (use group L-3), when approved steel fireplace units which are equipped with an air circulating chamber are installed integrally with the fireplace construction, the back and jambs of the fireplace may be reduced to four (4) inches of approved masonry.

1013.2. Hearth.—Every fireplace shall be constructed with a hearth of brick, stone, tile or other noncombustible material. For fireplaces with an opening of less than six (6) square feet the hearth shall extend not less than sixteen (16) inches in front and not less than eight (8) inches on each side of the fireplace opening. For fireplaces with an opening of six (6) square feet or more the hearth shall extend not less than twenty (20) inches in front and not less than twelve (12) inches on each side of the fireplace opening. Such hearths shall be supported on trimmer arches of brick, stone, tile or concrete not less than four (4) inches thick, or other equally strong and fireresistive materials. All combustible forms or centering shall be removed after completion of the supporting construction.

1013.3. Fireplace Damper.—Every fireplace shall be equipped with an approved damper, except as provided for vent flues from gas-fired appliances in section 1012.7.

1013.4. Fireplace Clearances.

1013.41. Floor Framing.—All header and trimmer beams of combustible floor construction shall be located at least four (4) inches from the face of chimneys and backs of fireplaces and the spaces shall be firestopped with approved noncombustible materials.

1013.42. Combustible Trim.—Wood or other combustible material shall not be installed on or about a fireplace less than six (6) inches from the fireplace opening; and combustible materials, located within the twelve (12) inch boundary of the opening shall not project more than one-eighth (⅛) inch from the face of the masonry for each one (1) inch distance from the opening.

1013.5. Fireplace Heaters.—No heater shall be placed in a fireplace unless it conforms to the requirements of article 11 for such device and is provided with a flue; except an electric or gas-fired heater which is exempted from vent requirements under the provisions of section 1011.

1013.6. Imitation Fireplaces.—The depth of an imitation fireplace or recess for heating equipment shall be not more than six (6) inches, unless such recess meets all the construction requirements for fireplaces. The surfaces of the recess shall be of masonry or fireresistive plaster and all combustible materials shall have the clearances or shall be fire-protected as specified herein. No flue other than an approved gas vent shall be installed within such imitation fireplaces.

SECTION 1014.0. CUPOLA CHIMNEYS

1014.1. Height of Cupolas.—A chimney or a metal smokestack for a cupola furnace, blast furnace or similar high heat industrial device shall extend not less than twenty-five (25) feet above any roof within a radius of fifty (50) feet and shall be covered on the top with heavy wire netting or other spark arrester as provided in section 1020.

1014.2. Cupola Clearances.—No combustible material shall be erected or placed within three (3) feet of any cupola or other high temperature chimney.

SECTION 1015.0. NON-FUEL-FIRED INCINERATOR CHIMNEYS

All incinerators that are constructed as an integral part of the building structure, other than portable, domestic incinerator units of less than two (2) square feet grate area or gas-fired incinerators of not more than four (4) bushel capacity shall comply with the requirements of this section. Chimneys for non-fuel-fired incinerators shall be constructed as herein specified.

1015.1. Nine Square Feet Grate Area.—When the grate area of the combustion chamber is not more than nine (9) square feet, and the height of the building is not more than three (3) stories, the flue shall be enclosed with not less than eight (8) inches of unlined clay brick masonry or of shale brick masonry lined with approved fire-clay flue lining complying with section 1008.

1015.2. Over Nine Square Feet Grate Area.—When the grate area of the combustion chamber is more than nine (9) square feet, or when such grate area is less than nine (9) square feet but is installed in a building over three (3) stories in height, the flue shall be enclosed with at least four (4) inches of clay or shale brick masonry and lined with not less than four and one-half (4½) inches of fire brick for at least forty (40) feet above the roof of the combustion chamber; and beyond the forty (40) foot level, the flue shall be enclosed with at least eight (8) inches of clay or shale brick masonry.

1015.3. Spark Arrestors.—All flues of non-fuel-fired incinerators shall terminate in an approved spark arrestor substantially constructed of noncombustible materials complying with section 1020.

SECTION 1016.0. FUEL-FIRED INCINERATOR CHIMNEYS

Chimneys for fuel-fired incinerators shall be constructed of at least four (4) inches of clay or shale brick masonry which is lined with not less than four and one-half (4½) inches of firebrick for at least forty (40) feet above the roof of the combustion chamber; and beyond the forty (40) foot level shall be enclosed with not less than eight (8) inches of clay or brick masonry.

SECTION 1017.0. MISCELLANEOUS INCINERATOR FLUES

1017.1. Flue Enclosures.—All incinerator flues not provided for in sections 1015 and 1016, including flues for rubbish and waste material incinerators, shall be enclosed with not less than eight (8) inches of clay or shale brick masonry, unless otherwise approved by the building official.

1017.2. Connection to Chimneys and Stacks.—Nothing in this article shall prohibit the connection of an incinerator by means of an approved breeching to a smokestack or chimney flue which serves a heat appliance; provided the cross-sectional area of such stack or flue is at least four (4) times that of the incinerator breeching and such stack or flue and the connection meet the requirements of this article for incinerator flues.

SECTION 1018.0. DUCT AND PIPE SHAFTS

In all buildings other than one- and two-family dwellings, vertical ducts or pipes arranged in groups of two or more which extend through two (2) or more stories and occupy an area of more than one (1) square foot shall be enclosed in construction of not less than three-quarter (¾) hour fire-resistance to comply with section 911.

SECTION 1019.0. CONSTRUCTION OF METAL DUCTS AND VENTS

All metal vents, ducts and duct systems required under the provisions of articles 10 and 11 for heating systems and equipment, and under the provisions of articles 5 and 18 for ventilating and air-conditioning systems shall be constructed and installed in accordance with the requirements of the Basic Code and accepted engineering practice.

1019.1. Material.—Ducts and vents shall be constructed of aluminum, copper, monel metal, galvanized steel, cement-asbestos or other approved, noncombustible, corrosion-resistive materials of adequate strength, durability and for the temperatures involved; and the seams shall be securely welded or riveted and made substantially air and gas tight.

1019.2. Thickness of Metal.—The weight and thickness of material, type of joints, connections, bracing and other structural features shall conform to the approved rules; but shall be at least equivalent to the minimum thickness prescribed in table 18. Aluminum shall be of not less than No. 26 B & S gage, copper of not less than 16 ounce sheets, galvanized iron and monel metal of not less than No. 28 U. S. gage, except as provided for one- and two-family dwellings in table 19.

TABLE 18.—METAL DUCT AND VENT CONSTRUCTION, OTHER THAN DWELLINGS

Diameter, or diagonal of rectangular ducts, dimension in inches	Minimum thickness	
	Galvanized Steel U. S. gage number	Aluminum B & S gage number
Up to 12	28	26
12-20	26	24
20-30	24	22
30-48	22	20
48-60	20	18
60-90	18	16
90 and over	16	14

1019.3. One- and Two-Family Dwellings.

1019.31. Material.—Warm air supply ducts in heating and air-conditioning systems of one- and two-family dwellings shall be constructed of aluminum, copper, galvanized steel, as specified in table 19, or other approved noncombustible materials of equal strength and durability.

1019.32. Supports.—All ducts shall be securely supported by metal or other approved noncombustible straps, hangers, lugs and brackets.

TABLE 19.—DUCTS FOR DWELLINGS

Diameter, or diagonal of rectangular ducts, dimensions in inches	Minimum thickness and weight		
	Tin weight per square in pounds	Galvanized steel U. S. gage number	Aluminum B & S gage number
Up to 12	IC 107	30	26
12-18	IX 135	28	26
18 and over	IX 135	26	24

1019.33. Clearances.—Horizontal runs of such ducts shall be located not less than one (1) inch from adjacent combustible construction unless insulated or protected as required in section 1019.4; and ducts in vertical partitions or concealed ceiling spaces shall be insulated in all cases with not less than twelve (12) pound asbestos paper with five-sixteenths (5/16) inch intermediate air space or protected with one-quarter (¼) inch air-cell asbestos or equivalent.

1019.4. High Temperature Ducts.

1019.41. Construction.—A single metal duct for a high temperature system which is enclosed in a combustible partition, or in a concealed ceiling space shall be of double construction with a continuous intervening air space of not less than one (1) inch; or the duct shall be covered on the exterior with approved noncombustible, insulating materials not less than one-fourth (¼) of an inch thick of air-cell asbestos or its equivalent. Approved asbestos cement ducts, not less than one-quarter (¼) inch thick, shall be insulated by an air-space of not less than one-eighth (⅛) inch. When not insulated, clearances shall comply with section 1011.

1019.42. Exception.—When sufficiently insulated to prevent more than two hundred and fifty (250) degrees F. temperature on the exterior, the clearances herein specified shall not be required.

1019.5. Duct Lining.—The lining of high temperature ducts shall be of approved noncombustible materials.

1019.6. Cold Air Ducts.—The construction of cold air ducts shall comply with all the provisions governing warm air supply ducts except as to heat insulation.

1019.7. Firestopping.—Whenever the passage of ducts in walls, floors or partitions requires the removal of firestopping, the surrounding spaces shall be completely filled with approved noncombustible materials; and the required clearance shall be maintained by a metal thimble which is filled with approved noncombustible insulating materials, or closed at both ends with metal collars.

1019.8. Ducts from Warm Air Furnaces.—The clearances of a metal duct from combustible materials for a distance of six (6) feet from warm air furnaces shall comply with section 1114. A duct which enters a floor, wall or partition of combustible construction within six (6) feet from the furnace shall change direction through an angle of ninety (90) degrees or more before it enters such floor, wall or shaft and shall be enclosed with approved fireresistive assemblies as required in section 1018 for duct shafts.

1019.9. Fire-Clay Vents.—Where permitted for use with gas-fired appliances, fire-clay vents shall have a thickness of not less than one-half (½) inch for an internal diameter of six (6) inches or less and three-quarter (¾) inch for an internal diameter of more than six (6) inches. The joints shall be made gastight with caulked bell and spigot, sheet metal sleeves or galvanized iron bands of not less than No. 26 U.S. gage, all thoroughly cemented and secured in place with high temperature cement mortar.

SECTION 1020.0. SPARK ARRESTORS

All chimneys, stacks and flues including incinerator stacks, which emit sparks that create a fire hazard, shall be provided with a spark arrestor of approved noncombustible construction in which the maximum size of mesh shall not exceed three-quarter (¾) inches. The total area of spark arrestors shall be not less than four (4) times the flue area.

ARTICLE 11

HEATING EQUIPMENT AND APPLIANCES—MOUNTING, CLEARANCES AND CONNECTIONS

SECTION 1100.0. SCOPE

The provisions of this article shall control the construction, inspection and maintenance of all heating, blower and exhaust systems in all buildings and structures in respect to structural strength, fire safety and operation.

1100.1. Accepted Engineering Practice.—All such systems and equipment constructed, installed and maintained in accordance with the applicable standards listed in appendix B shall be deemed to conform to the provisions of the Basic Code.

1100.2. Cooperating Agencies.—Nothing herein contained shall be deemed to nullify the provisions of other legal statutes or regulations of the municipality or state governing the operation and maintenance of boilers and other heating appliances and equipment nor the acceptance of the certificates and labels of inspection by authoritative national inspection agencies.

1100.3. Labeled Heating and Cooking Appliances.—Approved gas and oil-fired warm air furnaces, floor furnaces, unit heaters, domestic incinerators, cooking and heating stoves and ranges and other heating equipment, inspected and approved by the Underwriters Laboratories, Inc., the American Gas Association or other accredited testing authorities and contained in the published listings of such nationally recognized agencies shall be accepted by the building official when installed with the reduced clearances and details of installation therein recommended, provided they meet the requirements of the Basic Code for fire protection.

1100.4. Clearance From Combustible Construction.—All heating and cooking appliances shall be installed with adequate clearances from combustible construction or shall be provided with integral insulation of the appliance or fire-protection of the structural members so that continued or intermittent operation shall not raise the temperature on the surface of combustible floors, walls or partitions above two hundred and fifty (250) degrees F.

SECTION 1101.0. DEFINITIONS

floor furnace. A self-contained furnace suspended from the floor of the space which is being heated, with means of observing the flame and lighting the furnace from such space.

low pressure boiler. A steel or cast iron heating boiler in which the maximum allowable gage working pressure is limited to fifteen (15) pounds per square inch for steam and thirty (30) pounds per square inch for hot water heating boilers.

heating appliance. Any device designed or constructed for the generation of heat from solid, liquid or gaseous fuel or electricity.

high pressure boiler. A closed vessel in which steam or other vapor to be used externally to itself, is generated at a pressure of more than fifteen (15) pounds per square inch gage by the direct application of heat.

space heater. (room heater.) An above-the-floor device for direct heating of the space in and adjacent to that in which the device is located without external heating pipes or ducts.

unfired pressure vessel. A closed metal vessel which contains air, steam, gas or liquid pressure in excess of fifty (50) pounds per square inch gage which is supplied from an external source.

unit heater. An appliance which consists of an integral combination of heating element and fan within a common enclosure and which is located within or adjacent to the space to be heated.

wall heater. A unit heater which is supported from or recessed in the wall of the room or space to be heated.

warm air furnace. A solid, liquid or gas-fired appliance for heating air to be distributed with or without duct systems to the space to be heated.

mechanical warm air furnace. A warm air furnace equipped with a fan to circulate the air.

SECTION 1102.0. PLANS AND SPECIFICATIONS

Plans and specifications for the installation, repair, extension or removal of any heating appliance herein defined or of a heating, blower or exhaust system shall be submitted to the building official and a permit shall be secured prior to the commencement of any installation, except as herein provided.

1102.1. Matter Covered.—The plans and specifications shall show in sufficient detail all pertinent features and clearances of the appliances and systems including size and type of apparatus, construction of flue, stack or chimney, stack connections, kind of fuel, method of operation and the method of preventing the emission with the products of combustion of solids and gases detrimental to health.

1102.2. Permit.—Upon approval of the plans, a permit shall be secured from the building official before any work is started on the installation; and the permit or a copy thereof shall be posted at the site at all times during the course of installation.

1102.3. Exemption From Permit.—A heating appliance permit is not required for the installation, alteration, extension or removal of a solid fuel-fired warm-air space heating furnace not connected to duct work, nor for any heating appliance which does not require venting.

SECTION 1103.0. INSPECTIONS AND TESTS

1103.1. Periodic Inspections of Heating Equipment.—All boilers and unfired pressure vessels subject to the provisions of this article shall be

inspected at least once annually by the building official or other municipal authority or by a recognized national inspection agency listed in appendix A or acceptable to the building official.

1103.2. Certificate of Inspection of Heating Equipment.—No boiler or unfired pressure vessel subject to the provisions of this article shall be placed in operation until a certificate of inspection and approval has been issued.

1103.3. Tests of Heating Equipment.—Whenever a dispute arises as to the safety of operation of a heating device or in respect to unhealthful emission of smoke, the building official may require tests to be made at the owner's expense to determine the structural and fire safety or the amount of solids discharged with the products of combustion. When a boiler or unfired pressure vessel is found unsafe, the building official shall order such device withdrawn from service until the necessary repairs have been made.

1103.4. Boiler Record.—The building official shall maintain a file of all such boilers and pressure vessels, with a record of all inspections together with the official recommendations and actions thereon.

SECTION 1104.0. SMOKE ABATEMENT

All furnaces and heating appliances fired with solid, liquid or gas fuels which are subject to the provisions of section 1102, including all rubbish burners and incinerators, shall be so designed that they will not discharge under normal conditions of operation excessive smoke, soot, cinders, fly-ash or other materials which are deleterious to the safety or health of the public.

1104.1. Solid Fuel Fired.—When solid fuel is used, the maximum amount of cinders discharged with the gases of combustion into the free air and the maximum amount of fly-ash shall comply with the approved rules but in no case shall any such impurity exceed a concentration of four hundred (400) grains per one thousand (1000) cubic feet of combustion gases.

1104.2. Oil Fired.—When oil is used as fuel, the maximum amount of measured carbon discharged with the gases of combustion shall not exceed four hundred (400) grains per one thousand (1000) cubic feet of such gases.

SECTION 1105.0. MAINTENANCE AND OPERATION

1105.1. Boiler Operator Certificate of Fitness.—It shall be unlawful for any person to operate a steam boiler of more than ten (10) horsepower or a boiler designed to carry a steam pressure of more than fifteen (15) pounds per square inch, without a certificate of fitness from the building official or other authorized municipal agency.

1105.2. Renewal of Certificate.—The certificate of fitness shall continue in force for a period of one year, unless revoked or suspended; and application shall be made for renewal annually.

1105.3. Operation of Fire Extinguishing Equipment.—Licensed steam boiler operators may also qualify for a certificate of fitness to operate and

control the standpipe and fire-extinguishing equipment required by article 12 when approved by the authorizing agency.

SECTION 1106.0. EXISTING BUILDINGS

1106.1. Unsafe Boiler Orders.—All existing heating appliances and equipment shall be maintained and operated in accordance with the requirements of the Basic Code. Any such equipment which does not comply with the requirements and the operation of which is deemed unsafe to the building occupants shall be altered as ordered by the building official to secure adequate safety.

1106.2. Minor Heating Repairs.—Minor repairs which do not increase the capacity of heating apparatus or appliances, or which do not involve any substantial alteration in the method of operation or means of smoke prevention may be made without a permit.

SECTION 1107.0. INDUSTRIAL HEATING APPLIANCE CLASSIFICATION

1107.1. Low Heat Appliances.—A steam boiler which operates at fifty (50) pounds per square inch or less gage pressure; or a steam boiler of less than ten (10) boiler horse power, regardless of operating pressure; or any equipment otherwise classified as a medium heat appliance, but not larger than one hundred (100) cubic feet in size, in which the products of combustion at the point of entrance to the flue under normal operating conditions have a temperature of six hundred (600) degrees F. or less shall be classified as a low heat appliance.

Low heat appliances shall include among others:

Baking Ovens
Candy Furnaces
Coffee Ovens
Core Ovens
Fertilizer Ovens
Forge Furnaces (Solid fuel-fired)
Gypsum Kilns
Lead Melting Furnaces
Paraffine Furnaces
Resin Melting Furnaces
Zinc Amalgamating Furnaces

1107.2. Medium Heat Appliances.—A steam boiler which operates at fifty (50) pounds or more per square inch gage pressure; or a steam boiler of over ten (10) boiler horse power regardless of operating pressure, or any heat appliance, in which the products of combustion at the point of entrance to the flue have a temperature of between six hundred (600) degrees and one thousand (1000) degrees F. under normal operating conditions shall be classified as a medium heat appliance.

Medium heat appliances shall include among others:

Alabaster Gypsum Kilns
Annealing Furnaces
Charcoal Furnaces
Feed Dryers (direct fired)
Fertilizer Dryers (direct fired)
Galvanizing Furnaces
Gas Producers
Hardening Furnaces
Lime Kilns
Linseed Oil Boiling
Pulp Dryers (direct fired)
Wood Distilling Furnaces
Wood Gas Retorts

1107.3. High Heat Appliances.—Any appliance rated at higher horsepower or operating at higher temperatures or pressures than a low or

medium heat appliance shall be classified as a high heat appliance.

High heat appliances shall include among others:

Bessemer Retorts
Blast, Billet and Bloom and Open Hearth Furnaces
Brass Furnaces
Cement, Brick and Tile Kilns
Coal and Water Gas Retorts
Cupolas
Glass Kilns and Furnaces
Porcelain Baking and Glazing Kilns
Reverberatory Furnaces
Welding Furnaces
Wood Carbonizing Furnaces

SECTION 1108.0. HEAT APPLIANCE FOUNDATION MOUNTINGS

Unless specifically exempted in section 1109, all floor-mounted industrial heat appliances shall be mounted on the ground, or on a foundation of the following specified fireresistive construction with the required noncombustible insulated flooring or finish. No combustible material shall be permitted against the underside of the appliance or under the foundation unless specifically exempted. Such construction and insulation shall extend not less than the specified distances from the sides of the appliance. The fireresistive floor and its finish shall have equal heat insulation value as the protection herein required or such protection shall cover the entire surface under the appliance. The installation of heating appliances which operate at higher temperatures or pressures and industrial power or process boilers and furnaces shall be governed by accepted engineering practice.

1108.1. Low Heat Appliances.—Under a low heat appliance, the floor shall be of masonry or other noncombustible construction which affords not less than two (2) hour fireresistance and shall extend not less than twelve (12) inches beyond the appliance on all sides. When solid fuel is used, the floor on the firing side or where ashes are removed shall be protected for at least eighteen (18) inches with not less than one-quarter (¼) inch asbestos lumber covered with No. 24 U. S. gage sheet metal, or its approved equivalent.

1108.2. Medium Heat Appliances.—Under a medium heat appliance, the floor shall be of masonry or other noncombustible construction which affords not less than three (3) hours fireresistance and shall extend not less than three (3) feet beyond the appliance on all sides. When solid fuel is used, the fireresistive floor shall extend not less than eight (8) feet at the front or side from which the appliance is fired or the ashes are removed and shall be protected with not less than No. 24 U. S. gage sheet metal.

1108.3. High Heat Appliances.—Under a high heat appliance, the floor shall be of masonry or other noncombustible construction which affords not less than four (4) hours fireresistance and shall extend not less than ten (10) feet beyond the appliance and not less than thirty (30) feet at the front or side where hot products are removed and shall be protected with not less than No. 24 U. S. gage sheet metal.

SECTION 1109.0. MOUNTING EXCEPTIONS FOR HEAT APPLIANCES

When heat appliances are approved for installation on combustible construction they shall be mounted in accordance with the conditions of the approval and within the limitations of this section.

1109.1. Twenty-Four Inch Clearance.—When medium heat appliances are mounted on legs which provide an open ventilated space of not less than twenty-four (24) inches in height under the base and the appliance is arranged to prevent flame or hot gases from coming into contact with the base, the supporting floor shall be protected with four (4) inches of hollow clay or concrete tile covered with sheet metal of not less than twenty-four (24) U. S. gage. The masonry tile course shall be laid with ends unsealed and joints matched so as to provide through circulation of air.

1109.2. Eighteen Inch Clearance.—When low heat appliances are mounted on legs which provide an open ventilated space of not less than eighteen (18) inches in height under the base, and one or more metal baffles are furnished between the burners and the floor and the appliance is arranged to prevent flame or hot gases from coming in contact with the base, the supporting floor shall be insulated with not less than one-quarter (¼) inch asbestos mill board covered with No. 24 U. S. gage steel sheets under the appliance, projecting not less than eighteen (18) inches from the sides of the appliance where fired and where hot products of combustion are removed.

1109.3. Eight Inch Clearance.—When low heat appliances are mounted on legs which provide an open ventilated space of eight (8) inches in height under the base, and the appliance is arranged to prevent flame or hot gases from coming into contact with the base, the supporting floor shall be protected with not less than three-eighth (⅜) inch asbestos mill board covered with not less than No. 24 U. S. gage sheet metal; and said protection shall project at least six (6) inches beyond all sides of the appliance and eighteen (18) inches therefrom on firing sides and where hot products of combustion are removed.

1109.4. Four Inch Clearance.—When low heat appliances are mounted on legs which provide an open ventilated space of not less than four (4) inches in height under the base, and the appliance is so arranged as to prevent the flame or hot gases from coming in contact with the base, the supporting floor shall be protected with four (4) inches of hollow clay or concrete tile covered with sheet metal of not less than No. 24 U. S. gage. The masonry tile course shall be laid as provided in section 1109.1.

1109.5. Double Tile Base Protection.—When low heat appliances are not mounted on legs, the supporting floor shall be protected with two (2) courses of four (4) inch hollow clay or concrete tile covered with a three-sixteenth (3/16) inch steel plate. The tile courses shall be laid at right angles to each other, with the ends unsealed and joints matched in such manner as to provide a free circulation of air through the hollow masonry. On the firing side or where hot products of combustion are removed, the mounting and protection shall extend not less than eighteen (18) inches from the side of the appliance.

1109.6. Water-Cooled Base.—A low heat boiler with a water-cooled base, which has a grate area of less than three (3) square feet or one in which the combustion chamber is located not less than twelve (12) inches above the floor, may rest directly on a sheet metal base of not less than No. 14 U. S. gage steel without heat insulation on combustible construction.

SECTION 1110.0. MOUNTING EXCEPTIONS FOR HOUSE HEATING APPLIANCES

Boilers and furnaces used for heating buildings and structures including low pressure steam and hot water boilers, warm air furnaces and floor mounted direct-fired unit heaters shall be installed in accordance with accepted engineering standards listed in appendix B within the limitations of the Basic Code governing fire protection and fire safety. Mounting of such heating equipment shall conform with section 1108 for low heat appliances except as follows:

1110.1. Four Inch Clearance.—When heating boilers and furnaces that are mounted on legs which provide an open ventilated space of not less than four (4) inches in height under the base, the floor shall be protected with not less than one-quarter (¼) inch mill board covered with sheet metal of not less than No. 24 U. S. gage which shall extend not less than six (6) inches beyond the appliances and not less than eighteen (18) inches where ashes are removed;

1110.2. Tile Masonry Mounting.—When heating boilers and furnaces are not mounted on legs, the floor shall be protected with hollow clay or concrete tile masonry not less than four (4) inches in thickness complying with section 1109.4, extending not less than eighteen (18) inches for ash removal;

1110.3. Water Base Type.—All floor insulation herein required may be omitted under heating boilers of the water-cooled base type when the water jacket extends under all of the ash pit and fire box or under the entire fire chamber when there is no ash pit.

1110.4. Mechanical Warm Air Furnaces.—All floor insulation herein required may be omitted under mechanical warm air furnaces when the fire chamber provides a completely ventilated air space of not less than eighteen (18) inches in height beneath the firing chamber and at least one (1) metal baffle is provided between firing chamber and floor.

1110.5. One- and Two-Family Dwellings.—The mounting and clearances herein defined may be modified for heating installations in one- and two-family dwellings as required under the specific provisions in the Basic Code for gas boilers, warm air furnaces, floor furnaces, unit and space heaters.

SECTION 1111.0. MOUNTING EXCEPTIONS FOR RESTAURANT APPLIANCES

Floor mounted restaurant type cooking appliances including ranges, ovens, boilers and similar heating appliances designed for use in hotel and restaurant kitchens shall conform to section 1108 for low heat appliances except as follows:

1111.1. Eighteen Inch Clearance.—When restaurant type appliances are mounted on legs which provide an open ventilated space of not less than eighteen (18) inches in height under the base or which have no burners, oven or broiler within eighteen (18) inches of the floor, no special floor

protection shall be required provided there is at least one (1) metal baffle between burners and floor;

1111.2. Eight Inch Clearance.—When restaurant type appliances are mounted on legs which provide an open ventilated space of not less than eight (8) inches in height under the base, the floor shall be protected as provided in section 1109.3;

1111.3. Four Inch Clearance.—When restaurant type appliances are mounted on legs which provide an open ventilated space of not less than four (4) inches in height under the base, the floor shall be protected as required in section 1109.4;

1111.4. Double Tile Mounting.—When restaurant type appliances are not mounted on legs, the floor under the appliance shall be protected as required in section 1109.5 with a double tile base.

SECTION 1112.0. MOUNTING EXCEPTIONS FOR DOMESTIC APPLIANCES

Domestic type floor mounted heating and cooking appliances including stoves, ranges, space heaters, steam and hot water radiators and water heaters, shall conform to section 1108 for low heat appliances except as follows:

1112.1. Eighteen Inch Clearance.—When domestic heating and cooking appliances are mounted on legs which provide an open ventilated space not less than eighteen (18) inches in height under the base or which have no burners, oven or broiler within eighteen (18) inches of the floor, no special floor protection shall be required provided there is at least one (1) metal baffle between the burners and the floor;

1112.2. Four Inch Clearance.—When domestic heating and cooking appliances are mounted on legs which provide an open ventilated space not less than four (4) inches in height under the base, the floor shall be protected with sheet metal of not less than No. 24 U. S. gage or other approved noncombustible material. When solid fuel-fired, the protection shall extend not less than eighteen (18) inches on sides where ashes are removed.

1112.3. Tile Masonry Mounting.—When domestic heating and cooking appliances are not mounted on legs, the floor shall be protected as required in section 1109.4.

SECTION 1113.0. SIDE AND TOP CLEARANCES

Clearances shall be provided from wood and other combustible construction in walls, ceilings and partitions adjacent to heating appliances and equipment as follows:

1113.1. Low Heat Appliances.—A low heat appliance shall be installed to provide a clearance from combustible material of not less than eighteen (18) inches at the top, sides and rear and of not less than four (4) feet at the front;

1113.2. Medium Heat Appliances.—A medium heat appliance shall be installed to provide a clearance from combustible material of not less than three (3) feet at the sides and rear, of not less than four (4) feet at the top, and of not less than eight (8) feet at the front or sides where hot products of combustion are removed;

1113.3. High Heat Appliances.—A high heat appliance shall be installed to provide a clearance from combustible material of not less than ten (10) feet at the sides and rear, of not less than fifteen (15) feet at the top, and of not less than thirty (30) feet at the front or sides where hot products of combustion are removed.

SECTION 1114.0. CLEARANCE EXCEPTIONS

The building official may approve the installation of heating appliances with lesser clearances than specified in section 1113 within the limitations herein provided; and such variations shall be cited in the conditions of approval together with the reason therefor. Heating appliances labeled by authoritative testing agencies which are approved for installation with lesser requirements than herein provided may be installed in accordance with the conditions of such approvals.

1114.1. Clearance Variations.—House heating appliances, domestic type ranges and space heaters may be installed with modified clearances as herein specified from combustible materials:

	Clearance in Inches			
	Top	*Side and Rear*	*Front*	*Smoke-pipe*
Heating boilers and furnaces when water or masonry jacketed..	6	6	48	18
When jacketed with 1½" asbestos cement	9	6	48	18
Mechanical warm air with 250° F. temperature limit control ...	6	6	48	18
Domestic ranges and stoves	36	18	36	18
Ranges and stove with fire clay lining	24	18	24	18
Space heaters	36	18	36	18
Water heaters	12	12	12	18

1114.2. Gas-Fired Equipment.—The front clearance for boilers and furnaces which are gas-fired may be reduced to eighteen (18) inches. Gas-fired ranges and steam or hot water radiators may be reduced to six (6) inch front, side and rear clearances. Vent pipes for gas-fired appliances shall conform to section 1011.

1114.3. Fire Protection.—The clearances from combustible materials or construction for all types of heating appliances, systems, pipes, flues, and vents which contain hot gases may be decreased from those required elsewhere in the Basic Code when the exposed construction is protected with noncombustible materials to afford the fireresistances specified in table 20, or the equivalent protection is secured by an approved arrangement of plates and baffles.

TABLE 20.—REDUCED WALL AND CEILING CLEARANCES

Fire resistance of protected construction	Fraction of specified clearances	
	Top	Sides and rear
¼-hour	seven-eighths	five-eighths
½-hour	three-quarters	one-half
¾-hour	five-eighths	three-eighths
1-hour	one-half	one-quarter

1114.4. Masonry Enclosures.—When appliances of low or medium heat capacity are insulated on the exterior with approved masonry, the clearances from combustible materials or construction may be reduced to two-thirds (⅔) of the specified clearances.

SECTION 1115.0. BOILER ROOMS

1115.1. Enclosures.—Except in one- and two-family dwellings and as specifically required for industrial furnaces and accessory equipment or for high hazard uses in article 4, all heating boilers installed in a building or structure shall be located in a separate room or compartment completely enclosed by floors, walls and ceilings of the required fireresistance; but in no case shall the enclosure of boiler rooms have less than two (2) hour fireresistance for high pressure boilers and not less than three-quarter (¾) hours for low pressure boilers.

1115.2. High Hazard Uses.—When required by the provisions of article 4, all boiler rooms connected with high hazard use groups and special occupancies, including uses involving explosion hazards in section 400.6, dry cleaning plants in section 413.3 and storage or public garages in section 415.5 shall be separately enclosed with entrance from the outside of the building only; or shall be located in segregated accessory structures with walls, floors and roofs of fireproof or noncombustible construction.

1115.3. Boiler Room Exits.—Primary and emergency exits from all boiler rooms shall be provided to comply with section 618.2.

1115.4. Air Supply for Combustion.

1115.41. Solid and Liquid Fuels.—All rooms and spaces in which boilers, furnaces and other than gas and electric-fired heating appliances are located shall be provided with sufficient fresh air supply to insure proper combustion. The direct connection of air inlets to ashpits or combustion chambers of boilers or furnaces shall be prohibited. Such air supply inlets for solid or liquid fuel-fired equipment shall have a net area of not less than two (2) square inches for each one thousand (1000) B. T. U. of input rating up to one hundred thousand (100,000) B. T. U. per hour, plus an additional one (1) square inch for each additional one thousand (1000) B. T. U. of input rating or fraction thereof.

1115.42. Gas-Fired Equipment.—For gas-fired equipment located in enclosed spaces, openings shall be provided near floor and ceiling of the enclosing wall or partition of not less than one (1) square inch net clear area for each one thousand (1000) B. T. U. input per hour when adequate air supply cannot be provided from adjacent spaces within the building. Openings to the outer air shall be installed and protected with approved corrosion-resistive screens with not larger than one-half (½) inch mesh.

1115.5. Boiler Room Ventilation.—Boiler rooms which contain a medium or high heat appliance shall be provided with gravity or mechanical ventilation complying with articles 5 and 18 to prevent the accumulation of hot air over or near the appliance. All other rooms containing heating appliances shall be provided with gravity or mechanical ventilation.

1115.6. Boiler Room Location.—Boiler rooms shall not be located immediately below exitways; nor shall any space heater, floor furnace or other similar equipment be located in any aisle or passageway used as a required means of egress from the building or structure.

1115.7. One- and Two-Family Dwellings.—In one- and two-family dwellings central heating warm air or floor furnaces may be located in utility rooms in the basement or first floor provided the appliances are mounted on noncombustible floor construction of not less than three-quarter (¾) hour fireresistance, insulated on top with not less than one-quarter (¼) inch asbestos mill board, covered with No. 24 U. S. gage metal or the equivalent. The enclosure of utility rooms on the first floor shall be of noncombustible construction with clearances and ventilation as herein provided. Heating furnaces shall not be installed in attics except of an approved type complying with the mounting and clearance provisions of this article and equipped with type B vents complying with section 1011.3.

SECTION 1116.0. ASH PITS AND BINS

1116.1. Ash Pit Enclosures.—Ash pits and bins shall be constructed of masonry or concrete with walls not less than six (6) inches thick, or of steel or other approved noncombustible materials or combinations thereof as herein provided.

1116.2. Floors and Roofs.—The floor and roof of such pits and bins shall be of approved two (2) hour fire resistive construction; and the ceilings of rooms which contain uncovered ash pits shall be constructed of two (2) hour fireresistance; except that roofs over ash pits may be constructed of approved noncombustible materials.

1116.3. Opening Protectives.—All openings to ash storage bins shall be protected with tightly fitted approved sheet metal doors with metal frames and bucks securely anchored to the walls and roof.

SECTION 1117.0. STEAM AND HOT WATER PIPES

1117.1. Clearances.—Unless otherwise specifically provided in article 4 for special uses and occupancies, all high pressure steam pipes shall have a minimum clearance of one (1) inch from all combustible materials; and when such pipes pass through combustible floors or partitions, the openings shall be protected by metal or other approved noncombustible sleeves; and vertical risers arranged in groups extending through two (2) or more stories shall be enclosed in a shaft of fireresistive construction as specified in section 1018. The clearance of low pressure steam and hot water piping in walls, floors, and ceilings of combustible construction shall be not less than one-half (½) inch.

1117.2. Floor Sleeves.—When heating pipes pass through floors which may be subject to serious flooding, metal sleeves shall be installed to a height of at least six (6) inches above the finished floor surface and shall be provided with perforated cap plates.

1117.3. Firestopping.—When heating pipes pass through floors and

partitions, the open sleeve space shall be filled with noncombustible materials.

1117.4. Insulation.—All coverings or insulation used on steam and hot water pipes shall be of approved noncombustible materials; and where such pipes pass through stock shelving or are in close proximity to other combustible materials, the insulation shall be not less than one (1) inch thick.

1117.5. Freezing Temperatures.—All concealed heating pipes located in exterior walls shall be protected against freezing in accordance with the approved rules.

1117.6. Expansion and Contraction.—All heating pipes shall be installed to provide for all expansion and contraction movements due to temperature changes.

1117.7. Hot Water Line Exceptions.—Hot water lines which are equipped with approved automatic temperature control devices which prevent a temperature of the circulating water in excess of one hundred and seventy (170) degrees F. shall be exempt from the requirements of section 1117.

SECTION 1118.0. HEATING PANELS

Air chambers or spaces in walls, partitions or ceilings used as heat exchangers in warm air heating systems shall be used only with automatic temperature limit controls that cannot be set at more than two hundred (200) degrees F. Such spaces shall be entirely enclosed with noncombustible material with noncombustible interior linings. Where hung or supported from the wall or floor construction, the bases, hangers and other supports shall be of steel or other approved noncombustible materials.

SECTION 1119.0. HOT AND COLD AIR DUCTS

1119.1. Hot Air Ducts.—Hot air ducts for both low and high temperature systems shall be constructed entirely of noncombustible material equivalent in structural strength to the materials specified in tables 18 and 19 of section 1019. All vision panels for inspection purposes shall be constructed of wired glass or tightly fitted and secured metal panels.

1119.2. Cold Air Ducts.—Cold air ducts shall comply with all the provisions governing hot air supply ducts except in respect to the requirements for heat insulation and clearance from combustible construction.

1119.3. Floor Openings.—Where warm air ducts pass through combustible floors, the surrounding space shall be tightly fitted with asbestos cement or other noncombustible insulating material. Where such ducts enter combustible floors, walls or partitions within six (6) feet of the heating furnace, a five-sixteenth (5/16) inch clearance shall be provided around the duct for the entire six (6) foot length. Where required fire-stopping is removed from walls, floors and partitions by the passage of ducts, the surrounding space shall be completely filled with asbestos, mineral wool or other noncombustible materials.

1119.4. Integral Ducts.—When hot air ducts form an integral part of the

structure, the duct walls shall be constructed of not less than one-half (½) hour fireresistance.

1119.5. Insulation.—Only noncombustible exterior coverings shall be used on ducts carrying air at a temperature of more than two hundred (200) degrees F. and on the interior of ducts when required.

1119.6. Clearances.—Clearances of hot air metal ducts from unprotected combustible construction shall be not less than one (1) inch unless the duct is insulated with not less than one-half (½) inch of approved noncombustible materials or the exposed construction is protected to afford not less than one-half (½) hour fireresistance.

1119.7. Air Recirculation.—No return duct of a mechanical warm air system shall be permitted from a kitchen, bathroom or garage or other place in which flammable or noxious vapors may be present; nor shall the recirculation of air from one dwelling unit to another dwelling unit be permitted.

1119.8. Air Filters.

1119.81. Construction.—Air filters shall be of a flameresistive type which do not give off large volumes of smoke or other objectionable products of combustion in the event of fire. Air filters shall be kept clean in accordance with the approved rules.

1119.82. Filter Coatings.—Liquid adhesive coatings used on filters shall have a flash point not less than three hundred and fifty (350) degrees F. in an open cup tester.

1119.9. Air Conditioning.—The construction and installation of fire doors, dampers, fresh air inlets, emergency controls and fire-extinguishing equipment and outlets for air conditioning, ventilating and heating systems in other than one- and two-family dwellings shall comply with the provisions of article 18.

SECTION 1120.0. WARM AIR HEATING SYSTEMS

1120.1. Classification.—Warm air heating systems in one- and two-family dwellings shall be classified as follows:

1120.11. Low Temperature Systems.—Low temperature systems shall include all systems which use low pressure steam or hot water for heating the air and those systems which have automatically fired warm air furnaces equipped with fans to circulate the air. The operation shall be controlled by automatic limit temperature controls that cannot be set higher than two hundred (200) degrees F.;

1120.12. High Temperature Systems.—High temperature systems shall include all gravity warm air hand-fired and automatically controlled systems in which the temperature limit controls can be set above two hundred (200) degrees F.; and any other system that does not conform to the requirements for low temperature systems.

1120.2. Furnace Controls of Low Temperature Systems.

1120.21. Automatic Shut-Off.—The furnaces of an automatically-fired low temperature system which is equipped with an air-circulating fan shall

be provided with an approved automatic control of the fuel supply whenever the temperature of the air in the furnace bonnet or at the main supply duct exceeds two hundred (200) degrees F.

1120.22. Over-Run Control.—When the furnace is stoker-fired, it shall be equipped with an automatic over-run control to operate the fan when the air in the furnace bonnet or at the main supply duct reaches a temperature of two hundred (200) degrees F. after the stoker and fan have shut down in normal operation.

1120.3. Furnace Controls of High Temperature Systems.—A high temperature system which has an automatic fuel supply controlled by thermostat shall have the same controls as a low temperature system; except that the temperature setting may permit a maximum of two hundred and fifty (250) degrees F.

1120.4. Warm Air Furnaces.

1120.41. Mounting and Clearances.—The mounting of warm air heating furnaces shall comply with section 1110 and clearances with section 1114. Top clearances shall be measured from the top of the furnace bonnet or the warm air plenum chamber, whichever is higher.

1120.42. Gravity Systems.—Gravity warm air furnaces shall be encased in a double metal casing with intervening air space extending from the top of the casing down to the bottom of the fire-box. The top of the bonnet shall be insulated with not less than three (3) inches of sand or the equivalent in magnesia, asbestos or other approved noncombustible material. Gravity furnaces shall be equipped with automatic controls to shut off the fuel supply when the temperature of the warm air pipe at any point within twenty-four (24) inches of the furnace exceeds two hundred and fifty (250) degrees F.

1120.5. Registers.

1120.51. Combustible Construction.—When a register is located in a floor or wall of combustible construction, the register box shall be covered with twelve (12) pound asbestos paper and a clear space of not less than five-sixteenth (5/16) inch shall be left between the sides of the box and any combustible material.

1120.52. Over-Head Furnace Register.—When a register is installed in the floor over the furnace, the register box shall be of double construction, with an intervening air space of not less than four (4) inches, except when the warm air duct is surrounded by a cold air passage.

1120.53. Non-Automatic System.—A system which is not automatically fired and which is not equipped with an approved temperature limit control shall be provided with dampers and shutters which are not capable of shutting off more than eighty (80) per cent of the total duct area; or in lieu thereof, one register or grille shall be installed without a closeable shutter, and the duct leading thereto shall be installed without a damper.

1120.54. Return Air Connections.—Registers on more than one floor shall not be connected to the same vertical duct stack for return air to the heater.

SECTION 1121.0. CENTRAL RECIRCULATING SYSTEMS

1121.1. Air Supply.—A central fan heating system of the recirculating type for use in structures with large open areas such as garages and airplane hangars, shall provide a positive air recirculation of at least one (1) cubic foot per minute when the average ceiling height is fifteen (15) feet or less; and with greater heights the air recirculation shall be increased proportionately; but in no case shall less than five (5) per cent of the air moved by the fan be taken directly from outside the building.

1121.2. Air Duct.—Air ducts for fresh air supply shall be installed without dampers and shall be fully open at all times.

SECTION 1122.0. FLAMMABLE VAPOR SYSTEMS

1122.1. Exhaust Outlet.—A duct designed to remove flammable vapors from a room of a building or structure under the requirements of section 403 shall lead as directly as possible to the outside air and the outlets shall be kept not less than ten (10) feet clear from combustible construction or finish.

1122.2. Location of Ducts.—Flammable vapor ducts shall not be incorporated in a wall except to pass directly through it. Such ducts shall never be located in a fire wall or a fire division wall.

1122.3. Transmission of Power.—The motive power for fans located within the room from which flammable vapors are removed shall be transmitted from an outside source through a shaft operating in a bushed shaft hole, unless otherwise approved by the building official.

SECTION 1123.0. UNIT HEATERS

1123.1. Clearances.—Steam and hot water heaters shall be installed to provide clearances from combustible material of not less than one (1) inch to all heated portions thereof, including the steam and hot water supply piping.

1123.2. Supports.—All ceiling type direct-fired unit heaters shall be substantially supported by metal hangers, brackets or other approved noncombustible supports with the clearances specified for low heat appliances in sections 1113 and 1114.

1123.3. Wall Heaters.—A wall heater shall not be located in a wall of combustible construction unless approved by the building official and shall be installed in accordance with the conditions of such approval.

1123.4. Fireplace Heaters.—Unit gas-fired heaters, labeled for use in fireplace recesses, shall not be used elsewhere.

1123.5. Room Heaters. — The installation or use of unlisted electric room heaters is prohibited. The installation or use of unlisted or unvented gas, oil or other fuel burning room heaters is prohibited.

SECTION 1124.0. FLOOR FURNACES

1124.1. Location.—A floor furnace shall be located so as to be readily accessible and shall not be installed in the floor of any corridor, aisle or passageway, nor in any exitway in a place of public assembly; nor shall any but a gas-fired floor furnace be installed above the first story of a building,

and then only when the furnace assembly projects below the floor into a non-habitable space, enclosed in two (2) hour fireresistive walls, with clearances of at least six (6) inches on all sides and bottom, except as provided for one- and two-family dwellings in section 1124.5.

1124.2. Enclosures.—Enclosures of floor furnaces shall be constructed entirely of noncombustible materials with a fireresistance rating of not less than three-quarter (¾) hours, provided with suitable means for combustion-air intake which furnishes adequate direct air supply to insure proper combustion complying with section 1115.42 and with means of access for purposes of servicing the furnace.

1124.3. Furnace Supports.—Floor furnaces shall be installed only in floors of noncombustible construction of not less than two (2) hours fireresistance, except as provided for one- and two-family dwellings in section 1124.5 with the following clearances:

1124.31. Pit Clearances.—Such floor furnaces, when other than gas-fired, shall be mounted independently of the floor grille with the following clearances: six (6) inches at the bottom and twelve (12) inches at the sides, except that the clearance on the control side shall be not less than eighteen (18) inches;

1124.32. Pit Waterproofing.—When there is likelihood of water rising above the bottom clearance, the pit shall be constructed with an approved watertight enclosure with the sides extending not less than four (4) inches above the ground level.

1124.33. Pit Access Openings.—The access foundation wall opening or floor trap door shall be at least eighteen by twenty-four (18x24) inches in size; and the under floor passage to the furnace shall be at least twenty-four by twenty-four (24x24) inches in cross-section.

1124.4. Furnace Clearances.—Floor furnace clearances shall comply with section 1114 and flue and vent clearances with section 1011.

1124.5. One- and Two-Family Dwellings.—Furnace enclosures may be constructed of noncombustible materials with a fireresistance of not less than three-quarter (¾) hours and a minimum clearance of six (6) inches at sides and bottom for servicing. Means shall be provided for supporting the furnace when the floor grille is removed.

1124.6. Pressure Regulator.—The outlet duct temperatures shall be not greater than two hundred and fifty (250) degrees F. unless such installation is specifically approved by the building official; and in gas-fired furnaces, a gas pressure regulator shall be provided so that the gas input does not exceed the manufacturer's rating.

SECTION 1125.0. INDUSTRIAL FURNACES AND POWER BOILERS

Industrial furnaces and power boilers shall be designed and installed to provide fire and structural safety based on their character, size, temperature and explosion hazard in accordance with accepted engineering practice and within the limitations of the Basic Code for high heat appliances.

1125.1. Foundations of Furnaces.—Foundations for high heat boilers, furnaces and other appliances shall be isolated and insulated from floor slabs, foundations and footings of the building. The foundation bed shall be properly insulated to avoid disintegration or other structural injury of

the foundation due to high temperatures.

1125.2. Structural Insulation.

1125.21. Structural Frame.—The furnace setting and supports shall not be located in direct contact with unprotected structural steel or reinforced concrete framing, but shall be insulated or separated therefrom by a clearance of not less than six (6) inches.

1125.22. Heat Insulation.—Steel or reinforced concrete framing adjacent to a boiler or furnace in industrial plants and subject to temperatures in excess of seven hundred and fifty (750) degrees F. shall be protected with fireproofing of not less than four (4) hour fireresistance, or the design stress shall be reduced to provide structural safety.

1125.3. Air Supply.—Sufficient air supply for combustion shall be provided in conformity to section 1115.

SECTION 1126.0. UNFIRED PRESSURE VESSELS

All unfired pressure vessels shall comply with the construction, clearance and fire protection requirements of this article for high pressure boilers designed for the generation of steam or power and with the boiler code standards listed in appendix B.

1126.1. Inspection.—An owner or user shall not permit the operation or use of an unfired pressure vessel until such installation has been inspected for structural strength and safety and a certificate of operation has been secured from the building official or other authorized agency.

1126.2. Certificate.—The certificate of approval shall be valid for a period of one (1) year from date of inspection and shall state the maximum pressure which may be maintained in the vessel.

1126.3. Identification Label.—Every approved unfired pressure vessel shall be assigned a serial number for the purpose of identification, which shall be stamped or otherwise permanently and prominently indicated thereon and recorded in the department of buildings.

SECTION 1127.0. RESTAURANT COOKING APPLIANCES

All ranges, ovens, broilers and other miscellaneous low heat appliances of the types designed for floor mounting in hotel and restaurant kitchens shall comply with the provisions of sections 1111 and 1114 for low heat appliances and as herein provided.

1127.1. Ventilating Hoods.—Unless enclosed and vented in an approved manner, a range, candy kettle, cruller furnace, appliance for the frying of bakery and confectionery products and any similar apparatus generating hot and noxious smoke and gases shall be provided with a ventilating hood and ducts to remove such smoke, gases and vapors directly to the outer air.

1127.2. Construction.—Hoods and their ducts shall be constructed of approved noncombustible materials with tight joints and the width and length of the hood shall be not less than that of the appliance served.

1127.21. Height.—The hood shall be installed not more than seven (7) feet above the floor and shall completely cover the appliance served with not less than eighteen (18) inch clearances to combustible material unless the construction is protected as specified in section 1114.3.

1127.22. Flue Connection.—The hood or duct from a restaurant range or similar appliance shall connect directly to an approved masonry flue or metal smokestack complying with article 10. Connections to any other ventilating system shall be prohibited.

1127.3. Vents.—The vent of a floor-mounted gas-burning restaurant type cooking appliance installed under a hood may discharge into the space under the hood, providing the vent extends through or beyond any grease screen installed in the hood.

1127.4. Filters and Screens.—The exhaust duct shall be equipped with filters or screens which are readily accessible for removal and cleaning to prevent grease from accumulating in the smoke flue, chimney or smokestack to which it is connected.

SECTION 1128.0. HOT WATER SUPPLY HEATERS

All range boilers, hot water heaters and storage tanks shall be equipped with temperature limit controls and pressure relief valves as herein required.

1128.1. Automatic Hot Water Supply.—Automatic or remote control ignition equipment on domestic hot water heating devices using gas or liquid fuel shall be installed only in connection with a burner equipped with a safety pilot or other approved device arranged to automatically shut off the fuel supply to the main burners if the pilot flame is extinguished. All gas water heaters with an automatic remote-control pilot, or with means of lighting other than a manual method, shall be equipped with approved down draft diverters on the flue pipe from the heater arranged to prevent extinguishment of the pilot or heating flame in accordance with section 1012.2.

1128.2. Direct-Fired Gage Equipment.—Approved relief valves and pressure gages shall be installed in all direct-fired cast iron water heaters with cored sections, and in all heaters with a check valve located between the water meter and the heater or tank.

1128.3. Pressure Relief Valves.—The rate of discharge of pressure valves shall limit the pressure rise to ten (10) per cent of the pressure at which the valve is set to open for any given heat input.

1128.4. Temperature Relief Valves.—Temperature relief valves shall be capable of discharging sufficient hot water at two hundred and ten (210) degrees F. without any further rise in temperature.

1128.5. Vacuum Relief Valves.—All copper tanks shall be equipped with approved vacuum relief valves.

1128.6. Relief Outlet Wastes.—The size of relief outlet waste valves shall be not less than the cross-sectional area of the valve discharge outlet. No pressure, temperature or other type relief valve shall discharge directly to the building drainage system.

1128.7. Prohibited Uses.—No solid or liquid fuel or gas-fired water heaters shall be installed in bathrooms, bedrooms, or other habitable spaces or in any enclosed space with a volume of less than three hundred (300) cubic feet; nor shall vent pipes designed for use with gas appliances be used with solid or liquid fuel-fired equipment except as provided in section 1005.9 for alternate flue construction.

SECTION 1129.0. GAS-FIRED EQUIPMENT

All gas-fired boilers, furnaces and other equipment shall be provided with approved safety devices in accordance with the manufacturer's approved specifications to limit the gas input in the event of low water, excessive steam or air pressures and excessive temperatures.

1129.1. Gas Space Heaters.—Gas-fired space heaters used in sleeping rooms or other rooms normally kept closed shall be of the vented type equipped with an automatic pilot arranged to shut off the gas supply to the main burner when not in operation. Where appliances are installed in a tightly closed room, provisions shall be made to furnish necessary ventilation complying with article 5.

1129.2. Gas Piping.—Gas piping shall be of wrought iron or steel with malleable iron or steel fittings or copper tube complying with the Plumbing Code. No cast iron pipe or fittings in sizes less than four (4) inches or aluminum tubing shall be used for gas piping. When subject to corrosion from surrounding materials, the piping shall be of approved corrosion-resistive alloys. All connections to appliances shall be of the rigid type; except that approved semi-rigid connections may be used on appliances which burn not more than ninety (90) cubic feet of gas per hour.

1129.3. Flexible Connections.—Only fully portable appliances used in construction operations or commercial and industrial equipment shall be connected by flexible gas tubing and only when exposed to temperatures of not more than one hundred and twenty-five (125) degrees F. No appliances with a control valve that permits complete shut-off of the gas supply shall be connected with flexible tubing, except where flexible metallic tubing is permitted.

1129.4. Electric Connections and Wiring.—All electric wiring shall comply with article 15 and the National Electrical Code.

1129.41. Uninterrupted Power.—All electric controls shall be connected into a permanent live circuit and gas-fired central heating plants shall be supplied from separate independent circuits.

1129.42. Control Circuits.—Control circuits shall be run in multiple-conductor cable of not lighter than No. 18 B & S gage with approved thermoplastic coverings. Cables with more than two (2) conductors shall be color-coded.

1129.5. Gas Service Lines and Meters.—Outside shut-off valves shall be installed on gas service lines as follows:

1.—On all service lines operating at a pressure greater than ten (10) psig;

2.—On all service lines two (2) inches or larger in diameter;

3.—On gas service lines to any building, except on service lines to those buildings classified as use groups L-2 and L-3 structures and on gas service lines to private garages, provided that outside shut-off valves shall be installed on gas service lines to multiple family dwellings containing more than four (4) dwelling units.

Where the outside shut-off valve is underground, it shall be located in a durable box at or near the property line and shall be equipped with an extension bar permitting ready access to the valve stem from the surface.

The box shall not be dependent upon the gas service line for support. Keys for shutting off the shut-off valve shall be supplied to the fire department by the utility supplying the gas. The top of the box shall be at ground level except that "highhead type" valve boxes may be used providing they are set back from the property line and located in such a manner as not to constitute a hazard to either pedestrian or vehicular traffic. All such valve boxes shall be plainly labeled "GAS" and the owner of the building shall be responsible for keeping them accessible to the fire department at all times.

SECTION 1130.0. OIL BURNERS

1130.1. Permits.—Before any oil burning installation of more than six (6) gallons of fuel capacity is placed in operation, a special permit shall be secured from the building official except as herein specified. No permit shall be required for the installation and use of portable burners of the type commonly used for household purposes which do not require a flue connection including oil-stoves, oil heaters, and oil lamps equipped with a woven-wick or for such portable apparatus required in construction operations as blow torches, soldering pots and tar and bitumen heaters.

1130.2. **Identification.**—Each approved burner shall have permanently and prominently affixed thereto a metal plate, tag or other approved device which certifies that it has been tested and approved. Said certification shall also bear the manufacturer's or distributor's name, the number of the appliance, the hourly B.T.U. output rating, and the grade of fuel oil for which it is approved.

1130.3. **Instruction Card.**—When installed, each burner shall be accompanied by complete printed instructions for igniting, operating, maintenance and shut-down procedure, which shall be attached in a convenient location accessible to the installation.

1130.4. **Construction.**—An approved burner, including the oil burning heater shall be an assembly of approved parts which are suitable for use with each other and for the service intended.

1130.41. **Safety Devices.**—Each burner shall be provided with approved safeguards and protective devices for control of the oil supply, the mixing of the air, the ignition, high pressure or high temperature limits, high and low water limits and for the control of the burner when ignition fails.

1130.42. **Flexible Tubing.**—Flexible tubing over seventy-two (72) inches in length shall not be used as an integral part of a burner; and such tubing shall be of a type complying with the approved rules.

1130.5. **Quality of Oil.**—Oil for use in oil burners shall be free from acid, grit, fibrous and other foreign matter, with a flash point not lower than one hundred (100) degrees F. and shall comply with the classification of the applicable commercial standards listed in appendix C. The use of crankcase refuse oil shall be prohibited.

1130.6. **Flue Gas.**—The operation of an approved burner shall insure a CO_2 content in the flue gas of not less than eight (8) per cent without the emission of smoke throughout the operating range.

1130.7. **Tests.**—When assembled, each burner shall be tested for defects and proper functioning throughout the operating range as provided in the approved rules.

SECTION 1131.0. FUEL OIL TANKS AND EQUIPMENT

All fuel oil storage tanks, piping, vents and valves shall be installed in compliance with the Basic Code and accepted engineering practice.

1131.1. **Integral Tanks.**—A tank for the storage of six (6) gallons or less of fuel oil shall be considered an integral part of the burner installation and shall be included in the approval of the burner.

1131.2. **Separate Tanks.**—All tanks of more than six (6) gallons capacity shall be constructed of tank-steel plates of approved quality and thickness and shall be welded, riveted and caulked, or riveted and welded to meet test requirements. Interior small storage tanks may be constructed of other materials than steel when tested and approved to withstand a hydrostatic pressure of twenty-five (25) pounds per square inch.

1131.3. **Storage Tank Identification.**—At the time of installation, a storage tank shall have permanently and prominently affixed thereto a metal plate or tag certifying that it has been tested and approved. Said certification shall also bear the name of the tank manufacturer, the gage thickness of the material of which the tank was constructed, the minimum weight of the tank and its capacity.

1131.4. **Tank Vents.**—All fuel oil storage tanks shall be equipped with an approved relief vent discharging to the open air. The vent openings and vent pipes shall be designed to prevent abnormal pressure in the tank during filling, but in no case shall such vents be less than one and one-quarter (1¼) inch pipes; except that one-half (½) inch vent branches may be installed from auxiliary tanks and connected to the main tank vent.

1131.5. **Vent Discharge Outlet.**—The vent pipe from fuel-oil tanks shall terminate outside the building with the discharge end located not less than two (2) feet vertically and horizontally from any window, skylight or roof structure opening in the same or any adjoining building, and not more than twelve (12) feet above the fill pipe terminal. The tops of such vents shall be protected with a weatherproof hood.

1131.6. **Emergency Pressure Relief.**—All exposed fuel oil tanks unless otherwise approved by the building official shall be provided with an approved device for relieving excessive internal pressure in the event of fire.

1131.7. **Fuel Oil Preheaters.**—Where oil preheaters are installed they shall be of an approved type equipped with a relief valve to prevent excessive oil pressure. The relief valve shall be set to discharge at one and one-half (1½) times the working pressure of the system.

SECTION 1132.0. INTERIOR STORAGE TANKS

1132.1. **Auxiliary Tanks.**—Small storage or auxiliary tanks of not more than two hundred and seventy-five (275) gallons capacity may be installed above ground in the lowest story of a building, when mounted on substantial noncombustible supports and located at least seven (7) feet from any boiler, furnace, stove or other exposed flame. Not more than two (2) such tanks shall be connected to any one burner; nor shall more than two (2) tanks of two hundred and seventy-five (275) gallons capacity each be installed in any one building unless protected as provided for large tanks.

1132.2. Large Tanks.—Tanks of more than two hundred and seventy-five (275) gallons capacity located within a building shall be installed on the lowest floor and shall be protected with an approved reinforced concrete or masonry jacket not less than four (4) inches thick; or such tank may be buried with the top not less than two (2) feet below the floor level or shall be covered with an approved reinforced concrete slab not less than four (4) inches thick.

1132.3. Underground Tanks.—Storage tanks of more than five thousand (5000) gallons buried in the ground shall be constructed of tank-steel plates not less than one-quarter (¼) inch in thickness; and shall be located not less than three (3) feet from any foundation wall or footing.

1132.4. Maximum Storage.—The aggregate total capacity of all individual storage tanks located within a building or other structure shall not exceed twenty-thousand (20,000) gallons.

SECTION 1133.0. EXTERIOR STORAGE TANKS

Oil storage tanks which are located outside a building or other structure may be erected under or above ground and shall comply with all the pertinent requirements of sections 1130, 1131 and 1132.

1133.1. Underground Tanks.—When necessitated by ground water pressure, such tanks shall be anchored to a foundation of sufficient weight to prevent floating.

1133.2. Aboveground Tanks.—An aboveground storage tank located outside a building shall be located not less than one and one-quarter (1¼) tank diameters, but in no case less than ten (10) feet from interior lot lines or from the nearest building thereto, or from any other tank.

1133.3. Electric Ground.—All exterior storage tanks above ground of more than ten thousand (10,000) gallons capacity shall be electrically grounded to comply with the National Electrical Code.

1133.4. Location.—The capacity of individual tanks shall be determined by the location in respect to property lines as specified in table 21.

TABLE 21.—CAPACITY OF EXTERIOR FUEL OIL TANKS

Distance from lot lines in feet	Maximum capacity in gallons
25	16,000
30	24,000
40	36,000
50	48,000
60	60,000
70	96,000
85	100,000

1133.5. Protecting Dykes.—Each above ground tank of more than ten thousand (10,000) gallons capacity shall be protected by an embankment or dyke of approved construction with an enclosed volume not less than one and one-half (1½) times the capacity of the tank. The height of the dyke shall not exceed one-quarter (¼) the height of the tank, but in no case less than four (4) feet high.

SECTION. 1134.0. DRYING ROOMS

A drying room or dry kiln installed within a building shall be constructed entirely of approved noncombustible materials or assemblies of such materials with the required fireresistance rating based on the fire hazard of the contents and the process as regulated by the approved rules or as required in article 4 for special uses.

1134.1. Piping Clearance.—All overhead heating pipes shall have a clearance of not less than two (2) inches from combustible contents of the dryer.

1134.2. Insulation.—When the operating temperature of the dryer is one hundred and seventy-five (175) degrees F. or more, metal enclosures shall be insulated from adjacent combustible materials by not less than twelve (12) inches of air space, or the metal walls shall be lined with one-quarter (¼) inch asbestos mill board or other approved equal insulation.

1134.3. Fire Protection.—Drying rooms designed for high hazard materials and processes, including dry cleaning and other special uses provided for in article 4, shall be protected by approved automatic sprinkler or fog systems, manually controlled steam smothering systems, or other approved fire-extinguishing equipment conforming to the provisions of article 12.

SECTION 1135.0. NON-FUEL-FIRED INCINERATORS

1135.1. Enclosure Walls.—In buildings or structures designed for residential (use groups L-1 and L-2), for institutional (use group H-2), for school and church (use group F-4) uses, in which the non-fuel-fired incinerator has the refuse chute identical with the smoke flue, the enclosing walls of the combustion chamber shall be constructed of approved masonry not less than four (4) inches thick when the horizontal grate area is not more than nine (9) square feet, and not less than eight (8) inches thick when the grate area exceeds nine (9) square feet.

1135.2. Wall Lining.—The walls of non-fuel-fired incinerators shall be lined with fire brick laid in fire clay mortar not less than four and one-half (4½) inches thick with an intervening air space in eight (8) inch and thicker walls.

1135.3. Opening Protectives.—All service openings into the chute shall be equipped with approved three-quarter (¾) hour fireresistive self-closing hoppers so constructed that the chute opening is closed while the hopper is being charged. No part of the hopper shall project into the chute or flue, nor shall the service opening exceed one-third (⅓) the area of the chute or flue.

1135.4. Flue Construction.—The combined chute and flue shall be constructed in accordance with the provisions of section 1015.

SECTION 1136.0. FUEL-FIRED INCINERATORS

All fuel-fired incinerators and non-fuel-fired incinerators not covered by the provisions of section 1135 shall conform to the requirements of this section.

1136.1. Combustion Chamber.

1136.11. Nine Square Feet Grate Area.—The combustion chamber for incinerators with a capacity of less than two hundred and fifty (250) pounds refuse per hour or grate area not more than nine (9) square feet shall be constructed of eight (8) inches of approved masonry which is lined with four and one-half (4½) inches of fire brick laid in fire clay mortar.

1136.12. Over Nine Square Feet Grate Area.—When the capacity exceeds two hundred and fifty (250) pounds of refuse per hour or grate area more than nine (9) square feet, the combustion chamber shall be constructed of eight (8) inches of approved masonry which is lined with nine (9) inches of fire brick laid in fire clay mortar.

1136.13. Steel Enclosure.—The exterior four (4) inches of masonry on the unfired side may be replaced by a steel plate casing not less than three-sixteenth (3/16) inches thick.

1136.2. Structural Reinforcement.—The walls of the combustion chamber shall be strongly braced and stayed with structural steel shapes, or reinforced concrete or other approved reinforcement.

1136.3. Location.—Combustion chambers and waste material bins or containers shall be located in a room or compartment devoted to no other purpose; or they may be located in the same room with the boiler or heating plant. Such room shall be separated from the rest of the building by floors, walls and ceilings of not less than two (2) hours fireresistance with approved one and one-half (1½) hour fire doors or the approved labeled equivalent in all openings complying with article 9.

1136.4. Incinerator Smokepipes.

1136.41. Thickness of Metal.—Flue connections and breechings shall be constructed of not less than No. 16 U. S. gage sheet metal when less than twelve (12) inches and No. 12 U. S. gage metal when more than twelve (12) inches in diameter or largest dimension.

1136.42. Lining.—When the breeching is between twelve (12) and eighteen (18) inches in diameter, it shall be lined with not less than two and one-half (2½) inches of fire brick; and when it is over eighteen (18) inches in diameter, it shall be lined with not less than four and one-half (4½) inches of fire brick laid in fire clay mortar.

1136.43. Combined Breechings.—When an incinerator breeching combines with a smokepipe from another appliance, such connection shall also be lined as required for a direct incinerator flue connection; except that when the cross-sectional area of the combined connection is not less than four (4) times the area of the incinerator breeching, the lining may be omitted.

1136.5. Clearance of Incinerator Smokepipes.—A flue connection or breeching shall have a clearance on all sides from combustible materials or construction of not less than thirty-six (36) inches, except as provided in section 1114.3.

SECTION 1137.0. MISCELLANEOUS REFUSE INCINERATORS

1137.1. Integral Construction.—When constructed as an integral part of a building, incinerators for the reduction of garbage, refuse or other waste materials shall be installed in accordance with the provisions of sections 1135 and 1136.

1137.2. Portable Equipment.—Incinerators that do not form an integral part of the building construction shall comply with the provisions of sections 1107, 1108 and 1125 for low or medium heat industrial furnaces. The chimneys and smokepipes shall comply with the requirements of sections 1005, 1009 and 1010 for low and medium temperature flues and smokestacks.

SECTION 1138.0. REFUSE CHUTES

1138.1. Chute Discharge.—A refuse chute shall not feed directly to the combustion chamber of an incinerator, but shall discharge into an enclosed room or bin separated from the incinerator room by ceiling and walls of not less than two (2) hours fireresistance, unless otherwise approved by the building official.

1138.2. Chute Enclosures.—Refuse chutes shall be enclosed with walls of masonry of not less than two (2) hour fireresistance rating for interior chutes and of noncombustible (type 2) construction for exterior chutes. All chutes shall be supported on substantial foundations complying with article 7.

1138.3. Chute Height.—An interior refuse chute shall extend not less than four (4) feet above the roof and shall be covered with an approved ventilating skylight complying with section 927.

1138.4. Service Compartments.—Service openings for chutes shall be located in separate rooms or compartments enclosed in walls, partitions, floors and ceilings which have a fireresistance rating of not less than three-quarter (¾) hours and in which the openings are equipped with fire doors or other approved protectives of not less than three-quarter (¾) hours fireresistance rating or their approved labeled equivalent.

1138.5. Opening Protectives.—All openings between refuse rooms, chutes and incinerator rooms shall be protected with one and one-half (1½) hour fire doors or their approved labeled equivalent complying with article 9.

SECTION 1139.0. REFUSE VAULTS

1139.1. Refuse Vault Enclosures.—A vault for receiving combustible refuse from an exhaust system shall be constructed of not less than three (3) hour fireresistive assemblies.

1139.2. Openings to Boiler Rooms.—The opening between a vault and a boiler room shall not exceed nine (9) square feet in area and shall be located at least eight (8) feet from the firing door of the boiler, and the bottom of the opening shall be not less than six (6) inches above the boiler room floor. All openings shall be equipped with approved automatic fire doors of not less than one and one-half (1½) hour fireresistance rating or the approved labeled equivalent complying with article 9.

1139.3. Location.—When located within a building, a refuse vault shall extend above the roof or shall be directly vented to the outer air with ducts complying with section 1019.

1139.4. Fire Protection.—A vault for combustible refuse which exceeds three hundred and sixty (360) cubic feet in volume shall be protected by an automatic sprinkler or other approved automatic fire-extinguishing system conforming to article 12.

SECTION 1140.0. BLOWER AND EXHAUST SYSTEMS

1140.1. Ducts for Blower Systems.—The ducts for blower and exhaust systems for disposal of dust, stock and vapors from industrial and material processes shall be constructed of metal or other approved noncombustible materials as provided in table 22 for transporting non-abrasive and abrasive materials and table 23 for clearance of ducts carrying flammable vapors and dust from combustible construction. For vapor and dust temperatures in excess of nine hundred (900) degrees F., all ducts shall be lined with approved refractory materials.

TABLE 22.—THICKNESS OF STEEL SHEET EXHAUST DUCTS IN U. S. STANDARD GAGE

Diameter in inches	Non-abrasive	Abrasive
Less than 9	24	20
9 to 18	22	18
18 to 30	20	16
30 to 36	18	14
More than 36	16	12

TABLE 23.—CLEARANCE OF EXHAUST DUCTS IN INCHES

Temperature of vapor or dust in degrees F.	3 to 8 inch ducts	Over 8 inch ducts
175 to 600	8	12
600 to 900	18	24
Higher than 900	24	24

1140.2. Chutes.—No room, hallway, attic, or other part of a building or structure and no hollow or other concealed space in walls or partitions shall be used as an integral part of a blower or exhaust system handling combustible materials or vapors, unless designed and constructed as required for approved chutes in section 1138 or approved ducts for flammable vapor systems in section 1122.

1140.3. Location of Fan.—The fan for blowing flammable materials or vapors shall comply with the approved rules and shall be located and installed so as to be readily accessible. No fan for blowing flammables shall be located in a fire wall or fire division wall.

1140.4. Electric Ground.—All metal parts of the apparatus used for blower and exhaust systems and all shafting in connection therewith shall be electrically grounded as required in the National Electrical Code.

SECTION 1141.0. DUST, STOCK AND REFUSE CONVEYOR SYSTEMS

1141.1. Power Transmission.—Power for fans located in rooms from which flammable dust is being removed shall be transmitted by means of a shaft passing through a bushed hole, or by a belt, chain or similar driving mechanism which is encased in a metal or other noncombustible dust-tight enclosure, both within and without the room.

1141.2. Collectors and Separators.—Cyclone collectors and separators and their supports shall be constructed of noncombustible materials and shall be located whenever possible on the exterior of the building or structure. In no case shall a collector or separator be located nearer than ten (10) feet to combustible construction or to an unprotected wall or floor opening, unless the collector is provided with a metal vent pipe which extends above the highest part of any roof within a distance of thirty (30) feet.

1141.3. Discharge Pipes.—Discharge pipes shall conform to all the requirements for ducts including clearances required for high heat appliances in section 1019, 1119 and 1814. A delivery pipe from a cyclone collector shall not convey refuse directly into the fire-box of a boiler, furnace, dutch oven, refuse burner, incinerator or other appliance which utilizes induced or forced draft.

1141.4. Vents for Exhaust Conveyor Systems.—An exhaust system shall be vented to the outside of the building either directly by flue, or indirectly through the separator, bin, or vault into which it discharges.

1141.5. Spark Protection.—The outlet of an open air vent shall be protected with an approved metal or other noncombustible screen or by other equally efficient means to prevent the entry of sparks.

1141.6. Explosion Relief Vents.—A safety or explosion relief vent shall be provided on all systems which convey combustible refuse or stock of an explosive nature, in accordance with the requirements of article 4.

1141.61. Screens.—When a screen is used in a safety relief vent, it shall be so attached as to permit ready release under emergency pressure.

1141.62. Hoods.—The relief vent shall be provided with an approved noncombustible cowl or hood, or with a counterbalanced relief valve or cover arranged to prevent the escape of hazardous materials, gases or liquids.

ARTICLE 12

FIRE PROTECTION AND FIRE-EXTINGUISHING EQUIPMENT

SECTION 1200.0. SCOPE

The provisions of this article shall control the installation of fire alarm and fire communication systems, fire-extinguishing service equipment and the organization of private fire brigades and fire drills in all buildings and structures when specified or required by the Basic Code. All electrical equipment and the details of wiring for fire-extinguishing installations shall comply with the provisions of the National Electrical Code and the applicable standards listed in appendixes B and I.

1200.1. Approved Devices.—The building official shall accept the label or listing in the publications of tests of inspected fire protection equipment and materials of the Underwriters' Laboratories, Inc., or other accredited testing laboratories. When installed in accordance with the limitations of the approval, such systems, devices and equipment shall be deemed to comply with the requirements of this article for the purpose specified.

1200.2. Auxiliary Equipment.—Where required by this article, or by the provisions of article 4 for special uses and occupancies, readily available auxiliary, first-aid and fire-extinguishing equipment, including hand hose, water barrels, buckets, hand fire extinguishers, chemical engines, axes, hooks, ladders and other appliances and tools for controlling and fighting fires shall be installed as herein required.

1200.3. Tests.—All required tests shall be conducted by and at the expense of the owner or his representative, unless otherwise directed by the building official.

SECTION 1201.0. DEFINITIONS

automatic fire alarm system. A system which automatically detects a fire condition and actuates a fire alarm signal device.

automatic water supply source. Water supplied through a gravity or pressure tank, or automatically operated fire pumps, or from a direct connection to an approved city water main.

automatic sprinkler head. A device connected to a water supply system that opens automatically at a predetermined fixed temperature and disperses a stream or spray of water.

automatic sprinkler system. An arrangement of piping and sprinklers designed to operate automatically by the heat of fire and to discharge water upon the fire.

central station system. An automatic sprinkler or fire alarm system in which all equipment is supervised by a central or proprietary station to which all alarm signals are transmitted and relayed to the municipal fire department.

deluge system. A sprinkler system designed to deliver large quantities of water through open sprinkler heads, in which the water supply is controlled by a valve actuated by a thermostatic device on a predetermined temperature or rate of temperature rise.

fire drill. The organized procedure conducted with or without a private fire brigade for vacating the occupants of a building and for operating the first-aid fire appliances and equipment for the extinguishing of fire and safeguarding of life.

horizontal fire line. A fire line installed around the interior walls and columns of a building, pier or wharf, with hose outlets located so that every part of the floor area is within reach of at least one fire stream.

manual fire alarm system. An interior alarm system composed of sending stations and signaling devices in a building, operated on an electric circuit, so arranged that the operation of any one station will ring all signals throughout the building or at one or more approved locations. Signals may be either non-coded, or coded to indicate the floor area in which the signal originated and may be transmitted to an outside central station.

non-automatic sprinkler system. A sprinkler system in which all pipes are maintained dry and which is equipped with a siamese fire department connection.

one-source sprinkler system. An automatic sprinkler system which is supplied from one of the approved automatic sources of water supply.

partial sprinkler system. An automatic sprinkler system consisting of a limited number of automatic sprinkler heads serviced from the building water supplies with one or more fire department siamese connections as required, for use in exit facilities and isolated hazardous locations when approved by the building official.

sprinkler system, chemical. A system of automatic sprinklers controlled by thermostatic operating devices for the diffusion of approved fire-extinguishing chemicals or gases.

sprinkler system, dry pipe. A system in which all pipes and sprinkler heads are filled with air under pressure and the water supply is controlled by an approved automatic dry-pipe valve in the event of fire, actuated either by the release of air or by thermostatic electric control.

sprinkler system, thermostatic. An open or closed head sprinkler system operated through an auxiliary thermostatic device which functions at a predetermined rate of temperature rise.

sprinkler system, wet pipe. A system of automatic sprinklers in which all pipes are filled with water at all times.

sprinklered. Equipped with an approved automatic sprinkler system properly maintained.

supervised sprinkler system. A system in which all water supply, valves and accessory equipment is provided with electrical contact devices to transmit signals to an outside central supervisory station.

standpipe. A wet or dry fire line installed exclusively for the fighting of fire, extending from the lowest to the topmost story of a building or structure with hose outlets at every floor equipped with reducing valves and designed to operate at required working pressures.

standpipe, dry. A standpipe fire line without permanent or automatic water supply equipped with a siamese connection for use of the fire department.

standpipe, first-aid. An auxiliary vertical or horizontal fire line designed primarily for emergency use by the occupants of the building or by the private fire brigade before the arrival of the municipal fire department.

standpipe, wet. A standpipe fire line having a primary water supply constantly available at every hose outlet, or made available by opening the hose outlet or by automatic functioning of a control station.

two-source system. An automatic sprinkler system which is supplied from a combination of any two of the approved automatic sources of water supply, or from two (2) pressure tanks, or by direct connections to the municipal water supply on two (2) streets in which the water mains are separately controlled.

water curtain. A system of approved open or closed sprinkler heads or perforated pipes installed on the exterior of a building at eaves, cornices, window openings, and on mansard or peak roofs with water supply under manual control; or installed around openings in floors or walls of a building with water supply under thermostatic control.

SECTION 1202.0. PLANS AND SPECIFICATIONS

Before any standpipe or sprinkler equipment is installed or existing equipment which involves ten (10) or more sprinkler heads in any one fire area or on any one floor is remodeled, or before the installation or extension of any interior fire alarm signal system, a preliminary set of plans, drawn to suitable scale, shall be filed with the building official with specifications in sufficient detail showing essential features of the construction, heights of stories, location, size and arrangement of all required piping and accessories for each proposed standpipe fire line and sprinkler installation, and layout and wiring of the fire alarm signal system.

1202.1. Standpipe Fire Lines.—Plans for the standpipe installation shall show the size and location of feed lines, risers, connections and valves, size and location of siamese connections, tanks and pumps, hose stations and length of hose, stairways, stair sections and all subdividing partitions and walls.

1202.2. Sprinkler Systems.—Plans for the sprinkler installation shall show the location and capacity of water supply, connecting piping, feed lines and risers, all gate, check, alarm and dry-pipe valves, location and number of all heads, location and number of all actuating devices, and standpipe fire lines, if any.

1202.3. Interior Fire Alarms.—Plans for the interior fire alarm signal system shall show location and number of all sending stations and signals with specifications of the type, construction and operation of the system.

1202.4. Approved Plans.—After acceptance of the preliminary plans, three (3) final sets of plans shall be filed for final approval of every installation of standpipe fire line, sprinkler and fire alarm signal system.

SECTION 1203.0. ACCEPTANCE TESTS

Before final approval and acceptance of fire-extinguishing equipment in any building, pier, wharf or other structure, the installation shall be subjected to the tests prescribed herein or in the approved rules. It shall be unlawful to cover up or permanently conceal piping, wiring and accessory devices in any portion of a newly constructed system until it has been tested and approved.

1203.1. Standpipe Tests.—Upon completion of a standpipe installation and at least every five (5) years thereafter, every standpipe fire line shall be tested for static pressure and flow, including the top and bottom outlets in the presence of the administrative official authorized to witness such test.

1203.11. Pressure Test.—The test shall demonstrate that the system will sustain a hydrostatic pressure of not less than one hundred (100) pounds per square inch at the topmost hose outlet, and not less than three hundred (300) pounds per square inch at the fire department connection, or at the lowest pump supply connection to the risers. In buildings not exceeding three (3) stories nor more than forty (40) feet in height, the test pressures may be reduced to not more than twenty-five (25) per cent in excess of the normal operating pressure.

1203.12. Periodic Check Tests.—The periodic tests shall demonstrate the suitability of the system for fire department use.

1203.13. Temporary Construction Standpipes.—The feed mains, risers, interconnections and branch lines of temporary standpipes required under the provisions of article 13 in structures under erection shall be maintained water-tight when work is not being done on the system.

1203.2. Sprinkler Tests.

1203.21. Wet Pipe Systems.—Automatic wet pipe systems shall be subjected to a hydrostatic pressure test for two (2) hours duration of not less than two hundred (200) pounds per square inch in every part of the installation exclusive of water supply tanks; except that in buildings of not more than three (3) stories nor more than forty (40) feet in height, the test pressure need not be more than fifty (50) pounds per square inch in excess of the normal pressure carried in the system or in excess of the pressure necessary to operate the highest sprinklers in non-automatic systems.

1203.22. Automatic Dry Pipe Systems.—Automatic dry pipe systems shall be tested to forty (40) pounds per square inch air pressure for twenty-four (24) hours duration with a maximum permissible pressure loss of two (2) pounds per square inch.

1203.23. Pressure Tanks.—Pressure tanks shall be tested to a pressure of one and one-half (1½) times the working pressure.

1203.3. Fire Alarm Tests.—Upon completion of a fire alarm system, the installation shall be subjected to a test to demonstrate its efficiency of operation. All connections and wiring, with signal devices disconnected, shall develop an insulation resistance of not less than one (1) megohm.

SECTION 1204.0. PERIODIC INSPECTIONS AND TESTS

1204.1. Inspections.—Inspections and field tests of fire-extinguishing equipment shall be made by the owner, his authorized representative, or insurance organization and the fire department of the municipality as herein required to enforce the maintenance of all service equipment in operating condition and to familiarize the fire-fighting force with existing conditions in all buildings and structures.

1204.2. Maintenance and Test Records.—All fire-fighting and fire-extinguishing service equipment and appliances, including valves, hose, tools and accessories shall be maintained readily available and in good working order at all times for immediate use of the occupants of the building and the fire department. Records of required inspections and tests shall be available for examination by or filed with the administrative official as he may direct.

1204.3. Test Expense.—All tests shall be conducted at the owner's risk and expense and not less than forty-eight (48) hours' notice shall be given to the municipal official having jurisdiction before any test is made.

1204.4. Periodic Standpipe Tests.

1204.41. Flow Tests.—In buildings and structures exceeding seven (7) stories or eighty-five (85) feet in height, flow tests shall be made at intervals of not more than two (2) years with at least fifty (50) pounds pressure at the topmost hose outlet, with one hose stream flowing.

1204.42. Fire Pumps.—Fire pumps shall be operated at least once in ninety (90) days to insure that the equipment is in good operating condition. Records of these tests shall be maintained by the certified operator and shall be submitted to the fire official when requested for his inspection and approval.

1204.5. Periodic Automatic Sprinkler Tests.

1204.51. Periodic Check.—All automatic sprinkler systems shall be inspected to observe whether all rooms and spaces are equipped with required sprinklers and that all sprinklers are unobstructed by storage of the contents or by the erection of partitions or other structural features which prevent free operation of the system.

1204.52. Fire Pump Test.—Fire pumps shall be tested every two (2) years to rated capacity.

1204.53. Free Flow.—The test pipe at the top of the system shall be operated at each inspection to determine that there is free flow of water at good pressure; and the drains at the base of risers shall be opened and observed for volume of water flow.

1204.54. Supervisory Service.—When testing systems which are connected through a central supervisory station or directly to the fire department, notification shall be given to the administrative officials before the tests are made.

1204.6. Periodic Open Sprinkler Tests.—All exterior and interior water curtains or other open sprinkler equipment shall be inspected at least once each year and exterior systems shall be tested during warm weather.

1204.7. Periodic Interior Fire Alarm Tests.

1204.71. Monthly Tests.—All interior fire alarm signal systems and sending stations shall be tested monthly by the person in charge to insure normal operating conditions. The use of the system for fire drill purposes under the provisions of section 1220 shall be accepted as a test of those parts of the system actually used in the drill procedure. All sending devices shall be reset or rewound when required after each use.

1204.72. Test Records.—A complete written record of the monthly tests shall be kept by the person in charge and shall be filed with the administrative official if required by him. The monthly test may be held concurrently with the required practice fire drill.

SECTION 1205.0. MAINTENANCE AND CERTIFICATE OF FITNESS

The owner of every building and structure shall be responsible for the care and maintenance of all fire-extinguishing equipment and devices to insure the safety and welfare of the occupants. When installations of required automatic extinguishing equipment or fire alarm signal systems are interrupted for repairs or other necessary reasons, the owner shall immediately advise the administrative official and shall diligently prosecute the restoration of the protection.

1205.1. Certificate of Fitness.—In all buildings other than one- and two-family dwellings (use group L-3), when required by the administrative official, the fire extinguishing service equipment and systems shall be under the supervision of a person holding a certificate of fitness issued by such official; and day or night watchman service or both shall be provided as directed by him in places of assembly, amusement parks and other buildings of high human occupancy.

1205.2. Maintenance of Standpipes.

1205.21. Tank Supplies.—All supply tanks shall be maintained at proper water level and air pressure.

1205.22. Valves.—Valves at hose stations shall be examined for tightness and valves at automatic sources of supply shall be kept open.

1205.23. Hose.—Fire hose shall be maintained in good condition and properly arranged on the hose racks. When required, the gaskets shall be replaced in hose valve couplings and nozzles.

1205.3. Maintenance of Sprinklers.

1205.31. Open Valves.—The supply valve shall be kept open and the sprinkler system shall be maintained in service at all times. After alterations, repairs, or emergencies, special inspections shall be made to insure that valves are properly serviced in the open position and the system in operating condition.

1205.32. Corrosion.—Piping and heads shall be protected from corrosion and unwarranted loading and free from mechanical injury.

1205.33. Supervisory Service.—Where central station supervisory service or fire department connection is maintained, immediate notification shall be given to the administrative official before operating any supply valve or disturbing the system in any manner.

1205.34. Dry Pipe Systems.—All water supplies and the air pressure in dry pipe systems and pressure tanks shall be maintained in accordance with the requirements of the system.

1205.35. Fire Pumps.—Fire pumps shall be operated weekly until water is discharged freely from the relief valve.

1205.36. Spare Heads.—A sprinkler wrench and not less than six (6) spare sprinkler heads shall be available on the premises in a readily accessible and plainly identified place to replace fused or damaged equipment.

1205.4. Maintenance of Fire Alarms.

1205.41. Vacated Premises.—Fire alarm systems shall be maintained in operating condition at all times, except when the building is vacated for periods of more than one (1) week; and the system shall be tested upon restoration to use.

1205.42. Notice of Defective System.—When the fire alarm system becomes inoperative, the owner or his designated representative in charge shall notify all occupants and shall take immediate steps to restore proper working conditions. While out of order, all fire alarm stations shall be clearly tagged to indicate the system is not working.

1205.43. Notice to Fire Official.—If the operating current of any fire alarm system is disconnected for emergency reasons, the responsible person in charge shall notify the administrative official in advance of such disconnection, stating the reasons therefor.

1205.44. Spare Parts.—When break-glass type fire alarm boxes are employed, at least one (1) extra glass shall be maintained on the premises for each twenty (20) stations of the system.

SECTION 1206.0. EXISTING BUILDINGS AND FIRE SERVICE EQUIPMENT

1206.1. Existing Standpipes.—Standpipe fire lines heretofore approved shall not be required to be altered to conform to the provisions of this article except when the building is extended in height or in area, or the occupancy is changed to a use requiring superior protection; except that the following minimum requirements shall apply to all installations:

1206.11. Water Supply.—There shall be a reserve of fifteen hundred (1500) gallons of water in the gravity tank for exclusive use of the standpipe:

1206.12. Gravity Tank.—The gravity tank shall be fed by direct city water connection at a rate of not less than sixty-five (65) gallons per minute or by booster pump of equal capacity; and the bottom of the tank shall be located not less than twenty (20) feet above the topmost hose outlet;

1206.13. Fire Department Connection.—Existing siamese hose connections shall be maintained in a manner satisfactory to the fire official.

1206.2. Existing Sprinklers.—Sprinkler systems and devices heretofore approved shall not be required to conform to the provisions of this article except when the fire hazard due to construction and use of the building is increased, or when substantial additions are made to the building or when additional protection is deemed necessary for the safety of the occupants.

1206.21. Voluntary Protection.—Existing sprinkler systems not required by the Basic Code which have been installed voluntarily need not conform

to the provisions of this article except that the siamese hose connection shall be maintained as directed by the fire official.

1206.22. Communicating Buildings.—When a completely sprinklered building communicates with another not so equipped, the communicating openings shall be provided with an opening protective on both sides of the wall having a combined fireresistance rating not less than required by table 16 and section 908 for fire walls or fire division walls.

1206.23. Water Supply.—The service supply of existing systems shall be of sufficient size to operate the largest number of sprinklers in one (1) fire area except that the administrative official may accept systems in buildings of low fire hazard when the supply is adequate to furnish at least ten (10) sprinkler heads, and the supply line is at least one and one-half (1½) inches in diameter.

1206.3. Existing Fire Alarms.—Fire alarm signal systems heretofore installed in buildings and structures in accordance with the rules then in force shall be accepted so long as they are maintained in good working order satisfactory to the administrative official.

SECTION 1207.0. WET STANDPIPE REQUIREMENTS

Except as herein required, all buildings and structures hereafter erected, other than one- and two-family dwellings (use group L-3) and all buildings heretofore erected which are not already equipped with two and one-half (2½) inch or larger standpipes, shall comply with the provisions of this article.

1207.1. Size of Standpipes.

1207.11. Buildings Over Two Stories.—All buildings more than two (2) stories or thirty (30) feet in height and more than ten thousand (10,000) square feet in area shall be equipped with not less than two and one-half (2½) inch standpipes.

1207.12. Buildings Over Four Stories.—All buildings more than four (4) stories or fifty (50) feet in height shall be equipped with not less than four (4) inch standpipes.

1207.13. Buildings Over Six Stories.—All buildings more than six (6) stories or seventy-five (75) feet and not more than two hundred and fifty (250) feet in height shall be equipped with not less than six (6) inch standpipes.

1207.14. Buildings Over 250 Feet High.—All buildings more than two hundred and fifty (250) feet in height shall be equipped with not less than eight (8) inch standpipes.

1207.2. Exception From Standpipe Requirements.—Unless otherwise specifically required by the Basic Code or other statute, buildings of fireproof construction (types 1-A and 1-B) not exceeding six (6) stories or seventy-five (75) feet in height when not a high hazard use (use group A) and equipped with an approved two-source automatic sprinkler system shall be exempt from the standpipe requirement.

1207.3. Number of Standpipe Risers.

1207.31. Based on Floor Area.—The number of standpipe risers shall be

such that all parts of every floor area can be reached by a thirty (30) foot stream from a nozzle attached to one hundred (100) feet of hose connected to the riser outlet.

1207.32. Based on Street Fronts.—There shall be at least one (1) riser for each street front on which the building or structure faces; except that a corner building need not be considered as facing on more than one (1) street.

1207.4. Location of Standpipes.—Insofar as practicable standpipes shall be located with outlets within stairway enclosures; but when stairway enclosures are not available, the standpipes shall be located in a public corridor or accessible from an interior or exterior stairway or a smokeproof tower; but in any case, one riser shall be located in the main stairway or smokeproof tower.

1207.5. Standpipe Protection.—Standpipe fire lines shall be protected from freezing and mechanical and fire damage.

1207.6. Standpipe Construction.

1207.61. Height.—Standpipe fire lines shall extend from the lowest to the topmost story of the building or part of building which they serve and shall be installed progressively with the erection of the building as required in section 1319.

1207.62. Interconnections.—When more than one (1) standpipe is required in a building they shall be interconnected at their bases by pipes of size equal to that of the largest riser so as to permit water from any source to supply all risers. Each riser shall be equipped with an O.S. & Y. valve so as to permit individual risers to be taken out of service if damaged or broken without interrupting the water supply to other risers.

1207.63 Hose Connections.—Subject to the provisions of section 1210, standpipes shall be equipped in every story with a two and one-half (2½) inch hose connection and a one and one-half (1½) inch hose connection with valves and threads conforming to the municipal fire department's standard, located not more than five (5) feet above the floor level.

1207.7. Hose.—Except as provided in section 1210, standpipes located inside buildings and structures shall have not less than one hundred (100) feet of one and one-half (1½) inch diameter hose equipped with a one-half (½) inch nozzle and couplings conforming to the municipal fire department's standard at each outlet complying with section 1207.3 and hung in an approved rack or cabinet.

1207.8. Fire Department Connection.

1207.81. Location.—Every standpipe fire line shall be equipped with an approved siamese fire department inlet connection constructed of approved corrosion-resistive metal, located on a street front of the building not less than eighteen (18) nor more than thirty-six (36) inches above the grade.

1207.82. Projection.—When located two (2) feet or more above grade, the fire department connection shall not project beyond the street lot line or legal building line.

1207.83. Standpipe Feeder.—The pipe connecting the siamese to the standpipe shall be at least four (4) inches in diameter, but not less than the size of the interconnecting feed lines. When the automatic supply is from a city main or a yard hydrant system, a two and one-half (2½) inch valved and threaded hose outlet shall be provided to enable the system to be drained.

1207.84. Hose Threads.—All hose threads in the fire department connection shall be uniform with that used by the municipal fire department.

1207.85. Identification.—The fire department connection shall be suitably marked with raised letters not less than one (1) inch high reading "TO STANDPIPE," or otherwise identified for dry standpipes, automatic or open sprinkler systems as provided in sections 1209.3 and 1213.8 and for non-automatic in section 1216.3.

SECTION 1208.0. STANDPIPE WATER SUPPLIES

The source of water supply to standpipes shall be adequate to maintain a flow of two hundred (200) gallons per minute with not less than fifty (50) pounds per square inch pressure at the topmost outlet of the building or structure and shall conform to the minimum requirements of this section.

1208.1. Public Water Standpipe Supply.—When supplied by a street main, the acceptable flow shall be not less than five hundred (500) gallons per minute from a hydrant within two hundred (200) feet of the building under the minimum pressures herein specified.

1208.2. Gravity Tank Standpipe Supply.—When supplied by a gravity tank, the tank shall be so located that the bottom shall be not less than twenty-five (25) feet above the topmost outlet. The tank shall have a capacity of not less than five thousand (5000) gallons; and if jointly used for house supply and sprinkler systems it shall be arranged to provide a reserve supply of not less than five thousand (5000) gallons at all times for the standpipe fire line and such additional capacity to provide for yard hydrants when required.

1208.3. Pressure Tank Standpipe Supply.—When supplied by a pressure tank, the tank shall be located in the top story or on the roof of the building or structure and shall have an air pressure and water capacity to supply not less than forty-five hundred (4500) gallons and such additional capacity to provide for yard hydrants when required.

1208.4. Fire Pump Standpipe Supply.—When supplied by an automatic fire pump, the combined pump capacity shall be not less than five hundred (500) gallons per minute for a four (4) inch standpipe; seven hundred and fifty (750) gallons per minute for a six (6) inch standpipe or for two (2) four (4) inch standpipes; and not less than one thousand (1000) gallons per minute for an eight (8) inch standpipe, or for two (2) six (6) inch standpipes. When pumps are not supplied from the street main, the source shall furnish sufficient water for full operation of the standpipe for not less than one (1) hour.

SECTION 1209.0. DRY STANDPIPE FIRE LINES

When in the opinion of the administrative official, the fire hazard involved in the use of the building and type of construction does not warrant a constant, automatic water supply to insure fire safety, he may accept a dry standpipe fire line in buildings not more than seventy-five (75) feet in height. One riser shall be provided for each ten thousand (10,000) square feet of fire area or fraction thereof.

1209.1. Size and Capacity of Dry Standpipes.—Dry standpipes shall have a minimum diameter of four (4) inches and shall be capable of delivering two hundred and fifty (250) gallons of water per minute simultaneously from each of any three (3) outlets under the operation of one (1) fire engine or pumper; except that in existing installations, the administrative official may accept a smaller size when deemed adequate by him.

1209.2. Fire Department Connection for Dry Standpipes.—Siamese fire department connections shall be provided as herein specified; two-way connection on two and one-half (2½) and four (4) inch fire lines; three-way connection on five (5) inch fire lines; and four-way connection on six (6) inch or larger fire lines.

1209.3. Identification of Fire Department Connection.—Fire department connections shall be suitably marked with raised letters at least one (1) inch in height reading "TO DRY STANDPIPE."

SECTION 1210.0. FIRST-AID STANDPIPE FIRE LINES

First-aid standpipe fire lines for use of the occupants of a building or of the trained fire brigade shall comply with the provisions of this section. Such systems can be combined with the main standpipe fire lines by direct connection to the standpipe riser as provided in section 1207.62.

1210.1. Size of First-Aid Standpipes.—The minimum size of first-aid standpipe fire lines shall be two and one-half (2½) inches in buildings which are not more than six (6) stories nor more than seventy-five (75) feet in height.

1210.2. Number of First-Aid Risers.—The number and location of risers shall be such that all parts of every floor area requiring protection can be reached within twenty (20) feet by a three-eighths (⅜) inch nozzle attached to not more than seventy-five (75) feet of one and one-half (1½) inch hose connected to the standpipe outlet mounted on a rack or in a cabinet at each outlet.

1210.3. First-Aid Water Supply.—The water supply for first-aid protection shall be sufficient to service two (2) hose streams for a period of thirty (30) minutes with a flow of seventy (70) gallons per minute at the topmost outlet at a minimum pressure of fifteen (15) pounds per square inch.

1210.4. High Hazard Buildings.—First-aid standpipes shall be provided in storage buildings of moderate fire hazard (use group B-1) and in mercantile (use group C), industrial (use group D), and business (use group E) buildings, in which flammable materials, products or other hazardous conditions are present and which are more than thirty (30) feet or two

(2) stories in height and with more than three thousand (3000) square feet of undivided floor area; except that such buildings shall be exempt from this provision when equipped with an approved two-source automatic sprinkler system with supervisory service.

1210.5. Institutional Buildings.—First-aid standpipes shall be provided in hospitals, asylums, places of detention and other institutional buildings (use groups H-1 and H-2) and hotels, boarding houses and dormitories (use group L-1) with sleeping accommodations for more than twenty-five (25) persons and which are more than thirty (30) feet or two (2) stories in height.

1210.6. Assembly Buildings.—First-aid standpipes shall be provided in theatres and night clubs (use groups F-1 and F-2); and in assembly halls, lecture halls and recreation centers (use group F-3) with an occupancy load of more than three hundred (300) as required in article 4.

SECTION 1211.0. HORIZONTAL FIRE LINES

In one-story buildings of moderate or high fire hazard more than seven thousand five hundred (7500) square feet in area and on wharves and piers as provided in section 1212, which are not equipped with an approved automatic sprinkler system, there shall be provided a horizontal fire line complying with the requirements of this section.

1211.1. Construction of Horizontal Fire Lines.

1211.11. Size.—The horizontal fire line shall be constructed of two and one-half (2½) inch pipe supported on the interior walls of the building or attached to interior columns or girders of noncombustible construction.

1211.12. Water Supply.—Adequate water supply shall be provided to service not less than two (2) hose connections, but in no case less than a two (2) inch service tap connected to a public water supply main.

1211.13. Hose.—Approved hose valves, hose and nozzles shall be provided at intervals not exceeding one hundred and twenty-five (125) feet.

1211.14. Fire Department Connection.—On buildings which are less than ten thousand (10,000) square feet in area, no siamese fire department connection shall be required.

1211.2. Exemption from Fireproof Construction.—When the area of buildings of types 2, 3 and 4 construction which are not more than two (2) stories or thirty (30) feet in height, designed for use as a storage garage, or for industrial uses which are not deemed unusually hazardous by the building official, but in which a considerable amount of combustible contents are stored or processed, does not exceed the tabular limits by more than fifty (50) per cent, a horizontal fire line as herein described shall be accepted in lieu of fireproof construction.

SECTION 1212.0. PIER AND WHARF PROTECTION

1212.1. Fire Area of Piers.—All piers and wharves shall be subdivided into maximum areas of fifty thousand (50,000) square feet by fire walls complying with the provisions of article 9. The fire walls shall be located at horizontal intervals of not more than three hundred (300) feet and shall

extend two (2) feet above the roof and below the low water level when the substructure is of wood or other combustible construction.

1212.2. Fire Protection of Piers.—When not protected with an approved two-source automatic sprinkler system, both substructure and superstructure shall be equipped with an approved standpipe fire line complying with the provisions of this article.

SECTION 1213.0. AUTOMATIC SPRINKLER SYSTEMS

The requirements of this section shall apply to all sprinkler equipment specified by the provisions of the Basic Code. All such systems shall be designed, constructed and maintained in accordance with the accepted engineering standards listed in appendixes B and I and within the limitations of the approved devices of the Underwriters' Laboratories, Inc., and other recognized testing agencies.

1213.1. Buildings Requiring Sprinklers.—Approved automatic sprinkler systems shall be provided in all buildings herein specified or as required for special uses and occupancies in article 4.

1213.11. Partial Protection.—A one-source system shall be provided in all portions of residential (use groups L-1 and L-2) institutional (use groups H-1 and H-2) and assembly buildings (use groups F-1, F-2, F-3 and F-4) occupied for storage or workshop purposes which involve highly combustible and flammable materials.

1213.12. Basement Garages.—A one-source system shall be provided in basement and sub-basement public garages.

1213.13. Public Garages.—A one-source system shall be provided in garages more than ten-thousand (10,000) square feet in area or more than four (4) stories high used for the storage of trucks loaded with combustible materials, when of other than fireproof or protected noncombustible construction (type 1-A or 1-B) and (2-A or 2-B); and in all group 1 public garages as defined in section 415, located in buildings of which the upper stories are designed for other uses, when such garages have a storage capacity of twenty (20) or more automobiles; except that when such buildings are more than seventy-five (75) feet in height, a two-source system shall be provided.

In group two (2) public garages, as defined in section 415, located in buildings of which their upper stories are designed for other uses, standpipe systems complying with sections 1207 or 1209 and 1210 shall be provided.

1213.14. Bus Garages.—A one-source system shall be provided in all bus garages which are more than thirty (30) feet or two (2) stories in height, or which are designed as passenger terminals for four (4) or more buses, or for the storage or loading of four (4) or more buses.

1213.15. Assembly Uses.—A two-source system shall be provided in such parts of all theatres and assembly halls (use groups F-1 and F-3), designated in article 4.

1213.16. Mercantile and Industrial Buildings.—Except as provided herein, a one-source system shall be provided on all floors of mercantile and

industrial buildings (use groups C and D) which are more than twenty thousand (20,000) square feet in area on any floor above or below the grade floor when of types 1-A, 1-B or 2-A construction or more than ten thousand (10,000) square feet when of types 2-B or 3-A construction, or more than seven thousand five hundred (7,500) square feet when of types 2-C, 3-B and 3-C construction and more than six thousand (6,000) square feet when of type 4-A construction. This provision shall not apply to buildings of one (1) story without basement.

1213.17. Combustible Contents.—All buildings and structures used for the manufacture, sale or storage of combustible materials and products (use groups A and B-1) shall be equipped with an approved automatic sprinkler system when more than three (3) stories or forty (40) feet in height and more than ten thousand (10,000) square feet in area of fireproof (type 1-A or 1-B) construction; when more than three (3) stories or forty (40) feet in height and seven thousand five hundred (7500) square feet in area of noncombustible (type 2-A) construction; when more than two (2) stories or thirty (30) feet in height and six thousand (6000) square feet in area of protected noncombustible (type 2-B) or heavy mill (type 3-A) construction; when more than one (1) story in height and three thousand (3000) square feet in area of ordinary (type 3-C) or protected frame (type 4-A) construction; and in every usable or occupiable cellar or story with ceiling located less than six (6) feet above grade and more than three thousand (3000) square feet in area.

1213.18. Unpierced Enclosures.—All completely enclosed buildings designed for industrial occupancy which are provided with artificial means of light and ventilation as specified in section 517, shall require a two-source automatic sprinkler system protected with central supervisory service; except in refrigerating plants and buildings or parts thereof used for cold storage of meats and other food products.

1213.19. Unlimited Area Buildings.—One-story buildings of unlimited areas in conformity to section 309 shall be equipped with an approved one-source automatic sprinkler system.

1213.2. Number of Risers.—In each fire area there shall be at least one (1) riser of adequate size to furnish all the heads therein contained in one (1) story.

1213.3. Prohibited Connections.—No auxiliary connection shall be made to sprinkler risers for sill cock, house service, standpipe or other hose outlet purpose.

1213.4. Mechanical Protection.—Risers shall be protected from mechanical injury and shall not be located close to windows.

1213.5. Protection From Freezing.—All discharge, heating or filling pipes where exposed to the weather shall be protected from freezing and the water in all sprinkler tanks subject to freezing shall be provided with internal heating equipment or approved frostproof enclosures.

1213.6. Protection From Corrosion.—Wherever necessary, sprinkler pipes and hangers shall be protected against corrosion from moisture and the heads shall be covered with an approved chemically treated coating for protection from chemical fumes when required by the administrative official.

1213.7. Drainage of Discharge.—Provision shall be made for discharge of the overflow of water on every floor of sprinklered buildings designed for industrial and storage uses to comply with the Plumbing Code.

1213.8. Fire Department Connection.—Every sprinkler system shall be equipped with one (1) or more approved fire department connections as required by section 1207.8. The size, threads and accessories shall be uniform with the equipment of the local fire department. Each such connection shall be suitably marked with raised letters "FIRE DEPARTMENT CONNECTION — AUTOMATIC SPRINKLERS"; or when only stories below grade are equipped, "FIRE DEPARTMENT CONNECTION — BASEMENT SPRINKLERS" or "CELLAR SPRINKLERS" as the case may be.

1213.9. Main Control Valve.—Every sprinkler system shall be provided with a readily accessible outside screw and yoke valve or an indicator gate valve to control all sources of water supply except that from the fire department connection.

SECTION 1214.0. SPRINKLER WATER SUPPLIES

Automatic sprinkler systems shall have at least one (1) approved automatic source of water supply meeting the requirements of this section.

1214.1. Public Water Sprinkler Supply.—Direct connections to public water supplies shall be capable of supplying water at not less than fifteen (15) pounds per square inch pressure at the topmost sprinkler head.

1214.2. Sprinkler Gravity Tank.—Gravity tanks shall be capable of supplying twenty-five (25) per cent of the number of sprinkler heads in the maximum protected fire area for a period of twenty (20) minutes but in no case shall the capacity of any one (1) tank be less than five thousand (5000) gallons.

1214.3. Sprinkler Pressure Tank.—Pressure tanks shall be capable of supplying twelve and one-half (12½) per cent of the number of sprinkler heads in the maximum protected fire area; but in no case shall the capacity be less than three thousand (3000) gallons of water for a wet pipe system, nor less than five thousand (5000) gallons for a dry pipe system; nor shall any single tank have a capacity of more than six thousand (6000) gallons. The tank shall be maintained two-thirds (⅔) full of water under a pressure of seventy-five (75) pounds per square inch at all times.

1214.4. Sprinkler Fire Pump.—Automatic fire pumps shall be of an approved type with a supply capacity of at least five hundred (500) gallons per minute. The pumps shall be adequate to supply fifty (50) per cent of the sprinkler heads in the maximum protected fire area and shall be located in a room enclosed with two (2) hour fireresistive construction.

1214.5. Combined Water Supply.—When the sprinklers and standpipes are supplied from one (1) tank, it shall comply with the provisions of section 1208.2 and the standpipe supply shall be drawn from the top portion of the tank.

1214.6. Partial Sprinkler Systems.—Where approved by the administrative official, partial systems serviced from the building water supplies may be used in isolated hazardous locations and to protect unenclosed exitways in existing buildings as provided in section 606.32.

1214.7. Sprinkler Head Discharge.—In determining the required water supplies, standard one-half (½) inch sprinkler heads shall be assumed to have an average discharge of twenty (20) gallons per minute and the discharge of larger heads shall be computed proportionately to the area of their orifices.

SECTION 1215.0. DRY PIPE AUTOMATIC SYSTEMS

When a building or structure requiring an automatic sprinkler system under the provisions of the Basic Code is subject to temperatures below freezing, an automatic dry pipe system or other approved thermostatically controlled open or closed sprinkler system shall be installed in accordance with the approved rules.

1215.1. Thermostatic Control.—In other than standard dry pipe systems the thermostatic control shall be arranged to admit water to the system and simultaneously give an alarm.

1215.2. Auxiliary Manual Control.—All such thermostatically controlled systems shall also be provided with auxiliary manual controls.

SECTION 1216.0. NON-AUTOMATIC SPRINKLER SYSTEMS

When approved by the building official, a dry sprinkler system with fire department connection may be accepted in buildings and structures which involve low fire and life hazard and in which adequate heat is not provided, in place of an automatic sprinkler system. Such systems shall be provided with an approved automatic heat-actuated alarm with an outside alarm gong or connection to the fire department, or to the central station of an approved supervisory service.

1216.1. Risers of Non-Automatic Systems.—Each riser of non-automatic systems shall be provided with a control valve as required for automatic systems.

1216.2. Special Flooding Installations.—In buildings equipped with automatic sprinkler systems, the enclosures housing special hazardous processes or used for the storage of flammable or highly combustible materials may be protected with an open pipe sprinkler installation equipped with jumbo or deluge heads with such control as may be directed by the administrative official having jurisdiction.

1216.3. Non-Automatic Sprinkler Fire Department Connection.—In all non-automatic sprinkler systems, at least one (1) siamese connection shall be provided on each street front with an exposure of two hundred and fifty (250) feet in length and one (1) additional connection for each additional two hundred and fifty (250) feet or part thereof.

SECTION 1217.0. SPECIAL FIRE PROTECTION

1217.1. Elevator Service.—In every building or structure exceeding one

hundred and fifty (150) feet in height and in buildings during the course of construction exceeding seventy-five (75) feet in height, at least one elevator shall be available at all times for fire department use as provided in section 1608.2.

1217.2. Telephone Service.—In every building or structure exceeding two hundred and fifty (250) feet in height, a telephone system for fire department use shall be installed and maintained in accordance with the approved rules.

1217.3. Fire Alarm Systems.—All buildings and structures where required by the provisions of sections 1219 and 1220 shall be protected with an approved fire alarm system, or by approved watchman supervisory and manual fire alarm services.

1217.4. Central Station Alarm Systems.—When required under the provisions of the Basic Code in buildings designed for special hazard uses, including film studios and pyroxylin manufacturing (use group A), large public assembly buildings (use group F) with an occupancy load of more than three hundred (300) and hospitals and similar institutional buildings (use group H-2) requiring automatic fire-extinguishing equipment under the provisions of the Basic Code, protective signaling equipment shall be provided with connections to a local central station in the building, to an outside supervisory central station, or with direct fire department connection over private wire.

1217.5. Water Curtains for Wall Openings.—In all buildings and structures designed for high hazard (use group A), storage (use group B), mercantile (use group C), and industrial (use group D) uses involving the storage, sale or processing of flammable materials or products, the exterior wall openings located on or within six (6) feet of interior lot lines shall be protected with an approved water curtain.

1217.6. Unenclosed Exitways.—In existing multi-family and other residential buildings, existing exitways not now enclosed as provided in article 6 may be protected with water curtains or partial sprinkler systems when approved by the building official.

1217.7. Water Curtains for Floor Openings.—Unenclosed floor openings shall be protected with automatically controlled water curtains as specified in sections 522 and 1622.

1217.8. Yard Systems.—All shipyards, oil storage plants, lumber yards, amusement or exhibition parks and similar occupancies and uses involving high fire and life hazards, when required by the provisions of article 4 or when deemed necessary by the administrative official shall be provided with an installation of properly placed fire hydrants, piped to an adequate water supply and equipped with sufficient hose housed in accordance with the approved rules and supervised by a trained fire brigade.

1217.9. Chemical and Special Extinguishing Systems.—All buildings and structures and parts thereof designed for uses subject to fires of extreme severity and explosion hazards as provided in article 4 shall be protected with approved automatic extinguishing systems installed and maintained as required by accepted engineering standards.

SECTION 1218.0. MANUAL FIRE-EXTINGUISHING EQUIPMENT

All hand operated auxiliary fire-extinguishing equipment shall be of an approved type suitable to the occupational use of the building and shall be installed in corridors or other locations, visible and readily accessible to the occupants of the building in accordance with the requirements of the building official and as herein specified.

1218.1. Required Auxiliary Fire Appliances.

1218.11. Theatres.—Theatres (use group F-1) shall be provided with at least two (2) approved fire extinguishers in the stage area behind the proscenium wall where movable scenery is installed; not less than one (1) fire extinguisher on stages or platforms without scenery or stage equipment; one (1) in each tier of dressing rooms, and one (1) immediately outside the entrance to every motion picture booth.

1218.12. Other Assembly Buildings.—Schools, assembly and lecture halls (use groups F-3 and F-4) shall be provided with one (1) fire extinguisher for each twenty-five hundred (2500) square feet of floor area or fraction thereof but not less than one (1) on each occupied floor, including basements, and not less than one (1) fire extinguisher in each laboratory, shop or other vocational room.

1218.13. Residential Buildings.—In hotels, dormitories and lodging houses (use group L-1) not equipped with standpipes, at least one (1) fire extinguisher shall be provided on each floor at the stairway landing and in the corridor at each elevator or bank of elevators.

1218.14. Construction Operations.—All building operations during construction shall be protected as provided in article 13; but not less than one (1) approved fire extinguisher shall be provided in each storage shed and on each run of combustible scaffolding forty (40) feet or more in height.

1218.2. Cabinets.—When auxiliary emergency equipment is enclosed in cabinets, they shall be of an approved type of noncombustible construction equipped with readily openable keyless doors or with readily broken glass access panels.

1218.3. Partial Sprinkler System.—In isolated hazardous locations, incidental to the general use of the building, the building official may accept a partial sprinkler system serviced from the building water supplies complying with section 1214.6 as a substitute for portable fire extinguishers.

SECTION 1219.0. INTERIOR FIRE ALARM SYSTEMS

Interior fire alarm systems shall be installed in all buildings herein designated.

1219.1. Buildings Requiring Fire Alarms.

1219.11. Residential Buildings.— All hotels, lodging houses, dormitories and bath houses (use group L-1) having more than fifteen (15) sleeping rooms above the first floor with an occupancy load of fifty (50) or more shall be equipped with an approved fire alarm system.

1219.12. Institutional Buildings.—All hospitals, asylums, nursing homes and similar institutional buildings (use group H-2) accommodating more than twenty (20) occupants above the first floor shall be equipped with an approved fire alarm system.

1219.13. Nursery Buildings.—All nurseries accommodating more than thirty (30) children above the first floor shall be equipped with an approved fire alarm system.

1219.14. School Buildings.—All school buildings (use group F-4) with provision for more than thirty (30) children above the first story shall be equipped with an approved fire alarm system.

1219.15. Mercantile Buildings.—All department stores (use group C) with two (2) or more sales departments above the second floor not provided with a complete automatic sprinkler system shall be equipped with an approved fire alarm system.

1219.16. Industrial Buildings.—All factory buildings (use group D) exceeding two (2) stories in height not equipped with an approved automatic sprinkler system, in which more than twenty-five (25) individuals are employed above the first or ground floor shall be equipped with an approved fire alarm system.

1219.17. Business Buildings.—All office buildings more than six (6) stories or seventy-five (75) feet in height with an occupancy load of more than one hundred (100) above the first floor which are not equipped with an automatic sprinkler system shall be equipped with an approved fire alarm system.

1219.18. High Hazard Use.—All motion picture studios and film laboratories and similar high hazard uses (use group A) shall be equipped with an approved fire alarm system.

1219.19. Unpierced Industrial Buildings.—All fully enclosed industrial buildings as specified in section 517 more than one (1) story in height without exterior wall openings shall be equipped with an approved fire alarm system.

1219.2. Types of Alarm Systems.

1219.21. Non-Coded Systems.—Non-coded systems shall be required in residential, institutional, mercantile and business buildings and in all factory buildings not exceeding five (5) stories in height, nor more than five thousand (5000) square feet in area with an occupancy load of not more than fifty (50) above the first story.

1219.22. Coded Systems.—Coded systems shall be required in all other buildings specified in section 1219.1, installed in accordance with the approved rules.

1219.3. Number of Stations.

1219.31. Number Per Story.—At least one (1) sending station shall be located in each story in an accessible position in a natural path of escape or exitway.

1219.32. Length of Travel.—All stations shall be located so that no point on any floor of the building is more than one hundred and fifty (150) feet distant from a station.

SECTION 1220.0. FIRE DRILLS AND FIRE BRIGADES

The owner or tenant of all buildings required by law to be equipped with interior fire alarm signal systems, and where required in connection with yard fire-fighting equipment in section 1217.8, shall conduct systematic supervised fire drills and shall organize a fire brigade for the operation of all first-aid and emergency fire-extinguishing equipment and appliances and for the orderly vacating of the occupants. All fire drills shall be conducted under the supervision of the administrative official.

1220.1. Frequency of Drills.—Fire drills shall be conducted simultaneously throughout the building at least once every thirty (30) days at varied hours of the day.

1220.2. Supervisory Drill Organizations.—All professional organizations engaged in the practice of establishing, conducting and supervising fire drills shall be registered with the administrative authorities.

1220.3. Fire Drill Records.—It shall be the duty of the owner or his authorized representative in charge of the drill to make a complete report and written record of the procedure in accordance with the rules of the administrative official.

1220.4. Duties of Fire Brigade.—All drills shall be conducted in accordance with the requirements of the administrative official. The fire brigade shall be instructed in the operation of all auxiliary fire-fighting apparatus to insure minimum interference with the use of exitways while occupants are discharging from the building.

ARTICLE 13

PRECAUTIONS DURING BUILDING OPERATIONS

SECTION 1300.0. SCOPE

The provisions of this article shall apply to all construction operations in connection with the erection, alteration, repair, removal or demolition of buildings and structures. The execution of the detail requirements shall be regulated by the approved rules and the safety code for building construction listed in appendix B.

1300.1. Other Laws.—Nothing herein contained shall be construed to nullify any rules, regulations or statutes of state agencies governing the protection of the public or workmen from health or other hazards involved in manufacturing, mining and other processes and operations which generate toxic gases, dust or other elements dangerous to the respiratory system, eyesight or health.

1300.2. Combustible and Explosive Hazards.—The provisions of the Basic Code which apply to the storage, use or transportation of explosives, highly flammable and combustible substances, gases and chemicals shall be construed as supplemental to the requirements of the federal laws, the regulations of the Interstate Commerce Commission and the rules and regulations of the municipality.

SECTION 1301.0. DEFINITIONS

construction equipment. The construction machinery, tools, derricks, hoists, scaffolds, platforms, runways, ladders and all material handling equipment safeguards and protective devices used in construction operations.

construction operation. The erection, alteration, repair, renovation, demolition or removal of any building or structure; and the excavation, filling, grading and regulation of lots in connection therewith.

material platform hoist. A power or manually operated suspended platform conveyance operating in guide rails for the exclusive raising or lowering of materials, which is operated and controlled from a point outside the conveyance.

runway. Any aisle or walkway constructed or maintained as a temporary passageway for pedestrians or vehicles.

scaffold. Any elevated platform which is used for supporting workmen, materials or both.

SECTION 1302.0. PLANS, SPECIFICATIONS AND SPECIAL PERMITS

1302.1. Temporary Construction.—Before any construction operation is started, plans and specifications shall be filed with the building official showing the design and construction of all sidewalk sheds, truck runways,

trestles, foot bridges, guard fences and other similar devices required in the operation; and the approval of the building official shall be secured before the commencement of any work.

1302.2. Special Permits.—All special licenses and permits for the storage of materials on sidewalks and highways, for the use of water or other public facilities and for the storage and handling of explosives shall be secured from the administrative authorities having jurisdiction.

1302.3. Temporary Encroachments.—Subject to the approval of the building official, sidewalk sheds, underpinning and other temporary protective guards and devices may project beyond the interior and street lot lines as may be required to insure the safety of the adjoining property and the public. When necessary, the consent of the adjoining property owner shall be obtained.

SECTION 1303.0. TESTS

1303.1. Loading.—It shall be unlawful to load any structure, temporary support, scaffolding, sidewalk bridge or sidewalk shed or any other device or construction equipment during the construction or demolition of any building or structure in excess of its safe working capacity as provided in article 7 for allowable loads and working stresses.

1303.2. Unsafe Equipment.—Whenever any doubt arises as to the structural quality or strength of scaffolding plank or other construction equipment, such material shall be replaced; provided, however, the building official may accept a strength test to two and one-half (2½) times the superimposed live load to which the material or structural member is to be subjected. The member shall sustain the test load without failure.

SECTION 1304.0. INSPECTION

When inspection of any construction operation reveals that any unsafe or illegal conditions exist, the building official shall notify the owner and direct him to take the necessary remedial measures to remove the hazard or violation.

1304.1. Failure to Comply With Orders.—Unless the owner so notified proceeds to comply with the orders of the building official within twenty-four (24) hours, the building official shall have full power to correct the unsafe conditions as provided in sections 125 and 126. All expenses incurred in the correction of such unsafe conditions shall become a lien on the property.

1304.2. Unsafe Construction Equipment.—When the strength and adequacy of any scaffold or other device or construction equipment is in doubt, or when any complaint is made, the building official shall inspect such equipment and shall prohibit its use until tested as required in section 1303.2 or until all danger is removed.

SECTION 1305.0. MAINTENANCE

All construction equipment and safeguards shall be constructed, installed and maintained in a substantial manner and shall be so operated as to

insure protection to the workmen engaged thereon and to the general public. It shall be unlawful to remove or render inoperative any structural, fire-protective or sanitary safeguard or device herein required except when necessary for the actual installation and prosecution of the work.

SECTION 1306.0. EXISTING BUILDINGS

1306.1. Protection.—All existing and adjoining public and private property shall be protected from damage incidental to construction operations.

1306.2. Chimney, Soil and Vent Stacks.—Whenever a new building or structure is erected to greater or less heights than an adjoining building, the construction and extension of new or existing chimneys shall conform to the provisions of section 1006 and of soil and vent stacks and the location of window openings shall conform to the provisions of section 1706.

1306.3. Adjoining Walls.—The owner of the new or altered structure shall preserve all adjoining independent and party walls from damage as provided herein. He shall underpin where necessary and support the adjoining building or structure by proper foundations to comply with section 1308.

1306.31. Maintenance.—In case an existing party wall is intended to be used by the person who causes an excavation to be made, and such party wall is in good condition and sufficient for the use of both the existing and proposed building, such person shall preserve the party wall from injury and support it by proper foundations at his own expense, so that it shall be and shall remain as safe and useful as it was before the excavation was commenced. During the demolition, the party wall shall be maintained weather-proof and structurally safe by adequate bracing until such time as the permanent structural supports shall have been provided.

1306.32. Beam Holes.—When a structure involving a party wall is being demolished, the owner of the demolished structure shall, at his own expense, bend over all wall anchors at the beam ends of the standing wall and shall brick-up all open beam holes and otherwise maintain the safety and usefulness of the wall.

1306.33. Party Wall Exitways.—No party wall balcony or horizontal fire exit shall be destroyed unless and until a substitute means of egress has been provided and approved by the building official.

1306.4. Adjoining Roofs.—When a new building or demolition of an existing building is being prosecuted at a greater height, the roof, roof outlets and roof structures of adjoining buildings shall be protected against damage with adequate safeguards by the person doing the work.

SECTION 1307.0. PROTECTION OF PUBLIC AND WORKMEN

Whenever a building or structure is erected, altered, repaired, removed or demolished, the operation shall be conducted in a safe manner and suitable protection for the general public and workmen employed thereon shall be provided.

1307.1. Fences.—Every construction operation located five (5) feet or

less from the street lot line shall be enclosed with a fence not less than eight (8) feet high to prevent entry of unauthorized persons. When located more than five (5) feet from the street lot line, a fence or other barrier shall be erected when required by the building official. All fences shall be of adequate strength to resist the wind pressure specified in section 716.

1307.2. Sidewalk Bridge.—Whenever the ground is excavated under the sidewalk, a sidewalk bridge shall be constructed at least four (4) feet wide, or a protected walkway of equal width shall be erected in the street, provided the required permit for such walkway is obtained from the administrative authority.

1307.3. Sidewalk Shed.

1307.31. Within 10 Feet of Street Lot Line.—When any building or part thereof which is located within ten (10) feet of the street lot line is to be erected or raised to exceed forty (40) feet in height, or whenever a building more than forty (40) feet in height within ten (10) feet of the street lot line is to be demolished, a sidewalk shed shall be erected and maintained for the full length of the building on all street fronts for the entire time that work is performed on the exterior of the building.

1307.32. Within 20 Feet of Street Lot Line.—When the building being demolished or erected is located within twenty (20) feet of the street lot line and is more than forty (40) feet in height, exterior flare fans or catch platforms shall be erected at vertical intervals of not more than two (2) stories.

1307.33. Buildings Higher Than Six Stories.—When the building being demolished or erected is more than six (6) stories or seventy-five (75) feet in height, unless set back from the street lot line a distance more than one-half (½) its height, a sidewalk shed shall be provided.

1307.34. Walkway.—An adequately lighted walkway at least four (4) feet wide and eight (8) feet high in the clear shall be maintained under all sidewalk sheds for pedestrians. Where ramps are required, they shall conform to the provisions of this article and section 617.

1307.4. Thrust-Out Platforms.—The building official may approve thrust-out platforms or other substitute protections in lieu of sidewalk sheds when deemed adequate to insure the public safety. No thrust-out platforms shall be used for the storage of materials.

1307.5. Watchman.—Whenever a building is being demolished, erected or altered, a watchman shall be employed to warn the general public when intermittent hazardous operations are conducted across the sidewalk or walkway.

SECTION 1308.0. EXCAVATIONS

1308.1. Temporary Support.—Until permanent support has been provided, all excavations shall be safeguarded and protected by the person causing the excavations to be made, to avoid all danger to life or limb. Where necessary, such excavations shall be retained by temporary retaining walls, sheet-piling and bracing or other approved method to support the adjoining earth.

1308.11. Examination of Adjoining Property.—Before any excavation or demolition is undertaken, license to enter upon adjoining property for the purpose of physical examination shall be afforded by the owner and tenants of such adjoining property to the person undertaking such excavation or demolition, prior to the commencement and at reasonable periods during the progress of the work.

1308.12. Notice to the Building Official.—If the person who causes an excavation to be made or an existing structure to be demolished has reason to believe that an adjoining structure is unsafe, he shall forthwith report in writing to the building official. The building official shall inspect such premises, and if the structure is found unsafe, he shall order it repaired as provided in section 125.

1308.13. Responsibility of Adjoining Owner.—The person making or causing an excavation to be made shall, before starting the work, give at least one week's notice in writing to the owner of each neighboring building or structure the safety of which may be affected. Having received consent to enter a building, structure or premises, he shall make the necessary provisions to protect it structurally and to insure it against damage by the elements which may ensue from such excavation. If license to enter is not afforded, then the adjoining owner shall have the entire responsibility of providing both temporary and permanent support of his premises at his own expense; and for that purpose, he shall be afforded the license when necessary to enter the property where the excavation is to be made.

1308.14. Excavations for Other than Construction Purposes.—Excavations made for the purpose of removing soil, earth, sand, gravel, rock or other materials shall be performed in such a manner as will prevent injury to neighboring properties or to the street which adjoins the lot where such materials are excavated, and to safeguard the general public health and welfare.

1308.2. Permanent Support.

1308.21. Deep Excavations.—Whenever an excavation is made to a depth of more than ——— feet below the established curb, the person who causes such excavation to be made, if afforded the necessary license to enter the adjoining premises, shall preserve and protect from injury at all times and at his own expense such adjoining structure or premises which may be affected by the excavation. If the necessary license is not afforded, it shall then be the duty of the owner of the adjoining premises to make his building or structure safe by installing proper underpinning or foundations or otherwise; and such owner, if it be necessary for the prosecution of his work shall be granted the necessary license to enter the premises where the excavation or demolition is contemplated.

1308.22. Shallow Excavations.—Wherever an excavation is made to a depth less than ——— feet below the curb, the owner of a neighboring building or structure the safety of which may be affected by the proposed excavation, shall preserve and protect from injury and shall support his building or structure by the necessary underpinning or foundations. If necessary for that purpose, he shall be afforded a license to enter the premises where the excavation is contemplated.

Note C: Depth of Excavations.—Provisions have been incorporated in the Basic Code for the support of neighboring buildings and structures; and to fix the responsibility for the safety of such buildings and structures by statute. When no special legal provision is made, the common law requires that an excavator is only responsible for reasonable care in the prosecution of his work to avoid damage to adjoining structures. The depth of excavation at which the excavator's responsibility should start is a matter of local policy and rule and varies in different jurisdictions. The municipality should specify the limiting depth at which responsibility changes. In Niagara Falls, New York, it is fixed at three (3) feet, the assumed frost line, which is the minimum required legal depth for all foundations in that municipality. In New York City, the statutory depth is ten (10) feet. When the neighboring land adjoining an excavation is in its natural state and there are no structures erected thereon the owner of such land should also be entitled to permanent support as provided in the Basic Code; and the person proposing to excavate should not be relieved from the responsibility to maintain conditions that guarantee the safety of the public.

SECTION 1309.0. REGULATION OF LOTS

1309.1. Grading of Lot.—When a building has been demolished and no building operation has been projected or approved, the vacant lot shall be filled, graded and maintained in conformity to the established street grades at curb level. The lot shall be maintained free from the accumulation of rubbish and all other unsafe or hazardous conditions which endanger the life or health of the public; and provision shall be made to prevent the accumulation of water or damage to any foundations on the premises or the adjoining property.

1309.2. Utility Connections.—All service utility connections shall be discontinued and capped in accordance with the approved rules and the requirements of the municipal authority having jurisdiction.

SECTION 1310.0. RETAINING WALLS AND PARTITION FENCES

When the adjoining grade is not higher than the legal level, the person causing an excavation to be made shall erect, when necessary, a retaining wall at his own expense and on his own land. Such wall shall be built to a height sufficient to retain the adjoining earth, shall be properly coped as required in section 872 and shall be provided with a guard-rail or fence not less than four (4) feet in height.

SECTION 1311.0. STORAGE OF MATERIALS

All materials and equipment required in construction operations shall be stored and placed so as not to endanger the public, the workmen or adjoining property.

1311.1. Design Capacity.—Materials or equipment stored within the building, or on sidewalks, sheds or scaffolds shall be placed so as not to

overload any part of the construction beyond its design capacity, nor interfere with the safe prosecution of the work.

1311.2. Special Loading.—Unless the construction is designed for special loading, materials stored on sidewalk sheds and scaffolds shall not exceed one (1) day's supply. All materials shall be piled in an orderly manner and height, to permit removal of individual pieces without endangering the stability of the pile.

1311.3. Pedestrian Walkways.—No materials or equipment shall be stored on the street without a permit issued by the adminstrative official having jurisdiction. When so stored they shall not unduly interfere with vehicular traffic, or the orderly travel of pedestrians on the highways and streets. The piles shall be arranged to maintain a safe walkway not less than four (4) feet wide, unobstructed for its full length, and adequately lighted at night and at all necessary times for the use of the public.

1311.4. Obstructions.—Material and equipment shall not be placed or stored so as to obstruct access to fire hydrants, standpipes, fire or police alarm boxes, utility boxes, catch basins, or manholes, nor shall they be located within twenty (20) feet of a street intersection, or so placed as to obstruct normal observations of traffic control lights, or to hinder the use of street car loading platforms.

SECTION 1312.0. REMOVAL OF WASTE MATERIAL

No material shall be dropped by gravity or thrown outside the exterior walls of a building during demolition or erection. Wood or metal chutes shall be provided for this purpose and any material which in its removal will cause an excessive amount of dust shall be wet down to prevent the creation of a nuisance.

SECTION 1313.0. PROTECTION OF ADJOINING PROPERTY

Adjoining property shall be completely protected from any damage incidental to the building operation when the owner of the adjoining property permits free access to the building at all reasonable times to provide the necessary safeguards in accordance with section 1308.

SECTION 1314.0. PROTECTION OF FLOOR AND WALL OPENINGS

1314.1. Noncombustible Floor Construction.—The arches, slabs or structural floor fillings of buildings of fireproof construction (type 1) and noncombustible construction (type 2) shall be installed as the building progresses.

1314.2. Combustible Floor Construction.—In wood joist floor construction (types 3 and 4) when double flooring is used, the underfloor shall be laid on each story as the building progresses; and when double floors are not used, the floors shall be planked over two (2) stories below the level where work is being performed.

1314.3. Steel Structural Frames.—In steel construction, the entire tier of iron or steel beams upon which the structural work is in progress shall be planked over, with the exception of necessary hoistways and permanent openings; and in no case shall the steel work advance more than six (6) floors ahead of the permanent floor construction.

1314.4. Guard-Rails.—All floor and wall openings shall be protected with substantial guard-rails and toe boards in accordance with accepted engineering practice.

SECTION 1315.0. SCAFFOLDS

1315.1. Load Capacity.—All scaffolds shall be designed to support two and one-half (2½) times the superimposed live load to be placed thereon but in no case less than one hundred and twenty(120) pounds per square foot.

1315.2. Erection.—Built-up, swinging, and suspended scaffolds shall be erected by competent workmen only.

1315.3. Fireretardant Construction.

1315.31. All Buildings.—In the erection, alteration or maintenance of buildings of all use groups, all scaffolding exceeding eight-five (85) feet or seven (7) stories in height shall be constructed of noncombustible or fireretardant materials complying with the provisions of article 9 for scaffolding.

1315.32. Institutional Buildings.—All scaffolding used in construction operations involving the repair or partial demolition of institutional buildings (use groups H-1 and H-2), during occupancy of the building shall be constructed of slow-burning materials complying with the provisions of article 9.

SECTION 1316.0. HOISTS

1316.1. Hoist Protection.—All material hoists shall be adequately protected; and when erected on the outside of a building over eighty-five (85) feet or seven (7) stories in height, the structure shall be built of noncombustible or approved fireretardant materials with the exception of the loading platform.

1316.2. Passengers Prohibited.—No persons shall be permitted to ride a material hoist; and temporary elevators shall be installed when necessary to transport workmen as provided in article 16.

1316.3. Guarding of Cables.—All hoisting cables and signal cords shall be guarded wherever they pass through or cross working spaces to prevent injury to persons.

1316.4. Riggers License.—All persons engaged in the erection of derricks and other hoisting appartus shall secure a license or certificate of fitness for the performance of such work from the authorized administrative official.

SECTION 1317.0. STAIRWAYS AND LADDERS

1317.1. Temporary Stairways.—When a building has been constructed to a greater height than fifty (50) feet or four (4) stories, or when an exist-

ing building which exceeds fifty (50) feet in height is altered, at least one temporary lighted stairway shall be provided unless one or more of the permanent stairways are erected as the construction progresses.

1317.2. Ladders.—Temporary ladders when permitted for access to floors before stairways are installed, or which are designed for other working purposes, shall extend at least forty-two (42) inches above the floor level which they serve.

SECTION 1318.0. LIGHTING

All stairways and parts of buildings under demolition, erection or repair shall be adequately lighted while persons are engaged at work to comply with the provisions of sections 627 and 1502.15.

SECTION 1319.0. FIRE HAZARDS

The provisions of the Basic Code and of the fire prevention regulations shall be strictly observed to safeguard against all fire hazards attendant upon construction operations.

1319.1. Temporary Heating.—Whenever salamanders or other heating devices are used for temporary heating, all regulations as to maximum temperature, distance from combustible materials, spark arrestors, removal of noxious gases, and other requirements prescribed by the building official shall be fully observed. When the source of temporary heat consists of salamanders or other open-flame devices temporary canvas enclosures shall comply with section 904.6.

1319.2. Steam Boilers.—All temporary or permanent high pressure steam boilers shall be operated only by licensed operating engineers in accordance with the provisions of section 1105. When located within a building or within ten (10) feet thereof, all such boilers shall be enclosed with approved noncombustible construction.

1319.3. Storage of Flammables.—Storage of gasoline for hoists, oils, paints and other highly flammable materials shall be permitted only as specified in article 4 and when stored in approved safety containers. The storage of larger quantities may be approved by the administrative official when stored in separate compartments or enclosures of approved noncombustible construction.

1319.4 Flame Cutting and Welding.—The use of oxyacetylene torches for cutting or welding shall be permitted only in accordance with the applicable standards for air and gas welding in building construction.

1319.5. Concrete Forms.—No combustible materials shall be stored on any floor of a building under construction until all combustible concrete forms are removed from the tier immediately above.

1319.6. Fire-Extinguishing Equipment.—Required fire extinguishers, water buckets, auxiliary fire-fighting tools or other portable extinguishing equipment shall be installed and maintained on all floors of a construction operation in accessible locations as required in section 1218.14.

1319.7. Standpipes and Fire Lines.—Where standpipes are provided as a permanent part of the building, they shall be installed and made ready for instant use of the fire department as the structure progresses in accordance with the provisions of section 1207.6. Free access from the street to such standpipes shall be maintained at all times; and no materials shall be stored within five (5) feet of any fire hydrant or in the roadway between such hydrant and the center line of the street.

1319.8. Housekeeping.—Rubbish and trash shall not be allowed to accumulate on the site and shall be removed as fast as conditions warrant; combustible rubbish shall be removed daily, and shall not be disposed of by burning on the premises or in the immediate vicinity and the entire premises and area adjoining and around the operation shall be kept in a safe and sanitary condition and free of accumulations of trash, rubbish, nuts, bolts, small tools and other equipment.

SECTION 1320.0. HEALTH HAZARDS

Every construction or maintenance operation which results in the diffusion of dust, stone and other small particles, toxic gases or other harmful substances in quantities hazardous to health shall be safeguarded by means of local ventilation or other protective devices to insure the safety of the public as required by the regulations of the administrative official.

1320.1. Removal of Dust.—Dust, sand blasts or other harmful agents when employed or occurring in construction operations shall be disposed of at or near the point of origin to prevent their diffusion over adjoining premises or streets.

1320.2. Protective Equipment.—Facilities shall be provided for housing the necessary vision, respiratory and protective equipment required in welding operations in approved closed containers and in accordance with the regulations of the administrative official.

SECTION 1321.0. WELDING SAFETY PRECAUTIONS

1321.1. Welding Enclosures.—All welding and flame-cutting operations shall be performed in protected areas with full consideration to safety and fire hazards. Such closed spaces shall be properly ventilated while welding or cutting is being done. Suitable protection against the rays of the electric arc shall be maintained by the contractor where arc-welding operations might be viewed within harmful range by persons other than the welding operators and inspectors.

1321.2. Flammable Materials.—Proper precautions shall be taken to avoid all risk of fire or explosion and no flammable or explosive materials shall be stored in the vicinity of welding or cutting operations.

SECTION 1322.0. SANITATION

Every building in the course of demolition, erection or repair shall be provided with toilet and drinking water facilities which shall be constructed and installed in accordance with the Plumbing Code.

SECTION 1323.0. DISPUTES

The building official, when requested by any person, aggrieved or otherwise, shall serve a written notice on any owner, tenant and their agents who fail to conform to the requirements of this article directing him to take the necessary remedial action. If the person whose duty it is to protect his own or adjoining property under those provisions fails to proceed to fully comply with such notice within three (3) days of the receipt thereof, or within a reasonable time thereafter as determined by the building official, he may cause the necessary work to be done when the health, safety and general welfare of the public are involved. The cost of such work shall become a lien against the property of the offending owner and the legal authority of the municipality shall institute appropriate action for its recovery.

ARTICLE 14

SIGNS AND OUTDOOR DISPLAY STRUCTURES

SECTION 1400.0. SCOPE

The provisions of this article shall govern the construction, alteration, repair and maintenance of all signs and outdoor display structures together with their appurtenant and auxiliary devices in respect to structural and fire safety.

1400.1. Zoning Law.—Where more restrictive in respect to location, use, size or height of signs and outdoor display structures, the limitations of the zoning laws affecting required light and ventilation requirements and use of land shall take precedence over the restrictions of the Basic Code.

1400.2. Approved Rules.—In the absence of approved rules governing details of construction, the provisions of the applicable standards listed in appendix B shall be deemed to conform to the requirements of the Basic Code unless otherwise specified in this article.

SECTION 1401.0. DEFINITIONS

approved combustible plastic. A plastic material more than one-twentieth (1/20) inches in thickness which burns at a rate of not more than two and one-half (2½) inches per minute when subjected to the ASTM standard test for flammability of plastics in sheets of six-hundredths (0.06) inch thickness.

bill board. (poster panel.) A board, panel or tablet used for the display of printed or painted advertising matter.

closed sign. A display sign in which the entire area is solid or tightly enclosed or covered.

display sign. A structure that is arranged, intended, designed or used as an advertisement, announcement or direction; and includes a sign, sign screen, billboard, poster panel and advertising devices of every kind.

ground sign. A display sign supported by uprights or braces in or upon the ground surface.

marquee sign. A display sign attached to or hung from a marquee canopy or other covered structure projecting from and supported by the building and extending beyond the building wall, building line or street lot line.

open sign. A display sign in which at least fifty (50) per cent of the enclosed area is uncovered, or open to the transmission of wind.

poster panel. (See bill board.)

projecting sign. A display sign which is attached directly to the building wall and which extends more than fifteen (15) inches from the face of the wall.

roof sign. A display sign which is erected, constructed and maintained above the roof of the building.

temporary sign. A display sign, banner or other advertising device constructed of cloth, canvas, fabric or other light temporary material, with or without a structural frame, intended for a limited period of display; including decorative displays for holidays or public demonstrations.

wall sign. A display sign which is painted on or attached directly to the building wall and which extends not more than fifteen (15) inches from the face of the wall.

SECTION 1402.0. PLANS, SPECIFICATIONS AND PERMITS

1402.1. Owners Consent.—Before any permit is granted for the erection of a sign or outdoor display structure, plans and specifications shall be filed with the building official showing the dimensions, materials and required details of construction including loads, stresses and anchorage. The applications shall be accompanied by the written consent of the owner or lessee of the premises upon which the sign is to be erected.

1402.2. New Signs.—No new sign shall hereafter be erected, constructed, altered or maintained except as herein provided and until after a permit has been issued by the building official and the required bond shall have been filed in accordance with sections 120 and 1408.

1402.3. Alterations.—No sign shall be enlarged or relocated except in conformity to the provisions of this article for new signs, nor until a proper permit has been secured. The changing of movable parts of an approved sign that is designed for such changes, or the repainting or reposting of display matter shall not be deemed an alteration provided the conditions of the original approval and the requirements of this article are not violated.

SECTION 1403.0. EXEMPTIONS

No permit shall be required for the signs or outdoor display structures covered by the provisions of this section. Such exceptions however shall not be construed to relieve the owner of the sign from responsibility for its erection and maintenance in a safe manner.

1403.1. Wall Signs.—The wall signs herein listed shall not require a permit:

1403.11. Painted Signs.—Signs painted on the surface of masonry, concrete, frame or other approved building walls;

1403.12. Store Signs.—Non-illuminated signs erected over a show window or over the door of a store or business establishment which announce the name of the proprietor and the nature of the business conducted therein;

1403.13. Government Building Signs.—Signs erected on a municipal, state or federal building which announce the name, nature of the occupancy and information as to use of or admission to the premises;

1403.14. Other Wall Signs.—Any wall sign erected on a building or structure, which is not more than one (1) square foot in area;

1403.15. Fence Signs.—Signs painted on the surface of enclosure or division fences, or on picket or other ornamental fences.

1403.2. Ground Signs.—The ground signs herein listed shall not require a permit:

1403.21. Sale or Rent.—Signs erected to announce the sale or rent of the property so designated, provided such signs are not over six (6) feet in height nor more than sixty (60) square feet in area;

1403.22. Transit Directions.—The erection or maintenance of a sign designating the location of a transit line, a railroad station or other public carrier when not more than three (3) square feet in area;

1403.23. Street Signs.—Signs erected by the municipality for street direction.

1403.3. Temporary Signs.—The temporary signs herein listed shall not require a permit:

1403.31. Construction Signs.—Construction signs, engineers' and architects' signs and other similar signs which may be authorized by the building official in connection with construction operations;

1403.32. Special Displays.—Special decorative displays used for holidays, public demonstrations or promotion of civic welfare or charitable purposes, when authorized by the municipal authorities, on which there is no commercial advertising, provided the municipality is held harmless for any damage resulting therefrom as provided in section 1408.

SECTION 1404.0. UNSAFE AND UNLAWFUL SIGNS

1404.1. Notice of Unsafe Signs.—When any sign becomes insecure, in danger of falling, or otherwise unsafe, or if any sign shall be unlawfully installed, erected or maintained in violation of any of the provisions of the Basic Code, the owner thereof or the person or firm maintaining same, shall upon written notice of the building official, forthwith in the case of immediate danger and in any case within not more than ten (10) days, make such sign conform to the provisions of this article or shall remove it. If within ten (10) days the order is not complied with, the building official may remove such sign at the expense of the owner or lessee thereof as provided in section 126.

1404.2. Unlawful Signs.

1404.21. Egress Obstructions.—The building official shall notify the owner or lessee of the building or structure by registered mail whenever a sign is so erected as to obstruct free ingress to or egress from a required door, window, fire escape or other required exitway.

1404.22. Projecting Signs.—A projecting display sign erected at other than right angles to the wall of a building or structure outside of the building line which extends above the roof cornice or parapet wall, or above the roof level when there is no cornice or parapet wall and which obstructs access to the roof is hereby deemed unlawful. Such signs shall be reconstructed or removed as herein required.

1404.23. Alley Signs.—No signs shall be permitted to project beyond public alley lot lines.

SECTION 1405.0. MAINTENANCE AND INSPECTION

The building official may order the removal of any sign that is not maintained in accordance with the provisions of this article.

1405.1. Maintenance.—All signs for which a permit is required, together with all their supports, braces, guys, and anchors shall be kept in repair in accordance with the provisions of this article and article 1; and when not galvanized or constructed of approved corrosion-resistive noncombustible materials shall be painted when necessary to prevent corrosion.

1405.2. Housekeeping.—It shall be the duty and responsibility of the owner or lessee of every sign to maintain the immediate premises occupied by the sign in a clean, sanitary and healthful condition.

1405.3. Inspection.—Every sign for which a permit has been issued and every existing sign for which a permit is required including roof, ground, wall, marquee and pole signs, shall be inspected at least once in every calendar year.

SECTION 1406.0. EXISTING SIGNS

1406.1. Removing or Reconstructing Signs.—No sign heretofore approved and erected shall be repaired, altered or moved, nor shall any sign, or any substantial part thereof, which is blown down, destroyed or removed, be re-erected, reconstructed, rebuilt or relocated unless it is made to comply with all applicable requirements of this article.

1406.2. Repair of Unsafe Signs.—This section shall not be construed to prevent the repair or restoration to a safe condition as directed by the building official of any part of an existing sign when damaged by storm or other accidental emergency.

1406.3. Relocating Signs.—Any sign that is moved to another location either on the same or to other premises shall be considered a new sign and a permit shall be secured for any work performed in connection therewith when required by this article.

SECTION 1407.0. REGISTRATION AND IDENTIFICATION

1407.1. Registration.—Every ground sign and roof sign shall be registered with the building official by the person maintaining the same.

1407.2. Identification.—Every sign for which a permit has been issued and hereafter erected, constructed or maintained shall be plainly marked with the name of the person, firm or corporation owning, erecting, maintaining or operating such sign.

SECTION 1408.0. BONDS AND LIABILITY INSURANCE

1408.1. Filing Bond.—No person shall erect, install, remove or rehang any sign for which a permit is required under the provisions of the Basic Code until an approved bond shall have been filed in the sum of ———— as herein required and as specified in section 120.

1408.2. Amount of Bond.—Such bond shall be conditioned on the construction, erection and maintenance of the sign in accordance with the provisions of the Basic Code and shall protect and save the municipality of [*name of municipality*] harmless from any and all claims or demands for damages by reason of any negligence of the sign hanger, contractor or his agents, or by reason of defects in the construction, or damages resulting from the collapse or failure of any sign or part thereof.

1408.3. Notice of Cancellation.—The obligation herein specified shall remain in force and effect during the life of every sign and shall not be cancelled by the principal or surety until after thirty (30) days' notice to the building official.

SECTION 1409.0. GENERAL REQUIREMENTS FOR ALL SIGNS

All signs shall be designed and constructed in conformity to the provisions for materials, loads and stresses of articles 7 and 8 and the requirements of this article.

1409.1. Design Loads.

1409.11. Wind.—The effect of special local wind pressures shall be thoroughly considered in the design; but in no case shall the wind load be assumed less than thirty (30) pounds per square foot of net exposed area for roof signs, twenty (20) pounds per square foot for ground signs over fifty (50) feet in height and fifteen (15) pounds per square foot for ground signs not more than fifty (50) feet in height.

1409.12. Earthquake.—Signs adequately designed to withstand wind pressures shall generally be considered capable of withstanding earthquake shocks except as provided in section 719 and for combined loading in section 720.

1409.2. Illumination.—No sign shall be illuminated by other than electrical means and electrical devices and wiring shall be installed in accordance with the requirements of the National Electrical Code. In no case shall any open spark or flame be used for display purposes unless specifically approved by the building official for locations outside of the fire limits.

1409.3. Obstructions to Exitways.—No sign shall be erected, constructed or maintained so as to obstruct any fire escape, required exitway, window or door opening used as a means of egress or to prevent free passage from one part of a roof to another part thereof or access thereto as required by the provisions of article 6 or for the municipal fire-fighting forces.

1409.4. Obstruction to Ventilation.—No sign shall be attached in any form, shape or manner which will interfere with any opening required for ventilation in article 5; except that such signs may be erected in front of and may cover transom windows when not in violation of the provisions of the Basic Code.

1409.5. Use of Combustibles.

1409.51. Ornamental Features.—Wood or approved plastic or other materials of combustible characteristics similar to wood may be used for

moldings, cappings, nailing blocks, letters and latticing when permitted in section 1410.3, and for other purely ornamental features of signs in accordance with the approved rules.

1409.52. Sign Facings.—Sign facings may be made of approved combustible plastics provided the area of each face is not more than one hundred (100) square feet and the wiring for electric lighting is entirely enclosed in metal conduit and installed with a clearance of not less than two (2) inches from the facing material.

SECTION 1410.0. GROUND SIGNS

1410.1. Obstructions to Traffic.—No ground sign shall be erected so as to obstruct free access to or egress from any building.

1410.2. Setback.—No ground sign shall be set nearer to the street lot line than the established building line.

1410.3. Bottom Clearance.—The bottom capping of all ground signs shall be at least thirty (30) inches above the ground but the intervening space may be filled with open lattice work or platform decorative trim.

1410.4. Fire District Limitations.

1410.41. Fire District No. 1.—In Fire District No. 1, no ground sign shall be constructed of combustible materials, except as provided in section 1409.5.

1410.42. Fire District No. 2.—In Fire District No. 2, structural frames may be erected of wood or other materials of similar combustible characteristics provided the sign facings are covered with metal or other approved noncombustible material, when not more than thirty-five (35) feet in height and seventy-five (75) feet in length.

1410.43. Outside Fire Limits.—Outside the fire limits, the structural frame of ground signs shall not be erected of combustible materials to a height of more than thirty-five (35) feet above the ground.

1410.5. Maximum Size.—In all locations, when constructed entirely of noncombustible material, group signs may be erected to a height of one hundred (100) feet above the ground; and to greater heights when approved by the building official and located so as not to create hazard or danger to the public.

SECTION 1411.0. ROOF SIGNS

1411.1. Materials.—All roof signs shall be constructed entirely of metal or other approved noncombustible materials except as provided in section 1409.5. Provision shall be made for electric ground of all metallic parts; and where combustible materials are permitted in letters or other ornamental features, all wiring and tubing shall be kept free and insulated therefrom.

1411.2. Bottom Clearance.—There shall be a clear space of not less than six (6) feet between the lowest part of the sign and the roof level except for necessary structural supports.

1411.3. Closed Signs.—A closed roof sign shall not be erected to a height greater than fifty (50) feet above fireproof and noncombustible buildings (types 1 and 2) nor more than thirty-five (35) feet above the roof of non-fireproof (type 3) buildings.

1411.4. Open Signs.—An open roof sign shall not exceed a height of one hundred (100) feet above the roof of buildings of fireproof and noncombustible construction, (types 1 and 2); and not more than sixty (60) feet above the roof of buildings of non-fireproof (type 3) construction.

1411.5. Combustible Supports.—Within Fire Districts Nos. 1 and 2, no roof sign which exceeds forty (40) feet in height shall be supported on or braced to wooden beams or other combustible construction of a building or structure unless otherwise approved by the building official.

SECTION 1412.0. WALL SIGNS

1412.1. Materials.—Wall signs which have an area exceeding forty (40) square feet shall be constructed of metal or other approved noncombustible materials except for nailing rails and as provided in section 1409.5.

1412.2. Reflectors.—Lighting reflectors may project eight (8) feet beyond the face of the wall provided such reflectors are at least twelve (12) feet above the sidewalk level; but in no case shall such reflectors project beyond a vertical plane two (2) feet inside the curb line.

1412.3. Extension.—Wall signs shall not be erected to extend above the top of the wall, nor extend beyond the ends of the wall to which they are attached unless meeting all the requirements for roof signs, projecting signs or ground signs as the case may be.

SECTION 1413.0. PROJECTING SIGNS

1413.1. Materials.—Projecting signs shall be constructed entirely of metal or other approved noncombustible materials except as provided in section 1409.5.

1413.2. Maximum Projection.—No such sign shall project over a street or other public space more than ten (10) feet from the face of the building or structure, nor in any case beyond a vertical plane two (2) feet inside the curb line.

1413.3. Clearances.—A clear space of not less than ten (10) feet shall be provided below all parts of such signs.

SECTION 1414.0. MARQUEE SIGNS

1414.1. Materials.—Marquee signs shall be constructed entirely of metal or other approved noncombustible materials except as provided in section 1409.5.

1414.2. Height.—Such signs shall not exceed seven (7) feet in height nor shall they project below the facia of the marquee nor lower than ten (10) feet above the sidewalk.

1414.3. Length.—Marquee signs may extend the full length but in no case shall they project beyond the ends of the marquee.

SECTION 1415.0. MISCELLANEOUS AND TEMPORARY SIGNS

1415.1. Pole Signs.—Pole signs shall be constructed entirely of non-combustible materials except as provided in section 1409.5; and shall conform to the requirements for ground or roof signs as the case may be. Such signs may extend beyond the street lot line if they comply with the provisions of section 1413 for projecting signs.

1415.2. Banner and Cloth Signs.—Temporary signs and banners attached to or suspended from a building, constructed of cloth or other combustible material shall be strongly constructed and shall be securely attached to their supports. They shall be removed as soon as torn or damaged and in no case later than sixty (60) days after erection; except that permits for temporary signs suspended from or attached to a canopy or marquee shall be limited to a period of ten (10) days.

1415.3. Maximum Size.—Temporary signs of combustible construction shall be not more than ten (10) feet in one dimension nor more than five hundred (500) square feet in area.

1415.4. Rigid Frames.—When more than one hundred (100) square feet in area, temporary signs and banners shall be made of rigid materials with rigid frames.

1415.5. Projection.—Temporary signs of cloth and similar combustible construction shall not extend more than twelve (12) inches over or into a street or other public space except that such signs when constructed without a frame may be supported flat against the face of a canopy or marquee or may be suspended from the lower facia thereof but shall not extend closer to the sidewalk than eight (8) feet.

1415.6. Special Permits.—All temporary banners suspended from buildings or hung on poles, which extend across streets or other public spaces shall be subject to special approval of the municipal authority having jurisdiction.

SECTION 1416.0. ILLUMINATED SIGNS

1416.1. Certificates.—All electrically illuminated signs shall be certified as to electric wiring and devices by the municipal agency having jurisdiction and all wiring and accessory electrical equipment shall conform to the requirements of the National Electrical Code.

1416.2. Limitations.—Permits shall be issued for the erection or maintenance of illuminated signs within the limitations set forth in this article for the location, size and type of sign or outdoor display.

1416.3. Relettering Signs.—The requirements of this section shall not apply to the relettering of illuminated signs, except where such relettering requires a change of wiring or piping of the sign.

ARTICLE 15

ELECTRIC WIRING AND EQUIPMENT

SECTION 1500.0. SCOPE

The provisions of this article shall control the design and construction of all new installations of electrical conductors, fittings, devices and fixtures for light, heat and power service equipment and all equipment used for power supply to radio and television receiving systems and amateur radio transmission systems in buildings and structures; and all alterations or extensions to existing wiring systems therein to insure safety. All such installations shall conform to the provisions of this article and accepted engineering practice as defined in the National Electrical Code.

1500.1. Exceptions.—No electric wiring for light, heat or power or other purposes shall be installed in a building or structure nor shall an alteration or extension of an existing electric wiring system be made until a permit has been issued therefor as required in section 1502, except as herein provided:

1500.11. Public Service Agencies.—The provisions of the Basic Code shall not apply to installations for electric supply or communication agencies in the generation, transmission or distribution of electricity, or the operation of signals, or the transmission of intelligence, or located within or on buildings or premises used exclusively by such agency, or on public thoroughfares;

1500.12. Railway Utilities.—The provisions of the Basic Code shall not apply to the installations or equipment employed by a railway utility in the exercise of its functions as a public carrier and located outdoors or in buildings used exclusively for that purpose;

1500.13. Radio Transmitting Stations.—The provisions of the Basic Code shall not apply to electrical equipment used for radio transmission, except the equipment and wiring for power supply and the installation of radio towers and antennae, whether erected on buildings or on the ground.

1500.2. Electric Installation Standards.—Conformity of installations of electric equipment to the applicable standards of the National Electrical Code, National Electrical Safety Code and other accepted engineering standards listed in appendix B shall be prima facie evidence that such installations are reasonably safe for use in the service intended and in compliance with the provisions of the Basic Code.

1500.3. Electric Equipment Standards.—The materials, fittings, appliances, devices and other equipment listed in publications of inspected electrical equipment of the Underwriters' Laboratories, Inc., and other accredited authoritative agencies and testing organizations, and installed in accordance with the recommendations of the written approval of those authorities shall be accepted as meeting the requirements of the Basic Code.

SECTION 1501.0. DEFINITIONS

approved material, equipment and methods. (See section 201.0.)

building service equipment. (See section 201.0.)

electrical equipment. All installations of electrical conductors, fittings, devices and fixtures within or on public and private buildings.

electrical service equipment. The equipment located at point of entrance of supply conductors to a building which constitutes the main control of supply and means of cut-off of electricity, including circuit breaker, switches, fuses and electrical accessories.

SECTION 1502.0. PLANS AND SPECIFICATIONS

Plans, specifications and schedules in sufficient detail shall be filed with the building official showing the location and capacity of all lighting facilities, electrically operated equipment and light and power circuits required for all service equipment of the building or structure; except as may be modified by the administrative official.

1502.1. Items Covered.—All electrically-controlled devices, signal, communicating and lighting systems and their wiring whenever required under the provisions of the Basic Code shall be shown on the plans and elevations of the building or structure with respect to:

1502.11. Emergency and Hazard Use Lighting.—Places of public assembly and control of emergency lighting sytems, sections 418 and 627 and hazardous uses in article 4;

1502.12. Exitway and Elevator Lighting.—Stairway and exitway illumination equivalent to three (3) foot candles, sections 514 and 627; exit lighting circuits, section 626; elevator car illumination, section 1615; and existing elevators, section 1606;

1502.13. Service Equipment.—Electrical equipment and control of heating, refrigerating and ventilating machinery and devices, section 1129 and article 18;

1502.14. Fire Alarm and Signal Systems.—Fire alarm signal systems, fire department communication and supervisory service, sections 1216, 1217 and 1219;

1502.15. Construction Operations.—Temporary construction lighting requirements equivalent to three (3) foot candles, section 1318;

1502.16. Signs and Radio Towers.—Wiring of display signs, sections 1409 and 1416; and radio and television receiving antennae, sections 427 and 428;

1502.17. Elevators and Moving Stairways.—Power control and electric operation and circuit wiring of elevators and moving stairways, article 16;

1502.18. Toilet and Bath Rooms.—Illumination of toilet and bathrooms equivalent to three (3) foot candles, section 513; and

1502.19. Prefabricated Circuits.—Loop wiring for prefabricated construction, sections 1902 and 1919.

1502.2. Other Municipal Authorities.—Where required by local law or ordinance, the plans and specifications for electric light and power wiring shall be approved by the municipal authority having jurisdiction.

SECTION 1503.0. INSPECTION AND TESTS

1503.1. During Installation.—During the installation of electric wiring systems and service equipment, the building official shall make inspections to insure compliance with the provisions of this article, except as provided in section 1505.

1503.2. Concealing Work.—No work in connection with an electric wiring system shall be covered or concealed until it has been inspected and permission to do so has been granted by the building official.

1503.3. Final Inspection and Test.—On completion of the work, the administrative official shall inspect the work and cause tests to be made of the operation of the entire system to insure compliance with all requirements.

SECTION 1504.0. TEMPORARY USE

The building official may in his discretion give temporary permission for a reasonable time to supply and use current in part of an electric installation before such installation has been fully completed and the final certificate of approval has been issued; provided that the part covered by the temporary certificate complies with all the requirements specified for temporary lighting, heat or power in the National Electrical Code.

SECTION 1505.0. PERMIT AND CERTIFICATE OF INSPECTION

No wiring system or electrical equipment shall be installed within or on any building or structure or premises, nor shall any alteration or addition be made in any such existing installations without first securing approval and a permit from the building official except as provided in section 1505.1. It shall be unlawful to use or permit the use of, or to supply current for electric wiring for heat, light or power in a building or structure, unless the required certificate of inspection and permit has been issued by the building official.

1505.1. Exemptions.—No permit shall be required for the execution and use of the classes of work herein specified:

1505.11. Repairs and Maintenance.—Minor repair work, including the replacement of lamps or the connection of approved portable electrical equipment to approved permanently installed receptacles;

1505.12. Public Service Agencies.—The installation, alteration or repair of electrical equipment for the operation of communications and signals or the transmission of intelligence by wire by public service agencies except as provided in section 1219 for interior fire alarm systems;

1505.13. Power Companies.—The installation, alteration or repair of electrical equipment of a power or public service company for its use in the generation, transmission, distribution or metering of electricity; and

1505.14. Temporary Testing Systems.—The installation of any temporary system required for the testing or servicing of electrical equipment or apparatus.

1505.2. Annual Permit.—In lieu of an individual permit for each new addition to or alteration of an already approved electrical installation, the building official may issue an annual permit upon application therefor to any person, firm or corporation regularly employing one or more certified electricians in the building, structure or premises owned or operated by the applicant for the permit.

1505.3. Annual Records.—The person to whom an annual permit is issued shall keep a detailed record of all changes and alterations to an approved electrical installation made under such annual permit and such records shall be accessible to the building official at all times or shall be filed with him as he may designate.

SECTION 1506.0. EXISTING INSTALLATIONS

No alterations or additions shall be made to any existing installations of electric wiring or equipment for which a permit is required within or on any building, structure or premises except as provided in section 1505, without first securing the approval and a permit from the building official.

1506.1. Defective Wiring.—If upon reinspection an electric wiring system is found defective and unsafe, the building official shall revoke all certificates and permits in effect; and the use of such system shall be discontinued until it has been made to conform to this article and the approved rules and after a new permit has been issued.

ARTICLE 16

ELEVATOR, DUMBWAITER AND CONVEYOR EQUIPMENT, INSTALLATION AND MAINTENANCE

SECTION 1600.0. SCOPE

Except as may be otherwise provided by statute, the provisions of this article shall control the design, construction, installation, maintenance and operation of all elevators, dumbwaiters, moving stairways, moving walks and special hoisting and conveying equipment hereafter operated, installed, relocated or altered in all buildings and structures. The design, construction, installation, maintenance and operation of all miscellaneous hoisting and elevating equipment and amusement devices shall be subject to such special requirements as are deemed necessary by the building official to secure their safe operation. The provisions of this article shall not apply to portable elevating devices used to handle materials only and located and operated entirely within one story. All such equipment shall be constructed, operated and maintained in compliance with accepted engineering practice.

The construction, alteration, maintenance, operation, inspection and tests of manlifts shall be in conformity to the Safety Code for Manlifts listed in appendix B.

1600.1. Standard Code Adopted.—Except as otherwise provided in the Basic Code and except where more restrictive provisions govern, the construction, alteration, maintenance, operation, inspections and tests of elevators, dumbwaiters, moving walks and moving stairways shall be in conformity to the safety code for elevators, dumbwaiters and moving stairways listed in appendix B.

1600.2. Purpose and Exceptions.—The purpose of the Basic Code is to provide reasonable safety for life and limb. In case of practical difficulty or unnecessary hardship the building official may grant exceptions from the literal requirements or permit the use of other methods but only when it is clearly evident that reasonable safety is thereby secured.

SECTION 1601.0. DEFINITIONS

The following definitions, terms and their application, and the definitions of the accepted standard code for elevator installations and equipment which is supplementary hereto, shall be used and applied in the Basic Code.

amusement device. A device or structure open to the public by which persons are conveyed or moved in unusual manner for diversion.

elevator. A hoisting and lowering mechanism equipped with a car or platform which moves in guides for the transportation of individuals or freight in a substantially vertical direction through successive floors or levels of a building or structure.

—hand elevator. A freight elevator that is driven by manual power.

—freight elevator. An elevator primarily used for carrying freight and on which only the operator and the persons necessary for loading and unloading and employees having special permission of the building official are permitted to ride.

—hydraulic elevator. A power elevator in which the motion of the car is obtained through the application of energy from liquid under pressure.

—passenger elevator. An elevator for the transportation of individuals.

—power elevator. An elevator in which the motion of the car is obtained through the application of energy other than by hand or gravity.

—sidewalk elevator. A freight elevator which operates between a sidewalk or other area exterior to the building and floor levels inside the building below such area, which has no landing opening into the building at its upper limit of travel and which is not used to carry automobiles.

elevator repairs. All work necessary to maintain present elevator equipment in a safe and serviceable condition and to adjust or replace defective, broken or worn parts, with parts made of equivalent material, strength and design, and only where the replacing part performs the same function as the replaced part.

existing equipment. Any equipment covered by this article which was installed prior to the effective date of the Basic Code or for which an application for permit to install was filed with the building official prior thereto.

industrial lift. (material lift). A non-portable power operated raising or lowering device for transporting freight vertically, operating entirely within one (1) story of the building or structure.

loading ramp. A hinged, non-portable device, either mechanical or hydraulic, hand or power operated, used for spanning gaps or adjusting heights between loading surface and carrier or between loading surface and loading surface.

material platform hoist. (See section 1301.0.)

miscellaneous hoisting and elevating equipment. All power operated hoisting and elevating equipment for raising, lowering and moving persons or merchandise from one level to another such as inclined elevators, slings and hooks, tiering and piling machines not permanently located in a fixed position, mine elevators, skip hoists for blast furnaces, stage and orchestra lifts, lift-bridges and temporary builders' hoists and similar equipment.

moving stairway (escalator). A power driven, inclined, continuous stairway used for raising and lowering passengers.

moving walk. A type of passenger-carrying device on which passengers stand or walk, and in which the passenger-carrying surface remains parallel to its direction of motion and is uninterrupted.

special hoisting and conveying equipment. Manually or power-operated hoisting, lowering or conveying mechanisms, other than elevators, moving stairways or dumbwaiters for the transport of persons or freight in a vertical, inclined or horizontal direction on one floor or in successive floors.

—automotive lift. A fixed mechanical device for raising an entire motor vehicle above the floor level but not through successive floors of the building or structure.

—conveyors. A system of machinery and manual or mechanized devices other than elevator and dumbwaiter equipment consisting of belts, chains, rollers, buckets, aprons, slides and chutes and other miscellaneous equipment for hoisting, lowering and transporting materials and merchandise in packages or in bulk in any direction in a building or structure.

—manlifts. A power-operated belt device with steps and handholds for transporting persons in a vertical position through successive floors or levels of the building or structure.

—material lift. A power-operated rising or lowering device for transporting freight vertically, operating entirely within one (1) story of the building or structure.

SECTION 1602.0. PLANS, SPECIFICATIONS AND PERMITS

The person, firm or corporation responsible for the installation, relocation, or alteration of any equipment covered by this article shall file an application for permit with the building official accompanied by governing specifications and accurately scaled and fully dimensioned plans showing the location of the installation in relation to the plans and elevation of the building; the location of the machinery room and equipment to be installed, relocated or altered; and all structural supporting members thereof, including foundations; and shall specify all materials to be employed and all loads to be supported or conveyed. Such plans and specifications shall be sufficiently complete to illustrate all details of construction and design.

1602.1. Permits.—No equipment or device subject to the provisions of the Basic Code shall be constructed, installed, relocated or altered unless a permit has been received from the building official before the work is commenced. A copy of such permit shall be kept at the construction site at all times while the work is in progress.

1602.2. Identification of Equipment.—In buildings containing more than one elevator or device and where such devices are subject to periodic inspections, each such elevator or device shall be identified by a serial number attached to or painted, stenciled or otherwise registered on the crosshead of the elevator car and on the motor or machine; and on devices other than elevators, on the motor or machine, in figures not less than one (1) inch high. After such devices have been so designated, their numbers shall not be changed except by permission of the building official and all correspondence in regard to such device shall refer to said number.

SECTION 1603.0. TESTS AND INSPECTIONS

All equipment and devices covered by the provisions of the Basic Code shall be subjected to acceptance and maintenance tests and periodic inspections as required herein and in the accepted standard.

1603.1. Acceptance Tests.—Acceptance tests and inspections shall be required on all new, relocated and altered equipment subject to the provisions of this article. The tests and inspection shall be of such nature as to determine whether the entire installation is designed, constructed and installed in compliance with the Basic Code and the accepted standards, and shall include all parts of the equipment and machinery. All such tests shall be made in conformity to the requirements of section 1603.4, in the presence of the building official, by the person, firm or corporation installing such equipment.

1603.2. Maintenance Tests and Periodic Inspections.—Maintenance tests shall be required on all new and existing power elevators and periodic inspections shall be made of all new and existing equipment subject to the provisions of this article.

1603.21. Maintenance Tests.—Maintenance tests shall be made by a qualified agent or agency approved by and in the presence of the building official and shall be made at the expense and responsibility of the owner.

1603.22. Periodic Inspections.—Periodic inspections shall be made by the building official or by a qualified agent or agency approved by him. Where such inspections are not made by the building official, the approved agent or agency shall submit a detailed report of the inspection to the building official on forms approved by him not more than thirty (30) days following the completion of such inspection.

1603.3. Frequency of Tests and Inspections.

1603.31. Periodic Inspection Intervals.—Periodic inspections shall hereafter be made at intervals of not more than six (6) months for all elevators, manlifts and moving stairways; at intervals of not more than twelve (12) months for power dumbwaiters and all dumbwaiters with a capacity of one hundred (100) pounds and over. Miscellaneous hoisting and elevating equipment, conveyors and amusement devices shall be inspected at such intervals as may be deemed necessary by the building official to insure reasonable safety of operation.

1603.32. Maintenance Test Intervals.—Maintenance tests shall be made at not exceeding the following intervals:

a) Power elevator car and counterweight safeties, governors and oil buffers, every five (5) years.

b) Hydraulic elevator and dumbwaiter pressure tanks and piston rods of roped hydraulic elevators and dumbwaiters, every three (3) years.

1603.4. Minimum Requirements for Tests and Inspections.—The minimum requirements for the inspection and test of the devices subject to this article shall conform to this section.

1603.41. Elevators, Dumbwaiters and Moving Stairways.—The equipment and machinery of elevator, dumbwaiter and moving stairways shall be inspected and tested to the requirements of the standard listed in appendix B.

1603.42. Material Lifts, Conveyors and Amusement Devices.—Material lifts, conveyors and amusement devices shall be inspected and subjected to tests to insure the load capacity and safety of operation. The tests shall cover all operating protectives and safety devices, structural adequacy of the supports and anchorage to floors, walls, ceilings and foundations.

1603.43. Manlifts.—All equipment and machinery of manlifts shall be inspected and tested to insure reasonable safety of operation and shall include tests of the brake, terminal stopping device, belt tension and emergency stopping device. Acceptance tests shall also include a load capacity test as provided in the accepted standard listed in appendix B.

1603.44. Miscellaneous Hoisting and Elevating Equipment.—All miscellaneous hoisting and elevating equipment shall be subjected to such tests and inspections as may be required by the building official to insure safe operation.

SECTION 1604.0. CERTIFICATE OF COMPLIANCE

The operation of all equipment governed by the provisions of this article and hereafter installed, relocated or altered shall be unlawful by persons other than the installer thereof until such equipment has been inspected and tested as herein required and a final or limited certificate of compliance has been issued therefor by the building official.

1604.1. Final Certificate of Compliance.—The building official shall issue a final certificate of compliance for each unit of equipment which has satisfactorily met all the inspections and tests required by this article. Such final certificate shall bear the signature of the person who made the inspection and tests and shall designate the rated load and speed, the date of the acceptance tests and inspections, and the name of the building official who made or witnessed such test and inspection. The final certificate shall also include the necessary space for inserting:

(1) The name of the person who made the periodic inspection and who witnessed the periodic and maintenance tests.

(2) The date of the periodic inspection and test and of the maintenance "test".

1604.2. Limited Certificate of Compliance.—The building official may within his discretion issue a limited certificate of compliance for any equipment covered by this article, which is hereafter being installed, relocated or altered, to permit its limited use by the person designated therein during the period of such installation, relocation or alteration. Such certificate shall be signed by the building official and shall bear the dates of issue, renewal and expiration and shall designate the class of service allowed.

1604.21. Tests and Minimum Safeguards Required.—A limited certificate shall not be issued for an elevator until such elevator has satisfactorily passed the following tests: rated load, car and counterweight safety and terminal stopping devices. Permanent or temporary guards and enclosures shall be installed on the car, around the hoistway and at the landing entrances. Equipment other than elevators shall be tested and protectives provided as deemed necessary by the building official to insure reasonable safe operation for the limited service specified.

1604.22. Special Conditions.—Automatic and continuous-pressure operation elevators shall not be placed in temporary operation from the landing push buttons unless the door locking device and interlocks required by the safety code are installed and operative. When the car can be operated only from the inside, landing entrance guards shall be provided with locks that can be released from the hoistway side only.

1604.23. Time Limitation.—Limited certificates of operation shall be issued for periods of not more than thirty (30) days; but may be renewed within the discretion of the building official for additional periods of not more than thirty (30) days each.

1604.3. Posting Certificates of Compliance.—The owner or lessee shall post the last issued certificate of compliance in a conspicuous place inside all elevator cars and on or immediately adjacent to the entrance to all other approved equipment.

SECTION 1605.0. MAINTENANCE AND ACCIDENTS

1605.1. Owner Responsibility. — The owner or his legal agent of the building in which the equipment is located shall be responsible for the care, maintenance and safe operation of all equipment covered by this article after the installation thereof and its acceptance by him. He shall make or cause to be made all maintenance tests and service inspections and shall maintain all equipment in a safe operating condition.

1605.2. Contractor Responsibility.—The person, firm or corporation installing any device covered by this article shall make all acceptance tests and be responsible for the care and safe operation of such equipment during its construction and until temporarily or finally accepted by the building owner or his legal agent.

1605.3. Maintenance Items.—All operating and electrical parts and accessory equipment of devices subject to this article shall be maintained in safe operating condition. The maintenance of elevators, dumbwaiters and escalators shall conform to the standard listed in appendix B.

1605.4. Unsafe Conditions.—If upon inspection, any equipment covered in this article is found in an unsafe condition, or not in accordance with the provisions of the Basic Code, the building official shall thereupon serve a written notice of such finding upon the building owner or lessee stating the time when recommended repairs or changes must be completed. After the service of such notice, it shall be the duty of the owner to proceed within the time allowed to make such repairs or changes as are necessary to place the equipment in a safe condition; and it shall be unlawful to operate such equipment after the date stated in the notice unless such recommended repairs or changes have been made and the equipment has been approved by the building official, or an extension of time secured from him in writing.

1605.41. Power to Seal Equipment.—The building official in addition to any other penalties herein provided shall have the power to seal out of service any device or equipment covered by this article for the following reasons: when in case of emergency in the opinion of the building official, any such device is in a condition to render it totally unsafe for operation; or for willful failure to comply with recommendations and orders issued by the building official.

1605.42. Notice of Sealing Out of Service.—Before sealing any device out of service the building official, except in case of emergency, shall serve written notice upon the building owner or lessee stating intention to seal the equipment out of service and the reasons therefor.

1605.43. Unlawful to Remove Seal.—Any device sealed out of service by the building official shall be plainly marked with a sign or tag indicating the reason for such sealing, and any defacing or removal of the sign or tag, or any tampering with or removal of the seal without approval of the building official shall constitute a violation of this article.

1605.5. Accidents Reported and Recorded.—The owner of the building shall immediately notify the building official of every accident involving personal injury or damage to apparatus on or about or in connection with any equipment covered by this article, and shall afford the building official every facility for investigating such accident. When an accident involves the failure, breakage, damage or destruction of any part of the apparatus or mechanism, it shall be unlawful to use such device until after an examination by the building official and approval of the equipment for continued use. It shall be the duty of the building official to make a prompt examination into the cause of the accident and to enter a full and complete report thereof in the records of the building department. Such records shall be open for public inspection at all reasonable hours.

1605.6. Removal of Damaged Parts.—It shall be unlawful to remove any part of the damaged construction or operating mechanism of elevators or other equipment subject to the provisions of this article from the premises until permission to do so has been granted by the building official.

SECTION 1606.0. EXISTING INSTALLATIONS

1606.1. Retroactive Provisions.—The provisions of this article are not retroactive except as specifically provided hereunder; and except further that upon inspection of any device covered by the Basic Code the equipment is found in a dangerous condition, or there is an immediate hazard to those riding on or using such equipment, or if the design or the method of operation in combination with devices used is considered inherently dangerous in the opinion of the building official, he shall notify the owner or lessee in writing of the existing condition and shall recommend such alterations or additions as he may deem necessary to eliminate the dangerous condition.

1606.2. General Requirements.

1606.21. Projections Into Hoistway.—All ledges, floor beams, sills, saddles, timbers and other projections, except door interlocks and contacts, door closers, door tracks and hangers, and door operating or signal devices in front of car openings, that project more than one (1) inch from the inside of the general surface of the hoistway enclosure shall be fitted with smooth beveled guards set directly under the projections. The angle of the bevels or guardplates shall preferably be not less than seventy-five (75) but in no case less than sixty (60) degrees from the horizontal.

1606.22. Emergency Interlock Release Switch.—Glass or other breakable type covers of car emergency release switches where provided shall be maintained in place and if not so maintained the building official shall require that the existing emergency release switch be replaced with one of the key-operated continuous-pressure type.

1606.23. Lighting.—The cars and entrances of all elevators shall be properly lighted at all times when in service. The minimum illumination shall be not less than one (1) foot candle at the landing edge of the platform.

1606.24. Belt and Chain-Driven Machines. — Single-belted and chain-driven machines are permitted only on freight elevators and only when equipped with electrically released spring applied brakes and with terminal stopping devices and electrical safety devices required for new electric elevators. The brakes shall be applied directly to the hoisting machine and shall be arranged to operate automatically if the driving belt or chain breaks or comes off. Double-belted elevator machines are permitted only on freight elevators and when driven by a line shafting which is used to apply power for other purposes.

1606.25. Replacement or Relocation of Gate Switches or Interlocks.—The building official may require the replacement or relocation of car gate electric contacts, safety cutout switches, or interlocks where such devices are found to be tied or blocked so as to render them inoperative.

1606.26. Removal of Pipes from Hoistway.—The building official may order the removal from existing elevator hoistways of any pipe conveying gases, vapors or liquids which might endanger life if discharged into the hoistway or ignited.

1606.3. Existing Passenger Elevators.

1606.31. Hoistway Enclosure.—All existing passenger elevator hoistways shall be fully enclosed from floor to ceiling on all floors to comply with section 1610.

1606.32. Hoistway Doors and Interlocks.—All existing electric and electrically controlled and operated hydraulic passenger elevators shall be provided with hoistway landing doors equipped with approved type interlocks conforming to the requirements for new elevators; except that approved type interlock switches may be installed in connection with existing hoistway door closers, provided the combination door closers and interlocks conform to all the requirements for approved interlocks, except as to the

required tests. The use of service and emergency keys for opening hoistway doors from the landing side shall conform to the requirements of the standard code.

1606.33. Car Doors and Gates.—All openings on existing passenger elevator cars shall be provided with doors or gates.

Car doors and gates of electric or electrically controlled and operated hydraulic passenger elevators shall be provided with approved car door or gate electric contacts conforming to the standard listed in appendix B.

1606.34. Hydraulic Passenger Elevators.—Hydraulic passenger elevators, except those equipped with electric control and operating devices, shall be provided with self-closing hoistway doors arranged to lock automatically when closed, in lieu of interlocks. Car doors or gates on electric or electrically controlled and operated hydraulic elevators shall be equipped with car door or gate electric contacts conforming to the requirements for new elevators.

1606.35. Emergency Signal or Telephone.—Existing power-passenger and freight elevators shall be provided with emergency signal devices conforming to the requirements of the standard listed in appendix B.

1606.4. Existing Freight Elevators.

1606.41. Hoistway Enclosure.—If not now enclosed, an enclosure shall be required on existing freight elevators as required for existing passenger elevators in section 1606.3, except as provided in section 1606.43.

1606.42. Hoistway Doors.—All landing openings in existing electric or electrically controlled and operated hydraulic freight elevator hoistways which are enclosed with fireresistive partitions shall be provided with fire doors equipped either with approved hoistway door interlocks, or approved hoistway door electric contacts and mechanical locks, conforming to the standard code or with fusible links and automatic self-closing devices.

1606.43. Landing Gates.—Where automatic self-closing landings doors with fusible links are used, or where fireresistive hoistway enclosures are not required, the landing openings of electric or electrically controlled and operated hydraulic elevators shall be equipped with landing gates not less than five and one-half (5½) feet high provided with either hoistway gate interlocks, or with hoistway gate electric contacts and mechanical locks conforming to the standard code.

1606.44. Hydraulic Freight Elevators.—Interlocks or electric contacts shall not be used on hydraulic elevator landing doors or gates except where such elevators are provided with electric control and operating devices; and provided further that the landing openings of such elevators shall be equipped with self-closing gates at least five and one-half (5½) feet high with approved mechanical locks. Full automatic gates shall be prohibited. Semi-automatic gates shall be prohibited except on hydraulic elevators with mechanical control and operating devices.

1606.45. Gates on Cars.—All openings on existing electric or electro-hydraulic freight elevator cars, except the opening immediately adjacent to the operating device, shall be provided with car gates and car gate

electric contacts when the distance between the hoistway side of the landing door adjacent to such opening and the hoistway edge of the landing threshold is more than four (4) inches. All such elevators using lever, wheel or cable operating devices, shall have car gates and car gate contacts installed at all car openings. All openings on existing continuous-pressure or automatic operation freight elevator cars that can be operated from the landings shall be provided with car gates and car gate electric contacts. Existing sidewalk elevators shall not be subject to the provisions of this section.

Car gate electric contacts shall be of approved type conforming to the standard listed in appendix B.

SECTION 1607.0. ALTERATIONS

Alterations to existing elevators shall conform to the standard listed in appendix B.

Alterations to all other devices subject to this article shall conform to such requirements as the building official considers necessary for safe operation.

1607.1. Relocated Equipment.—The relocation of an existing installation of any device covered by this article shall be deemed to be a new installation and shall conform to the requirements therefor.

SECTION 1608.0. POWER ELEVATOR OPERATION

1608.1. Designated Operator.—Every power elevator except automatic and continuous-pressure operation types and sidewalk elevators shall be in charge of a competent designated operator.

1608.2. Fire Department Use.—In every structure over one hundred and fifty (150) feet in height, a competent elevator operator shall be available at all times to assist the fire department in obtaining access to any floor in the building or structure served by elevators, except where an automatic or continuous-pressure operation elevator is available.

1608.3. Passenger Restriction.

1608.31. Freight Operators.—Except as provided in section 1608.32, it shall be unlawful for any person other than the operator or those individuals necessary to handle freight to ride on any elevator other than a passenger elevator; and it shall be unlawful for the owner or other responsible person to permit any individual other than above specified to ride on any elevator other than a passenger elevator.

1608.32. Other Employees.—Employees of the owner may ride on a freight elevator, subject to approval of the building official, and the requirements of the standard code.

SECTION 1609.0. ELEVATOR SPEED LIMITS

The car speed limits herein specified shall be the maximum permitted for the types listed.

1609.1. Non-Counterweighted Drum Elevators.—The speed of all non-counterweighted drum elevators shall be not more than fifty (50) feet per minute.

1609.2. Sidewalk Elevators.—The speed of sidewalk elevators shall not exceed fifty (50) feet per minute where a drum type machine is used or where the car raises and lowers doors or covers in the sidewalk or other exterior area.

1609.3. Continuous-Pressure Elevators.—The speed of continuous-pressure operation elevators shall be not more than one hundred and fifty (150) feet per minute.

SECTION 1610.0. HOISTWAY ENCLOSURES AND VENTING

1610.1. Fire Resistance Rating of Hoistway Enclosures.

1610.11. Elevator Enclosures.—All elevator and other hoistway enclosures other than dumbwaiter shafts shall be constructed to afford at least two (2) hours fireresistance with approved opening protectives conforming to section 1614 and article 9.

1610.12. Dumbwaiter Enclosures.—Shaft enclosures of dumbwaiters having a car area of more than three (3) square feet which travel through more than one (1) story and serve more than two (2) adjacent floors shall be of three-quarter (¾) hour fireresistive construction with approved three-quarter (¾) hour opening protectives or the approved labeled equivalent complying with article 9, except that when the load capacity exceeds one hundred (100) pounds per square foot the enclosure and opening protectives shall comply with the requirements of section 1610.11 for fireresistance.

1610.13. Special Dumbwaiter Enclosures.—The enclosure of dumbwaiters not more than three (3) square feet in area with a load capacity of not more than twenty-five (25) pounds and all dumbwaiters serving not more than two (2) adjacent levels shall be enclosed with approved noncombustible materials.

1610.2. Limiting Number of Elevators in One Hoistway Enclosure.—The number of elevators permitted in one hoistway shall conform to the standard listed in appendix B.

1610.3. Vents Required.—Hoistways of elevators and dumbwaiters serving more than three (3) stories shall be provided with means for venting smoke and hot gases to the outer air in case of fire, except as follows:

1—In buildings other than hotels, apartment houses, hospitals, and similar buildings with overnight sleeping quarters, hoistways not extending into the top story may be provided with approved automatic

sprinklers connected to the building water-supply system or to an approved automatic sprinkler system conforming to section 1213.0 in lieu of the required vents.

2—Sidewalk elevator hoistways are not required to be vented.

1610.4. Location of Vents.—Vents shall be located in the side of the hoistway enclosure directly below the floor or floors at the top of the hoistway, and shall open either directly to the outer air or through non-combustible ducts to the outer air; or in the wall or roof of the penthouse or overhead machinery space above the roof, provided that vent openings of at least equivalent area are provided in the floor or floors at the top of the hoistway.

1610.5. Area of Vents.—Except as herein provided the area of the vents shall be not less than three and one-half (3½) per cent of the area of the hoistway nor less than three (3) square feet for each elevator car, and not less than three and one-half (3½) per cent nor less than one-half (½) square foot for each dumbwaiter car, in the hoistway, whichever is greater. Of the total required vent area, not less than one-third (⅓) shall be of the permanently-open type. Where mechanical ventilation conforming to article 18 and providing equivalent venting of the hoistway is provided in the overhead elevator machine room, the required vent area may be reduced provided:

1—The building is not a hotel, apartment house, hospital or similar building with overnight sleeping quarters;

2—The machine room is so located that it has no outside exposure;

3—The hoistway does not extend to the top story of the building;

4—The machine room exhaust fan is automatically re-activated by thermostatic means.

1610.6. Closed Vents.—Closed portions of the required vent area shall consist of windows, skylights or duct openings glazed with plain glass not more than one-eighth (⅛) inch thick.

1610.61. Skylights.—Skylights used as required vents shall conform to section 928.2.

1610.62. Windows.—Windows used as required vents shall conform to section 918.0 except they shall be glazed with one-eighth (⅛) inch plain glass.

SECTION 1611.0. ELEVATOR EXITWAY RESTRICTIONS

Elevators shall not be accepted as a required means of exit. Elevators shall not be installed in a common enclosure with a stairway, and the path of travel on any exit stairway shall not pass directly in front of any elevator hoistway door.

SECTION 1612.0. ELEVATOR AND DUMBWAITER MACHINERY AND EQUIPMENT

Elevator and dumbwaiter machinery and equipment shall conform to the standard listed in appendix B.

SECTION 1613.0. HOISTWAYS AND RELATED CONSTRUCTION FOR PASSENGER ELEVATORS AND DUMBWAITERS AND FREIGHT

The construction of hoistways, machine rooms and related construction for passenger and freight elevators and dumbwaiters shall conform with the standard listed in appendix B.

SECTION 1614.0. ELEVATOR OPENING PROTECTIVES

All hoistway enclosure doors for elevators, dumbwaiters and other hoisting equipment shall be constructed in accordance with the provisions of article 9 and as herein required.

1614.1. Fire Doors.—Door openings of elevator hoistway enclosures shall be equipped with protective assemblies having a fireresistance rating of not less than one and one-half (1½) hours or their approved labeled equivalent; except that when the shaft opens into a vestibule enclosed with not less than two (2) hour fireresistive construction in which all vestibule openings are protected with assemblies having a fireresistance rating of not less than three-quarter (¾) hours, the fireresistance rating of the shaftway doors may be reduced to three-quarter (¾) hours. Elevator hoistway fire doors shall not be required to be self-closing.

1614.2. Hardware.—All hardware on opening protectives shall be of an approved type, installed as tested; except that interlocks, mechanical elevator door locks and electric contacts and door operating mechanisms of approved types shall be exempt from the fire test requirements.

SECTION 1615.0. ELEVATOR CAR EMERGENCY SIGNALS

Elevator cars shall be provided with car emergency signals conforming to the standard listed in appendix B.

SECTION 1616.0. MANLIFTS

Manlifts shall be accessible and their use shall be restricted to employees only. They shall comply with the applicable requirements of this article and shall be installed only when permitted by the building official in feed, flour and cereal mills, grain elevators and in similar buildings of other use groups.

1616.1. Enclosures.—When the clear vertical distance between mounting platform and ceiling guard is less than seven and one-half (7½) feet, the manlift shall be completely enclosed to comply with section 1610 without access openings.

1616.2. Accessibility.—No entrance to manlifts shall be provided from any floor or level with a clear ceiling height of less than nine (9) feet and the minimum clearance between the head pulley and the roof or other overhead obstruction shall be not less than four (4) feet.

1616.3. Speed.—The speed of manlifts shall not exceed ninety (90) feet per minute.

1616.4. Manlift Safeties.

1616.41. Manlift Manual Stops.—An approved manually operated stopping device shall be provided to permit passengers riding on a manlift to control the operation of the lift at all floors and at any level in the travel of the device.

1616.42. Manlift Automatic Stops.—An approved safety device shall be provided which will automatically stop the lift in the event that a rider fails to alight at the top landing; but no such automatic device shall be capable of restoring the operating circuit when it has been interrupted for any cause.

1616.43. Secondary Manlift Stop.—All new installations shall be provided with a secondary safety stop to act immediately after and in the event of a failure of the automatic stop brake or other device required in section 1616.42.

1616.5. Manlift Construction.

1616.51. Floor Openings.—Floor openings shall be circular and not less than twenty-four (24) inches in dimension from belt to perimeter. The floor openings shall be provided with bevel guards underneath the landing with a slope of not less than forty-five (45) degrees from the horizontal extending not less than forty-two (42) inches back from the handhold.

1616.52. Guards.—The floor opening shall be protected with a railing or guard of metal or other approved noncombustible material, forty-two (42) inches in height, located not less than twelve (12) inches from the edge of the opening.

1616.53. Entrance and Exit.—The entrance and exit to the manlift shall be equipped with a gate at all floors and landings, hung to swing away from the opening and located not less than two (2) feet from the floor openings. The landings shall be constructed to provide safe footing and shall be kept clear of obstructions and lighted to an intensity of not less than three (3) foot candles. The runs of the manlift shall be illuminated throughout the entire height to an intensity of not less than one (1) foot candle.

1616.54. Steps.—Manlift steps shall be uniform in size and not less than twelve (12) inches deep from the plane of the belt to the edge of the tread and of adequate strength to support a load of four hundred (400) pounds. The vertical distance between step treads shall be not less than fifteen (15) feet.

1616.55. Belts.—All manlift belts shall be of approved types, not less than twelve (12) inches wide and of adequate strength to support a load of two hundred (200) pounds on each step of one run without loss of traction.

1616.56. Handholds.—Manlift handholds shall be located not less than four (4) nor more than four and two-thirds (4⅔) feet above each step tread on both runs of the manlift with a two (2) inch clearance from the belt. Such handholds shall be not less than nine (9) inches in length in the clear.

1616.6. Final Acceptance.—All manlifts shall be subject to acceptance by the building official and periodic tests and inspections as provided in section 1604.

1616.7. Manlift Instruction Signs.

1616.71. Landing Signs.—Approved signs shall be provided on each landing and stenciled on the belt at approximately eye level above each step giving the following instructions:

"For Employees Only
Face the Belt.
Use the Handhold.
To Stop, Pull Rope."

1616.72. Terminal Sign.—The top landing shall be provided with an illuminated warning sign in block letters not less than two (2) inches high which shall be located within easy view of ascending passengers at a level of not more than two (2) feet above the top landing, reading:

"Top Floor — Get Off."

1616.8. Manlift Electric Equipment.—In locations where the atmosphere contains grain or other explosive dust, all electrical equipment for manlifts shall comply with the requirements of the National Electrical Code for installations in hazardous locations.

SECTION 1617.0. INDUSTRIAL LIFTS AND LOADING RAMPS

Except as exempted by section 1600 or as may be otherwise provided by statute, the provisions of this section and section 1618.0 shall control the design, construction, installation, maintenance and operation of all automotive lifts, industrial lifts and loading dock ramps hereafter installed, relocated or altered in all buildings and structures. All such equipment shall be constructed, operated and maintained in compliance with accepted engineering practice. The purpose of the Basic Code is to provide reasonable safety for life and limb. In case of practical difficulty or unnecessary hardship the building official may grant exceptions from the literal requirements or permit the use of other methods but only when it is clearly evident that reasonable safety is thereby secured.

1617.1. General Requirements.

1617.11. Markings and Labels.—All material lifts and loading ramps shall be marked with the name of manufacturer, model number, serial number, and rated capacity; and such markings shall be legibly stamped or etched on a metal plate which shall be permanently secured in a convenient place for inspection. Such nameplates shall not be obscured, obliterated or changed.

1617.12. Controls.—The controls shall be so located that the operator has a full and unobstructed view of the lift area at all times. All control devices shall be accessible to the operator without exposing him to danger.

No alterations or changes shall be made in the control device, or its manner of use which will render its normal functioning inoperative.

1617.13. Lift Control.—When the device used for controlling the travel of the lift in either direction is not continuous pressure or deadman type, an emergency stop button shall be provided and so located as to be readily accessible to the operator at all times.

1617.14. Electrical Wiring.—All electrical wiring shall comply with the National Electrical Code for ordinary locations.

1617.2. Maintenance.

1617.21. Owner Responsibility.—The owner or his agent shall be responsible for the care, maintenance, and safe operation of all equipment covered by this article after the installation thereof and its acceptance by him or its approval by the building official. The owner, or his agent shall not permit the equipment to be used unless it is, to the best of his knowledge, in safe operating condition.

1617.22. Housekeeping.—The spaces around, or beneath the equipment shall be kept clean; no rubbish or oil shall be allowed to accumulate therein, nor shall any part of this space be used for storage of materials or equipment.

All parts, except such parts as require freedom of movement, shall be kept tight at all times.

All mechanical working parts shall be kept free of rust, and properly lubricated and adjusted.

The owner, or his agent, shall be responsible for inspecting the oil level in all hydraulic systems to insure that it is at, or above, the manufacturer's prescribed minimum level.

1617.23. Lighting.—The entire operating area shall be illuminated to provide a distributed intensity of not less than three (3) foot-candles over the area of operating floor and platform.

1617.3. Pressure Tanks.—All separate tanks for liquid storage under pressure, not an integral part of the cylinder assembly, shall conform to the provisions of ASME Code for unfired pressure vessels listed in appendix B and shall be marked with a securely attached metal label to indicate the approved operating pressure. For hydro-pneumatic systems the storage capacity shall be such that with the lift in fully elevated position there shall remain not less than three (3) inches of usable oil in the storage tank. Adequate means shall be provided to determine that the oil level in reservoir, with lift in the lowest position, is at or above the safe minimum operating level as prescribed by the manufacturer.

1617.4. Design and Construction.—The construction and installation of all power industrial lifts and loading ramps shall comply with the provisions of this section and the accepted standards listed in appendix B.

1617.41. Rated Load.—The lifting capacity of the lift shall be not less

than fifty (50) pounds per square foot of gross platform area.

1617.42. Platform Construction.—The platform and its supports shall be designed for the loads to be transmitted within the strength and deflection limitations herein specified, when one-half (½) the capacity load is applied as a static center concentration within twelve (12) inches of the loading edge, the lift platform shall not deflect more than one-half (½) inch at any edge point.

1617.5. Platform and Hoist Protection.

1617.51. Unprotected Space Not More Than Five Feet.—When the lift rise is such that the unprotected vertical distance from the landing to the bottom edge of the vertical side of the platform is not more than five (5) feet, protection shall be provided as follows:

toe guards. A toe guard plate not less than eight (8) inches in width shall be provided on all unprotected sides. It shall be made of steel, not less than No. 11 gage in thickness, attached flush with the vertical edge of the platform and slanted inwardly at an angle of approximately thirty (30) degrees from the vertical. Skirts may be used in lieu of toe guards.

skirts. For automatic operation, the unprotected sides of the platform shall be provided with metal or wood sheathing or skirts attached to the platform to protect the exposed vertical opening.

enclosures. When toe guard or skirt protection is not provided the unprotected sides may be provided with solid or mesh enclosures to the full height of the lift rise. Mesh enclosure shall, by test, reject a two (2) inch ball.

1617.52. Unprotected Space More Than Five Feet.—When the unprotected space exceeds that set forth in Section 1617.51, protection shall be provided as follows:

Sides used for loading or unloading at the lower level shall be protected with skirts as described in paragraph 1617.51, or by a landing gate with electrical contact, or an automatic landing gate.

Sides not used for loading or unloading shall be protected with skirts or enclosures as described in paragraph 1617.51.

1617.53. Lift Rise More Than 5½ Feet.—When the lift rise exceeds five and one-half (5½) feet above the lowest level, additional protection shall be provided as follows:

The upper landing shall be provided with a landing gate equipped with mechanical lock and electrical contact.

The sides of the platform not used for loading or unloading shall be provided with railings, mesh, or solid enclosures not less than three and one-half (3½) feet high.

1617.54. Surface Installations.—When the lift is surface mounted, toe clearance space shall be provided on all unprotected sides. Such toe clearance shall provide not less than three (3) inches vertical and four (4) inches horizontal clearance when the platform is at its lowest position.

1617.6. Platform Protection—Loading Ramps.—The sides or edges of the loading ramps which rise above the surrounding platform shall be provided with skirt or toe guards protecting the opening under the sides of the ramp.

1617.7. Overload Protection.

1617.71. Electric-Hydraulic Operation.—Hydraulic overload protection shall be provided by means of a relief valve that will prevent raising of the elevating device when it is loaded to one hundred twenty-five (125) per cent of rated capacity. The relief valve shall be so located that its operation will not cause the platform to lower.

1617.72. Electric Operation.—Electric overload protection shall be provided by means of a thermal cutout or other suitable device.

SECTION 1618.0. AUTOMOTIVE LIFTS

All electric, hydraulic and hydro-pneumatic automotive lifts shall comply with the requirements of section 1617.0, 1617.1 and the applicable standards listed in appendix B.

1618.1. Types.—Lifts shall be classified as semi-hydraulic, full hydraulic or mechanical lifts according to their operation as described in the following subsections.

1618.11. Semi-Hydraulic (Hydro-Pneumatic).—A semi-hydraulic lift is an automotive lift of the plunger type which employs compressed air as the primary lifting and load sustaining agent; such compressed air acts continuously against a column of liquid to provide the lifting and load sustaining effort.

1618.12. Full Hydraulic.—A full hydraulic lift is an automotive lift of the plunger type that employs a liquid under pressure as the direct lifting and load sustaining agent. Such a lift is so designed and constructed that the full weight of the load and lifting assembly rest on a continuous column of liquid which extends from the cylinder to the liquid control valve.

1618.13. Mechanical Lifts.—A mechanical lift is an automotive lift so designed that the motive power is transmitted to the lifting frame by mechanical means. There are three principal types: cable and drum; rack and pinion; and screw type.

1618.2. Chassis and Axle Supports.—Only those chassis and axle supports complying with the requirements of paragraph 4.6 of Commercial Standard CS142-51 may be used.

1618.3. Safeties.—All mechanical automotive lifts shall be equipped with approved safeties as herein specified.

1618.31. Limit Stop.—Every mechanical automotive lift shall be equipped with an automatic overtravel device to stop the motor or drive machine before the lifting frame reaches safe limits of travel.

1618.32. Holding Brake.—When the friction of the gear train of the driving mechanism is insufficient to hold the load, the mechanical automotive lift shall be equipped with a brake or other locking device to automatically hold the lift at any level immediately on failure of the lifting power for any cause.

1618.33. Stopping Brake.—When the structural members of the lifting frame are so designed that they interfere with open doors or other projections from the vehicle, the automotive lift shall be provided with a quick acting automatic brake to stop the ascent of the lift in case of emergency.

1618.4. Controls.

1618.41. Automatic Release.—The direct control device shall be of a type that will automatically return itself to the neutral or off position upon release by the operator.

1618.42. Speed Control.—A speed control device shall be provided to control the descent of the lift at a speed of not more than twenty (20) feet per minute under rated load.

SECTION 1619.0. CONVEYORS

1619.1. Enclosures.—All package elevators, boosters or lifts connecting successive floors or levels shall be enclosed in fireresistive construction in conformity to the requirements of sections 1610 and 1613 and article 9.

1619.2. Opening Protectives.

1619.21. Plans and Specifications.—Whenever conveyor or other material-handling devices are designed to pass through floors, ceilings, partitions or walls, the plans and specifications shall give the necessary details of the opening protectives in respect to location, structural strength and fireresistance.

1619.22. Fire Curtains.—Openings in partitions and walls through which conveyors pass shall have automatic fire dampers or curtains to prevent the spread of fire when, in the opinion of the building official, such protection is necessary due to the hazard of operation of the conveyors.

1619.23. Fire Doors.—All opening protectives shall meet the fireresistive requirements of article 9 for the location, type of construction and use of the building or structure.

1619.3. Machinery Guards.—Adequate protection shall be provided around all moving parts of every conveying device in accordance with the approved rules.

1619.4. Chute Enclosures.—All slides and chutes shall be enclosed with fireresistive construction or protected with approved automatic shutters of noncombustible construction to insure a full firestop between floors of the building or structure.

1619.5. Conveyor Safeties.—All power-operated conveyors, belts and other material moving devices, shall be equipped with automatic limit switches which will shut off the power in emergency and automatically stop all operation of the conveyors.

SECTION 1620.0. ELECTRIC WIRING AND EQUIPMENT

All electric wiring and electrical equipment covered by this article shall comply with the requirements of the standard code for elevators and the National Electrical Code.

SECTION 1621.0. MOVING STAIRWAYS

All moving stairways and their enclosures shall comply with the provisions of this section and the standard elevator code. When serving as a required means of egress, moving stairways shall meet the additional requirements of section 622.

1621.1. Construction Materials.

1621.11. Enclosures.—When not approved as a required means of egress, the stairwell may be open when protected with an exhaust system of ventilation and water curtains as provided in section 522, or with a power-operated shutter conforming to section 1621.2; except that the machine room shall be enclosed with three-quarter (¾) hour fireresistive construction and shall be properly lighted and ventilated. When such stairway serves as a required means of egress, the complete enclosure including the machine room shall be constructed with a fireresistance rating of not less than two (2) hours complying with the requirements of section 618 for interior stairways.

1621.12. Noncombustible Materials.—All parts of the moving stairway and equipment shall be constructed entirely of noncombustible and fire-retardant materials except electrical equipment, wiring, wheels, handrails and the use of one-twenty-eighth (1/28) inch wood veneers on balustrades backed-up with noncombustible materials.

1621.2. Automatic Fire Shutter.—Unenclosed moving stairways that do not meet the requirements of article 6 for exit stairways and which are not protected with an approved exhaust system and automatic water curtain specified in section 522, shall be equipped with a power-operated automatic shutter at every floor pierced thereby, constructed of noncombustible materials with a fireresistance rating of not less than one and one-half (1½) hours as provided in section 522.4.

1621.21. Construction.—The shutter shall be so constructed as to close immediately upon the automatic detection of fire or smoke by an approved device and shall completely shut off the well opening. The shutter shall operate at a speed of not more than thirty (30) feet per minute and shall be equipped with a sensitive leading edge to arrest its progress when in contact with any obstacle and to continue its progress on release therefrom.

ARTICLE 17

PLUMBING, DRAINAGE AND GASPIPING

SECTION 1700.0. SCOPE

The design and installation of plumbing systems, including sanitary and storm drainage, sanitary facilities, water supplies and storm water and sewage disposal in buildings shall comply with the requirements of this article and accepted engineering practice as defined in the National Plumbing Code listed in appendix B, except as modified in section 1707 and except that plastic pipe and fittings meeting the standards in appendix C may be used in the following applications:

a. Drain, Waste and Vent

1700.1. Gas Piping.—Installation of gas piping conforming to the applicable requirements of the standards for installation of gas piping and gas appliances listed in appendix B shall be accepted as complying with the requirements of the Basic Code.

SECTION 1701.0. BASIC PLUMBING PRINCIPLES

potable water supply. All premises intended for human habitation or occupancy shall be provided with an adequate supply of pure and wholesome potable water, neither connected with unsafe water supplies nor subject to the hazards of backflow or back-siphonage.

flushing and service water supply. Buildings in which there are water-closets and other plumbing fixtures shall be provided with a supply of water adequate in volume and pressure for flushing and other building service purposes.

hot water supply. Devices for heating and storing water in boilers or hot water tanks shall be so designed and installed as to prevent danger from explosion through overheating.

size of pipes. The pipes conveying water to fixtures shall be of sufficient size to supply the water at an adequate rate for use and flushing without undue noise or undue reduction of the pressure at other fixtures.

sanitary fixtures. Each dwelling unit abutting on a public sewer or with a private sewage disposal system shall have at least one (1) water-closet, one (1) lavatory, one (1) tub or shower bath and one (1) kitchen type sink. All other structures for human occupancy or use abutting on a sewer or with a private sewage disposal system shall have at least one (1) water closet and one (1) fixture for cleansing purposes. In hotel and dormitory residential buildings, there shall be not less than one (1) toilet room for each sex containing not less than one (1) water-closet, one (1) lavatory and one (1) tub or shower bath for every six (6) occupants.

toilet compartment. No watercloset shall be located in a room or compartment which is not properly lighted and ventilated.

construction of fixtures. Plumbing fixtures shall be made of smooth non-

absorbent material, free from concealed fouling surfaces, and the fixture enclosures shall be ventilated.

water seal. All fixtures directly connected to the drainage system shall be equipped with a water-seal trap.

accessibility of fixtures. All plumbing fixtures shall be installed and spaced so as to be reasonably accessible for their intended use and maintenance.

anti-siphonage. The drainage system shall be so designed as to provide an adequate circulation of air in all pipes without danger of siphonage, aspiration or forcing of trap seals under normal use.

drainage system. The drainage system shall be designed, constructed and maintained so as to guard against fouling and clogging.

sanitary piping. The piping of the plumbing system shall be of durable material, free from defective workmanship and so designed and installed as to give satisfactory service for the reasonable life expectancy of the building.

venting system. All vent terminals shall extend to the outer air and shall be so installed as to minimize the possibilities of clogging and the return of foul air to the building.

cleanouts. Provision shall be made in the drainage system for adequate cleanouts so arranged that all pipes may be readily cleaned.

public sewage disposal. All plumbing fixtures installed in buildings intended for human habitation, occupancy or use in premises abutting on a street, alley or easement in which there is a public sewer shall be connected to such sewer.

private sewage disposal. When waterclosets or other plumbing fixtures are installed in buildings which are not located within a reasonable distance of a sewer, suitable provisions shall be made for disposing of the building sewage by some method of sewage treatment and disposal satisfactory to the administrative authority having jurisdiction.

sewage interceptors. No substances which will clog the pipes, produce explosive mixtures, or destroy the pipes or their joints shall be allowed to enter the building drainage system or interfere with sewage disposal processes.

indirect connections. Proper protection shall be provided to prevent contamination of food, water, sterile goods and similar materials by backflow of sewage and if necessary the fixture, device or appliance shall not connect directly with the building drainage system.

backwater traps. When there is a possibility that a plumbing drainage system will be subject to backflow of sewage, suitable provisions shall be made to prevent its overflow into the building.

plumbing system tests. The plumbing system shall be subjected to such tests as will effectively disclose all leaks and defects in the work.

maintenance. Plumbing drainage and sewage disposal systems shall be maintained in a sanitary and serviceable condition.

weather protection. Drainage and water piping shall be protected against freezing temperatures and water supply systems shall be installed to permit complete drainage when necessary.

structural integrity. Plumbing systems shall be installed so that structural members of the building are not impaired nor adjacent surfaces damaged through ordinary use of the plumbing fixtures.

SECTION 1702.0. PLANS AND SPECIFICATIONS

1702.1. When Required.—Prior to the issuance of any permit, mechanical plans and specifications for the installation, or alteration of, or addition to the plumbing, sewerage, drainage or gas piping systems of any building, structure or premises shall be submitted to the building official for approval. The plans and specifications shall show in sufficient detail the layout and spacing of fixtures; the size, material and location of all building sewers and drains, storm sewers and drains; and the soil, waste, vent, water and gas supplying piping.

1702.2. Plans.—Legible plans drawn to a scale of not less than one-eighth (⅛) inch to the foot of each floor and of a typical floor shall be filed in triplicate and shall show the complete plumbing system, all plumbing fixtures and all water supply and gas piping, together with building sections showing vertical and diagrammatic elevations of the soil, waste, vent and water supply lines with traps and valves, and the location and size of the public sewer or other disposal system.

1702.3. Exemptions.—The filing of plans and specifications shall not be required for minor repairs as defined in the Plumbing Code or for the installation or alteration of plumbing and drainage systems in buildings or structures herein specifically exempted: open sheds for storage purposes, isolated private garages without sanitary fixtures, temporary sanitary installations required under the provisions of article 13 for construction operations and temporary installations for exhibition purposes when not designed for sanitary use and not directly connected to a sewerage system.

SECTION 1703.0. SEWER AND WATER SUPPLY DATA

1703.1. Public Sewer.—Plans for new plumbing systems or alterations to existing plumbing systems shall be accompanied by a diagram showing the relative elevation of the lowest fixture and the top of the public sewer referred to the established datum of [*name of municipality*] when such public sewer is available. The plans shall show the size, number and location of all new sewer connections.

1703.2. Public Water Main.—When the installation of a water distribution system or the replacement or alteration of a water supply system is contemplated, the plumbing plans shall show the location and sizes of all the water lines and branches involved, the fixtures or other devices to be supplied, and the minimum water pressure in the main in front of the building or structure.

1703.3. Identical Structures.—The same set of plumbing, water supply or gas piping plans and specifications may be used for two (2) or more buildings or structures when the buildings are exactly similar and are located on adjoining lots under the same ownership, provided the applications for permission to construct or alter are filed simultaneously.

SECTION 1704.0. PERMITS AND CERTIFICATES OF APPROVAL

1704.1. Approved Plans.—Before any work is commenced on plumbing, drainage and gas piping installations which require the submission of plans, a permit shall be secured from the building official and such permit with a stamped and approved copy of the plans shall be available at the construction site at all times.

1704.2. Amended Plans.—All plumbing installations shall be installed in accordance with the plans as approved and any changes made during construction which are not in conformity to the approved plans shall be resubmitted for approval on amended plans.

1704.3. Certificate of Approval.—After the prescribed tests and final inspection indicate the work complies in all respects with the provisions of the Plumbing Code, a certificate of approval and acceptance shall be issued by the building official.

1704.4. Notice of Commencement and Completion.—The building official shall be notified of the commencement of any plumbing or gas piping work, and when such work is completed or ready for inspection. All such notices shall be confirmed in writing and shall be part of the official record of the application and permit.

1704.5. Violations.—If work is installed contrary to the approved plans in any essential details, the owner, general contractor, supervising engineer or architect and the master plumbing shall all and separately be deemed to be in violation of the Basic Code and subject to the penalties provided in section 123 until amended plans are filed and approved.

1704.6. Owner Performance.—Nothing herein contained shall prohibit the owner of a building or structure from personally installing the plumbing system in his own residence under the conditions herein specified:

1704.61. Approval of plans and final approval of the building official shall be obtained;

1704.62. A permit shall be secured as herein provided before the work is performed;

1704.63. All legal fees shall be paid to the municipality;

1704.64. All work shall be performed by the owner himself in accordance with the provisions of the Basic Code; and

1704.65. The owner shall make application for all required inspections and tests.

SECTION 1705.0. WATER SUPPLY SYSTEMS

Every building in which people live, work or congregate shall be provided with a supply of clean, cool and potable water in sufficient quantity to maintain all water supply and plumbing fixtures in a safe and sanitary manner; and such other water supplies as may be required for fire-extinguishing, air-conditioning and all other service equipment of the building or structure required by the Basic Code.

1705.1. Public Water Supply.

1705.11. Required Capacity.—Where the required capacity of potable water supply is available from public water mains at the site, every building and structure shall be supplied from such mains to provide for all its service equipment.

1705.12. Power Pumps.—When power pumps are required in the water supply system of a building or a structure, they shall not pump directly from a city main or from the building supply but shall be fed through an open surge tank controlled by a balanced ball cock unless otherwise approved by the building official.

1705.2. Private Water Supply.—When public water mains are not available, a private source of water supply may be used provided samples are submitted periodically to the health official for analysis and approval and the use of such source of supply has been approved by him and the building official.

1705.3. Cross-Connected Supplies.

1705.31. Building Service Supply.—It shall be unlawful to connect water piping supplied directly from city water mains or other approved sources with or to piping from underground storage tanks or other unapproved sources; and no cross-connection shall be made between the potable water distribution system and any portion of waste or soil systems, or fixtures or devices that may contaminate, pollute or otherwise render the water unsafe.

1705.32. Process Water.—Water from unapproved sources for industrial processing or for fire protection shall be identified at each outlet with an approved sign stating that the water is unfit and that its use is prohibited for drinking purposes. Piping carrying potable waters shall be identified and distinguished from water piping from unapproved sources by distinctive painting and appropriate signs.

SECTION 1706.0. EXISTING BUILDINGS AND INSTALLATIONS

1706.1. Compliance With Code.—When alterations are made in an existing building or structure requiring the addition of any two (2) or more plumbing fixtures, or one (1) or more waterflush closets, or when a new bathroom is installed, or a building is remodeled for an extension in size or change in use, in which plumbing, drainage or gas piping work is involved, the new work shall be made to conform to all the applicable sanitary requirements of the Plumbing Code.

1706.2. Unsafe Installations.—Any existing installation of plumbing, drainage or gas-piping systems deemed unsafe and dangerous to the public health, in whole or in part, shall be made to comply with all the provisions of this article or as the building official shall determine to be necessary, subject to review in accordance with the provisions of section 128.

1706.3. Existing Drainage Nuisances.—Any surface or roof drainage which creates a structural or health hazard, or any other nuisance to the owners or occupants of adjacent premises, or to the public by reason of

discharge into, onto or across any adjacent building, premises or public thoroughfare shall be abated by the owners of the improperly drained area; and the building official shall require the drainage to be disposed of in accordance with the provisions of the Plumbing Code.

1706.4. Soil and Vent Stacks.

1706.41. Extension Above New Building. — When a new building is erected higher than an existing building, no windows or other wall openings shall be located nearer than six (6) feet to an existing soil or vent stack on the lower building unless the owner of the new building makes the necessary provision to extend such soil or vent stacks to a height of not less than three (3) feet above the topmost opening at his own expense and with the approval of the adjoining owner.

1706.42. Extension Above Existing Building.—When the existing adjoining building is of greater height than the new building, the owner of the structure of greater height may, with the consent of the owner of the new structure, extend all new soil, waste or vent stacks which are located within twenty (20) feet of the common lot line to a level above the higher existing roof.

1706.43. Exemption.—Approved fixed window assemblies of the required fireresistive construction which comply with the provisions of article 9, when permitted in lot line walls, shall not be deemed wall openings within the meaning of this section.

SECTION 1707.0. EXCEPTIONS TO THE NATIONAL PLUMBING CODE

1707.1. Materials for Drainage Systems.—Soil, waste and vent piping above ground within buildings shall be of any material specified in the standard for plumbing systems as provided in section 1700.0 of the Basic Code when complying with the standards for that material as listed in appendix C.

ARTICLE 18

AIR CONDITIONING, REFRIGERATION AND MECHANICAL VENTILATION

SECTION 1800.0 SCOPE

The provisions of this article shall control the design and installation of air-conditioning, refrigerating, ventilating, cooling and air exhaust systems hereafter installed, and all alterations or additions to existing systems; except refrigerating systems subject to inspection and regulation under federal law, or where specific exemption is made in this article, or where a special kind of ventilating or exhaust installation is required in a structure or occupancy use group in article 4, or in sections 521 and 522 for emergency ventilation.

1800.1. Other Standards.—All approved refrigerating systems shall be constructed, installed and maintained in accordance with the provisions of the standard safety code for mechanical refrigeration listed in appendix B and with the approved rules adopted hereunder. All air-conditioning, warm air heating, air cooling and ventilating equipment and devices constructed, installed and maintained in accordance with the standards of the National Fire Protection Association listed in appendix B and with the standards of accepted engineering practice shall be deemed to conform to the requirements of this article unless otherwise specifically provided.

1800.2. Cooperating Agencies.—Nothing herein contained shall be deemed to nullify the federal, state or municipal rules and regulations governing the storage and use of flammable and explosive gases and chemicals, or the requirements of the Interstate Commerce Commission or other federal statutes governing the transportation and use of hazardous gases, explosives and other flammable substances.

SECTION 1801.0. DEFINITIONS

air conditioning. The process of treating air so as to control simultaneously the temperature, humidity, cleanliness and distribution to meet the requirements of the conditioned space.

air duct. A tube or conduit, or an enclosed space or corridor within a wall or structure used for conveying air.

fire damper. An approved automatic or self-closing noncombustible barrier designed to prevent the passage of air, gases, smoke or fire through an opening, a duct or plenum chamber.

limit control. A thermostatic device installed in the duct system to shut off the supply of heat at a predetermined temperature of the circulated air.

mechanical ventilation. The mechanical process for introducing fresh air or for providing changes of air in a building or structure.

plenum chamber. An air compartment or enclosed space to which one or more distributing air ducts are connected.

refrigerant. The medium used to produce cooling or refrigeration by the process of expansion or vaporization.

refrigeration. The mechanical process of removing heat from the air in an enclosed space of a building or structure.

rupture member. A mechanical device that will rupture at a predetermined pressure to control automatically the compressor or maximum pressure of operation of the refrigerant.

smoke detector. A device installed in the plenum chamber or in the main supply air duct of an air-conditioning system to automatically shut off the blower and close a fire damper in the presence of smoke.

ton of refrigeration. The unit of capacity of refrigeration equivalent to the removal of heat at the rate of twelve thousand (12,000) B.T.U. per hour.

ventilation. The process of supplying or removing air by natural or mechanical means to or from any space. Such air may or may not have been conditioned.

SECTION 1802.0. PLANS, SPECIFICATIONS AND PERMITS

1802.1. Plans and Specifications.—Where a permit is required an application shall be filed with the building official and if, due to the size of the equipment involved or the complications that might arise from the installation of the equipment, the building official deems it necessary, such application shall be accompanied by specifications and diagrammatic mechanical drawings in sufficient detail, complying with the provisions of article 1, before a permit shall be issued for an air-conditioning, refrigerating or ventilating system. The plans shall be drawn to a scale of not less than one-eighth (⅛) inches to the foot and shall show the location and arrangement of all equipment and distribution elements, including safeties and pressure controlling devices.

1802.2. Permits.—A permit shall be required for all new installations and for all major replacements in existing installations which may result in violation of the Basic Code; or where required for the remedying of existing defective installations; except that permits will not be required for the following systems:

1802.21. Residential Buildings.—One- and two-family and multi-family dwellings (use groups L-2 and L-3) shall not be required to have permits unless the refrigerating systems contain more than ten (10) pounds of refrigerants or are actuated by motors or engines of one and one-half (1½) horsepower or larger.

1802.22. Unit Refrigerating Systems.—In business, commercial, industrial and residential use groups, B, C, D, E, H, and L, no permit shall be required for the installation of new self-contained unit refrigerating systems which contain not more than six (6) pounds of group 1 refrigerants.

1802.3. Approved Refrigerants.—It shall be unlawful to maintain or operate any refrigerating system without a permit when such is required by the provisions of section 1802.2, and no refrigerant other than that specified in the permit shall be employed in the system without the written approval of the building official.

SECTION 1803.0. TESTS

No air-conditioning, refrigerating or ventilating system requiring a permit shall be operated until it has been tested and found safe by the building official. All tests shall be conducted in accordance with the standard safety code and the approved rules adopted thereunder.

SECTION 1804.0. INSPECTIONS AND CERTIFICATES

All systems requiring permits shall be inspected by the building official upon their completion. If the system is found safe and in conformity to the requirements of the Basic Code and the approved application, a certificate shall be issued by the building official upon request.

1804.1. Concealment.—It shall be unlawful for owners, contractors or workmen to lath over, or in any way to conceal any piping, outlet boxes or other parts of a refrigerating system requiring a permit until an inspection has been made thereof and due notice given that the work has been approved.

1804.2. Periodic Inspection.—Refrigerating systems in buildings for assembly uses (use group F) and institutional uses (use group H) shall be inspected periodically. All refrigerating systems shall be subjected to such inspections and tests deemed necessary by the building official for the adequate protection of the public safety.

1804.3. Defects and Repairs.—Upon inspection or reinspection of a refrigerating, air-conditioning or ventilating system, any defects or deficiencies which require repair to insure safe operation shall be rectified before the system is placed in use.

1804.4. Power of Condemnation.—When a system or any part thereof is found unsafe to life or property, it shall be condemned and no such system shall be restored to use until it has been made safe and approved by the building official.

SECTION 1805.0. OPERATION AND MAINTENANCE

1805.1. Housekeeping.—All air-conditioning and refrigerating systems shall be maintained in a clean and orderly manner, free from accumulations of dust, oily waste or other debris; and all piping and machinery shall be kept readily accessible at all times for inspection and repair. Plenum chambers, air ducts, cooling and heating coils shall be kept clean, and unit filters shall be cleaned or renewed to insure adequate air flow in accordance with the approved rules.

SECTION 1806.0. EXISTING BUILDINGS AND INSTALLATIONS

1806.1. Existing Approvals.—Existing refrigerating, air-conditioning and ventilating equipment heretofore legally installed may be continued in use, provided the public safety is not endangered thereby, and the sys-

tem is maintained in a safe operating condition as required by the building official and in accordance with the standard safety code.

1806.2. Unsafe Installations.—If in the opinion of the building or fire officials, the continued use of existing equipment is unsafe, the building official shall order such use to cease until all defects are remedied.

SECTION 1807.0. ACCIDENTS

1807.1. Notice to Building Official.—The owner, lessee, or person in charge of refrigerating or air-conditioning systems shall immediately notify the building official of each and every accident to a person involving medical attention or damage to apparatus or property on or about or in connection with said installation; and he shall afford the building and fire officials or other authorized municipal agent every facility for investigating the accident.

1807.2. Damaged Equipment.—The removal of any part of the damaged construction or operating mechanism from the premises is forbidden until permission has been granted by the building official.

1807.3. Restoration of Use.—When an accident involves the failure or destruction of any part of the system, operating mechanism, or of the structure housing the equipment, the re-use of the installation shall be unlawful until it has been made safe; and a new certificate of approval shall be secured for any installation requiring a permit under the provisions of this article.

SECTION 1808.0. CLASSIFICATION OF REFRIGERANTS

All refrigerants shall be classified in accordance with the standard safety code and it shall be unlawful to maintain or operate any system employing a refrigerant other than those specified therein or in the approved rules adopted hereunder.

SECTION 1809.0. USE OF REFRIGERANTS

Only approved refrigerants shall be used in any installation as determined by the life hazard of the use and occupancy of the building or structure, and as provided in the standard safety code.

1809.1. Classification of Buildings.—For the purpose of this article buildings shall be classified in respect to use as follows:

1809.11. Industrial Buildings shall include use groups A, B-1, B-2 and D;

1809.12. Commercial Buildings shall include use groups C and E;

1809.13. Public Assembly Buildings shall include use groups F-1, F-2, F-3, F-4;

1809.14. Institutional Buildings shall include use groups H-1 and H-2;

1809.15. Residential Buildings shall include use groups L-1, L-2 and L-3;

1809.16. Mixed Use Buildings.—In buildings of mixed use and occupancy as provided in section 213, the requirements of the standard safety code which secure the greatest public safety shall apply to the entire building; except that the requirements of the standards shall apply to each part separately when such uses are completely separated by horizontal and vertical fire divisions complying with the highest fire grading of table 16 for the separated uses. When high hazard uses are incidental to the main use of the building or part thereof, the area devoted to such high hazard use shall be enclosed with fireresistive construction complying with the Basic Code.

1809.2. Storage of Refrigerants.

1809.21. Machinery Rooms.—All Class T machinery rooms when required under the standard safety code shall be enclosed with vapor-tight construction of not less than two (2) hours fireresistance with one and one-half (1½) hour self-closing fire doors or their approved labeled equivalent complying with article 9. Such rooms shall be ventilated to the outer air in accordance with the standard safety code. Every refrigerating machinery room shall be adequately lighted to furnish an illumination of not less than three (3) foot candles on all parts of the floor.

1809.22. Quantity of Refrigerant.—Not more than three hundred (300) pounds of refrigerant shall be stored in approved containers in the machinery room. Quantities in excess of three hundred (300) pounds shall be stored in a separate accessory building or in a room used for no other purpose enclosed with not less than three (3) hour fireresistive construction.

1809.23. Smoke Detector.—When in the opinion of the building or fire officials, the life safety of any use or occupancy is exceptionally hazardous, or when required for automatic operation of exhaust systems, all mechanical ventilating and air-conditioning systems shall be provided with an approved smoke detector as specified in section 1814.6.

SECTION 1810.0. HEATING AND COOLING EQUIPMENT

1810.1. Steam and Hot Water Heating Equipment.—The installation of all steam and hot water apparatus in air-conditioning systems shall comply with the requirements of articles 10 and 11 for piping, flues and flue connections. Direct heating units when used in air-conditioning systems shall not exceed fifteen (15) pounds per square inch gage working pressure.

SECTION 1811.0. PLUMBING AND WATER CONNECTIONS

1811.1. Discharge Lines.—Discharge lines from condensers and other equipment shall not be directly connected to the waste or sewer system but shall discharge over and above the rim of a trapped and vented plumbing fixture or other interceptor or into a separate storm water sewer as provided in the Plumbing Code.

1811.2. Water Connections.—Water lines shall be connected to condensers to prevent siphoning into potable water supplies and no water used for removing heat from a refrigerating system shall be discharged into any water supply directly or indirectly intended for human consumption.

SECTION 1812.0. AUTOMATIC FIRE DOORS AND DAMPERS

1812.1. Fire and Fire Division Walls.—An approved fire door or an approved automatic fire shutter complying with the provisions of article 9 shall be provided at each side of a fire wall or fire division which is pierced by a duct of an air-conditioning or ventilating system. Such opening protectives shall be installed so as to be readily accessible for inspection and repair. When fire doors are not practical and where required in ducts, approved fire dampers shall be constructed of noncombustible materials and installed in the locations prescribed in the standard safety code for air-conditioning and air-cooling systems listed in appendix B.

1812.2. Flammable Residues.—Ducts for exhaust ventilating and air-conditioning systems which discharge or contain flammable vapors, dust or other solid residues shall extend to the exterior of the structure in the most direct manner possible and shall not pierce floors except when enclosed with construction of the required fireresistance as regulated by the fire grading in table 16; nor shall such ducts transporting flammable matters extend through fire walls, nor shall they be incorporated in the structural elements of the building.

SECTION 1813.0. INLET AND OUTLET OPENINGS

1813.1. Exterior Intake Openings.—Exterior fresh air intake openings when located on a street or alley lot line shall be installed not less than twelve (12) feet above grade; and all intakes shall be protected by approved corrosion-resistive screens. Fresh air intakes with less than thirty (30) feet exposure distance to openings in adjoining walls or buildings shall be protected with approved automatic fire shutters, curtains or other approved opening protectives complying with article 9.

1813.2. Exterior Exhaust Openings.—The exhaust openings shall be located on the exterior of structures with approved protecting guards, covers or other approved means of preventing the creation of a nuisance; and shall not circulate air downward in such manner as to strike pedestrians. The discharge outlet shall be located not less than twelve (12) feet above grade and not less than twenty (20) feet horizontally from a fire escape, exterior stairway or other required exitway.

1813.3. Ventilation Duct Outlets.—Ventilation ducts from all range hoods including residential exhaust fans shall discharge to the outside atmosphere.

SECTION 1814.0. DUCTS, LININGS AND COVERINGS

1814.1. Materials and Supports.—All ducts shall be constructed of approved, noncombustible, corrosion-resistive materials in accordance with

the requirements of this article and the provisions of sections 1019 and 1119. Ducts may be of independent construction or may be incorporated in the walls or other parts of the structure, provided that the portion of the structure forming the duct enclosure meets the minimum requirements for strength and fireresistance specified herein or in article 9. They shall be made reasonably air-tight throughout, without openings other than those required for the proper operation and maintenance of the air-conditioning or ventilating system. Ducts and all parts of the duct system shall be substantially supported and securely fastened to the structural members of the building with supports of approved, durable noncombustible materials. Duct sizes shall be based on the discharge capacity and size of the refrigerating system as specified in the standards.

1814.2. Linings and Coverings.—Only approved noncombustible materials shall be used for duct lining; nor shall combustible coverings be used on the outside of ducts carrying air of temperatures greater than one hundred and seventy-five (175) degrees F. Insulating materials forming a component or auxiliary part of any duct system shall meet the test requirements of article 9 for noncombustible materials.

1814.3. Location of Ducts.—All ducts shall be installed so that they will not vitiate the strength of any structural member nor be subject to mechanical damage or rupture; nor shall the effectiveness of the fire protection of structural members be impaired. The firestopping of floors, partitions and walls shall not be destroyed where ducts pass through floors, ceilings, walls or partitions.

1814.4. Clearances.—Metal ducts shall be installed not nearer than two (2) inches to any combustible construction unless protected by at least one-quarter (¼) inch of asbestos or other approved noncombustible insulating material.

1814.5. Plenum Chambers.—Plenum chambers shall conform to all the minimum requirements for duct systems, and when such chambers are enclosed in walls or partitions, the enclosures shall be constructed in accordance with the requirements of article 8 for enclosure walls, but in no case shall the fireresistance rating be less than two (2) hours.

1814.6. Corridors as Return Ducts.—In all corridors, hallways or exitways which are used as the return exhaust of air-conditioning systems, an approved smoke detector or other device shall be provided to automatically and instantaneously stop the exhaust fan in the presence of smoke as required in section 605.2. The louvres provided for the transmission of air to and from air-conditioned spaces to such corridors shall be arranged to automatically close after stopping of the fans and shall be equipped with auxiliary manually-operated closing devices.

ARTICLE 19

PREFABRICATED CONSTRUCTION

SECTION 1900.0. SCOPE

The provisions of this article shall govern the materials and methods of construction of all prefabricated buildings, prefabricated subassemblies and prefabricated building units as herein defined.

Note D: Mass and Industrialized Production.—Prefabrication as herein used is nat restricted ta housing far one- and two-family dwellings, but applies to all prefabricated forms of building elements and assembled constructian units intended for bath structural and service equipment purposes in all buildings of all use groups. The provisians of this article are supplemental to the structural, mechanical and fireresistive requirements af the Basic Cade. Prefabrication cavers the precutting and assembling of individual elements either in the shop ar at the site before erection in the building structure. Prefabricated shop assemblies may be shipped in structurally camplete units ready for installatian in the building structure or in knack-down and packaged form for assembly at the site. There is no distinction in the application af the Basic Code requirements for controlled or ardinary materials as defined in sectians 701, 722 and 800, to either prefabricated or at-site canstructian. However, the use of cantrolled materials procedure permits greater latitude far the development af industrialized shop productian methads.

1900.1. Approved Materials and Methods.—The use of all materials or methods of construction which meet the specified strength, durability, sanitary and fireresistive requirements of the Basic Code and accepted engineering practice as listed in appendix B shall be permitted.

1900.2. New Materials.—All new materials not specifically provided for shall be tested and approved in accordance with the provisions of articles 8 and 9 for strength, durability and fireresistance; or the building official shall accept the reports of accredited testing authorities complying with the approved rules to assist him in his determination.

1900.3. At-Site Construction.—Nothing in these provisions shall be deemed to prohibit at-site construction and erection of buildings or structures when designed in compliance with the provisions of the Basic Code and the minimum requirements prescribed in this article.

1900.4. Conflicting Laws.—Nothing herein contained shall be deemed to nullify any provisions of the zoning laws or any other statute or legally adopted rule pertaining to building construction of [*name of municipality*] in respect to the location, use, height, area of building and type of construction except as may be specifically exempted in these provisions; nor have the effect of increasing working stresses or reducing exit facilities and health provisions as prescribed in the Basic Code.

SECTION 1901.0. DEFINITIONS

prefabricated. Construction materials or assembled units fabricated prior to erection or installation in a building or structure.

prefabricated building. The completely assembled and erected building or structure, including the service equipment, of which the structural parts consist of prefabricated individual units or subassemblies using ordinary or controlled materials; and in which the service equipment may be either prefabricated or at-site construction.

prefabricated subassembly. A built-up combination of several structural elements designed and fabricated as an assembled section of wall, ceiling, floor or roof to be incorporated into the structure by field erection of two (2) or more such subassemblies.

prefabricated unit. A built-up section forming an individual structural element of the building, such as a beam, girder, plank, strut, column or truss, the integrated parts of which are prefabricated prior to incorporation into the structure, including the necessary means for erection and connection at the site to complete the structural frame.

prefabricated unit service equipment. A prefabricated assembly of mechanical units, fixtures and accessories comprising a complete service unit of mechanical equipment, including bathroom and kitchen plumbing assemblies, unit heating and air-conditioning systems and loop-wiring assemblies of electric circuits.

SECTION 1902.0. PLANS AND SPECIFICATIONS

Complete legible dimensioned drawings to a scale of not less than one-eighth (⅛) inch per foot and specifications covering every type of prefabricated construction complying with the administrative provisions of section 113 shall be submitted to the building official for approval. Such application shall describe all essential elements of the structure or assembly, identify such materials as the building official may designate with the name of manufacturer, trade name, commercial grade, manufacturing process or chemical composition when necessary, and shall include all required data of the physical properties of the component materials.

1902.1. Plot Diagram.—A plot plan complying with section 113.6 shall be filed for each individual building or structure.

1902.2. Mechanical Plans.—Mechanical plans in sufficient detail for the installation of heating, cooking, electrical, ventilating, air-conditioning, sanitary and all other service equipment, piping and accessories shall be submitted to the building official with the application for general approval of the design; or, if not included in the general application for approval, such information shall be furnished for each specific installation.

1902.3. Piping, Electric Wiring and Accessories.—The design shall include provision for all installations of piping, wiring and accessories for service equipment to be installed either in the shop or at the site.

1902.4. Integral Accessories.—When unit service equipment is furnished with and forms an integral part of the prefabricated subassembly, the construction shall be preformed to accommodate accessory conduits, piping, ducts, outlet boxes and fittings; and no material essential to the structural strength of the unit or assembly shall thereafter be removed from structural elements during installation on the site.

1902.5. Service Equipment Requirements.—All service equipment shall comply with the requirements of articles 10 and 11 for heating, article 12 for fire-extinguishing, article 15 for electrical, article 17 for plumbing, and article 18 for air-conditioning and ventilating systems and equipment.

SECTION 1903.0. TESTS OF PREFABRICATED ASSEMBLIES

When not capable of design by accepted engineering analysis, all prefabricated assemblies or subassemblies constructed as in practice shall be subjected to the unit assembly tests prescribed in articles 7 and 8 and the test standards listed in appendixes C, D, E, F and G. All assembly tests shall meet the strength requirements of section 804 within the limits of deflection therein provided.

SECTION 1904.0. INSPECTION AND CERTIFICATE OF SUPERVISION

1904.1. Verified Report.—Except where all assemblies and subassemblies, service equipment and accessories are readily accessible for complete inspection at the site, the licensed professional engineer or architect who supervised the design, fabrication and erection of the prefabricated construction, or the authorized and qualified representative of the manufacturer, shall furnish a verified report of inspection to the building official upon completion of the work certifying that the building has been erected in accordance with the Basic Code, and that the work has been constructed in conformity to the approved plans except as to specific legally authorized variations which are noted in the verified report.

1904.2. Test and Inspection Records.—All required test and inspection records shall be accessible to the building official at all times during the fabrication of the unit or subassembly and the erection of the building; or such records as the building official may designate shall be filed with him.

SECTION 1905.0. PREFABRICATED UNITS

Approved prefabricated individual units for use in floor, roof, ceiling or wall construction which are designed to meet all prescribed structural provisions of article 7 and 8 including connection and anchorage details may be used in all at-site construction types and building use groups within the height, area and fireresistance limitations of tables 5 and 6.

SECTION 1906.0. EXISTING SYSTEMS AND APPROVALS

1906.1. Existing Approvals.—Any material, appliance, form or system of construction heretofore legally approved may be used for the purposes and within the limitations for which it was approved, provided such use is not detrimental to the safety of the public or is not specifically prohibited by the provisions of the Basic Code.

1906.2. Materials Already Fabricated.—The use of any material already fabricated or of any construction already erected under a heretofore legally issued permit of the building official shall be permitted; but the continuation of any construction erected in violation of any statute or legally adopted rule in force at the time of erection shall be prohibited.

SECTION 1907.0. APPROVALS BASED ON DESIGN

When capable of design by accepted engineering analysis, any prefabricated structural element or combination of elements shall be approved by the building official when the design is based on the working loads and working stresses provided in articles 7 and 8 and appendix K.

1907.1. Ordinary Materials.

1907.11. Average Working Stresses.—When the character of construction permits site inspection by the building official, and all prefabricated assemblies and subassemblies are readily accessible for field inspection, the use of ordinary material with the average working stresses prescribed in appendix K shall be permitted in prefabricated construction.

1907.12. Field Inspection.—When ordinary materials are used, field erection and installation of prefabricated units and service equipment at the site shall be inspected by the building official or he may accept the report of a qualified licensed engineer or architect in respect thereto. All prefabricated subassemblies shall be certified by the authorized representative of the manufacturer for compliance with the Basic Code.

1907.2. Expert Services.—When a system of construction involves unusually intricate design analysis, the building official may require the submitter to retain a competent expert to assist in his determination; or he may accept the recommendations of the Building Officials Conference in respect thereto.

1907.3. Check Tests.—When there is reasonable doubt as to the adequacy of the construction or accessory details which are based on design, the building official may require check tests of assembled units as specified in section 702.2 or he shall accept certified reports of such tests from accredited testing authorities.

SECTION 1908.0. APPROVALS BASED ON TESTS

When not capable of design by accepted engineering analysis, every system of prefabricated building, subassembly or unit and its connections shall be subjected to the tests and conditions of approval prescribed by article 8 or to any other tests acceptable to the building official that simulate the actual loads and conditions of application that the completed structure will be required to resist in normal use; or certified reports of such tests conducted by an approved and recognized testing authority shall be accepted by the building official provided such tests meet the requirements of the Basic Code. The costs of all investigations and tests shall be paid by the submitter.

1908.1. Field Connections.—All field splices and structural connections of floor, wall, ceiling and roof subassemblies shall be of sufficient strength to transmit two and one-half (2½) times the design live loads without failure, and shall be so constructed as to insure weather-tightness in exterior wall and roof panels.

1908.2. Weather Resistance.—In the absence of reliable experience records, the building official may require accelerated tests on the prefabricated assemblies as prescribed by article 8 and appendix F to determine durability, weather tightness and weather resistance; or he shall accept certified reports of approved and recognized testing authorities in respect thereto.

1908.3. Comparative Tests.—When not available from existing authoritative test data, the building official may require comparative tests of traditional standard construction of the dimensions and proportions required in the Basic Code for the proposed use.

SECTION 1909.0. MATERIALS, DIMENSIONS AND METHODS OF FABRICATION

1909.1. Accepted Standards.—The provisions of articles 7 and 8 and the approved standards listed in the appendixes shall control the selection of materials, design and fabrication of all prefabricated structures; or in the absence of such standards of accepted engineering practice, the minimum requirements shall be regulated by the approved rules.

1909.2. Below-Grade Construction.—The prefabricated construction covered by these provisions shall not be permitted in cellar, basement or part-story below grade unless specifically approved by the building official. All such subsurface structures shall be constructed of approved masonry, or reinforced concrete complying with article 8; or the subgrade walls and floors shall be constructed of approved durable, water-resisting materials of adequate strength.

1909.3. Exterior and Interior Finish.—When fireresistance is specified, framed wall and partition assemblies shall be veneered, surfaced or constructed with approved materials to secure the specified fireresistance rating required by article 2 for the construction type and use group of the building or structure within the limitations of tables 5 and 6. When not required to meet fireresistance requirements, interior wall and partition surfaces shall be constructed to comply with section 855.9.

1909.4. Exterior Protection.—All steel or other corrodible siding and weather boarding exposed to the weather shall be protected from corrosion or shall be manufactured from corrosion-resistive metal to comply with section 855. In structures two (2) stories or more in height, the weather boarding shall be constructed of noncombustible or approved protected-combustible materials as regulated by tables 5 and 6.

1909.5. Condensation and Weather Resistance.—Exterior frame walls of buildings shall be constructed or ventilated to avoid condensation and leakage of moisture to comply with section 855.8.

1909.6. Roofing.—All roof covering shall be of approved types meeting the requirements of sections 903.4 and 928.

1909.7. Connections.—All connections and accessories shall be proportioned to transmit the loads and stresses imposed in accordance with accepted engineering practice and as provided in section 1908.1.

1909.8. Waterproofing, Ratproofing and Termite Protection.—All installations shall comply with the provisions of sections 874 for waterproofing, 875 for ratproofing and 876 for termite protection.

SECTION 1910.0. LIGHT GAGE STEEL FRAME CONSTRUCTION

The fabrication of light gage steel frame structures shall comply with the requirements of sections 828 governing formed steel and 829 governing steel joists.

SECTION 1911.0. LIGHT WOOD FRAME CONSTRUCTION

The fabrication of light wood frame structures shall comply with the requirements of section 855.

SECTION 1912.0. LIGHT REINFORCED CONCRETE FRAME CONSTRUCTION

The fabrication of light reinforced concrete frame structures shall comply with the provisions of sections 841 to 849 inclusive.

1912.1. Shop Procedure and Test Reports.—The design and manufacture of all precast concrete structural units and assemblies shall follow the procedures specified for ordinary or controlled materials. Tests shall be made at the place of manufacture to determine the water-ratio and the aggregate proportions required to maintain the design strength for every change in material and manufacturing conditions. The shop report shall cover the quality of concrete materials and the total amount of water used; the mixing and placing of concrete and the installation of reinforcement, together with a record of the temperatures and means of protection provided for the concrete while curing.

1912.2. Test Cylinders.—Not less than three (3) compression specimens shall be tested at the age of shipment of the prefabricated member for each one hundred (100) yards of concrete. The test cylinders shall develop an average compressive strength at the age of shipment of the prefabricated member of not less than twice the compressive stress used in the design.

SECTION 1913.0. LIGHT REINFORCED GYPSUM FRAME CONSTRUCTION

The fabrication of light reinforced gypsum frame structures shall comply with the requirements of section 850.

1913.1. Test Cylinders.—Not less than three (3) compression specimens for each one hundred (100) yards of gypsum concrete cured and stored under the same conditions as the prefabricated member shall be tested at the age of shipment. The test specimens shall develop an average compressive strength at the time of shipment not less than twice the stress used in the design.

1913.2. Protection of Units.—Continual protection from the weather and from contact with water shall be furnished for the prefabricated units or subassemblies during shipment, storage and after erection in the structure.

1913.3. Handling and Erection Stresses.—All units shall be metal bound or otherwise reinforced for handling stresses and precaution shall be observed to provide temporary anchorage to the structural frame during erection and to prevent damage or destruction from the weather and wind before final completion of the installation.

1913.4. Grade Construction.—The ventilated space underneath first floor construction shall be not less than two (2) feet high and the underside of first floor construction shall be dampproofed with an approved protective covering.

SECTION 1914.0. FIRERESISTANCE AND FIRESTOPPING

Provision shall be made to comply with all the requirements of sections 877 and 921 for fire protection and firestopping and the provisions for fireresistive construction of article 9.

SECTION 1915.0. LIGHT AND VENTILATION

Means of light and ventilation shall comply with the provisions of article 5 governing habitable and occupiable rooms, bathrooms and toilet rooms, attic and crawl spaces.

SECTION 1916.0. EGRESS FACILITIES

The requirements of article 6 shall control the number, size and construction of all means of egress as specified therein for the use and occupancy of the building.

1916.1. Fireresistance Requirements.—Where fireresistive construction is required, fireresistance ratings shall be regulated by table 5 for the respective type of construction. Required exitways, public hallways, interior trim and finish shall be constructed to comply with article 9.

SECTION 1917.0. PLUMBING, PIPING AND SANITARY EQUIPMENT

All installations of plumbing, drainage and gas-piping systems shall comply with the provisions of article 17 and the Plumbing Code.

SECTION 1918.0. HEATING AND AIR CONDITIONING

The applicable provisions of articles 10 and 11 and the standards of accepted engineering practice listed in the appendixes shall control the construction and installation of chimneys, flues and heating appliances as therein provided for liquid and solid fuel and gas-fired heating equipment and service-water heaters; and the provisions of article 18 for air-conditioning installations.

SECTION 1919.0. ELECTRIC WIRING AND EQUIPMENT

All electric conductors, equipment, wiring and outlets for electric appliances shall be installed in accordance with the provisions of article 15 and the National Electrical Code.

ARTICLE 20

PLASTIC CONSTRUCTION

SECTION 2000.0. SCOPE

The provisions of this article shall govern the quality and methods of application of plastics for use in buildings and structures.

2000.1. Approved Materials.—The use of all plastics which meet the strength, durability, sanitary and fireresistive requirements of the Basic Code and accepted engineering practice as listed in appendixes C and G shall be permitted.

2000.11. Application for Approval.—Applicants for approval of a plastic material shall furnish all necessary technical data required by the building official including among others the manufacturing process; all pertinent physical properties including coefficient of expansion, fireresistance, flame spread; products of combustion; electrical properties and weather resistance.

2000.2. Identification.—All plastic materials approved for use under the Basic Code shall be identified by the trade formula number or name or other acceptable identification. Each sheet, roll or film of approved plastic shall bear the approval number or other identification mark of the approving authority.

2000.3. Manufacturer's Certificate.—All applications for a building permit shall indicate the type and kind of plastic proposed for use in the building or structure and shall specify the trade formula, number or other approved designation and shall be accompanied by the manufacturer's certificate certifying that the plastic material has been approved or that the assembly complies with the requirements of the Basic Code for the specified use.

SECTION 2001.0. DEFINITIONS

approved plastic. Any plastic material which meets the requirements of section 2000.1.

flameresistant plastic (check test). A plastic material which will not support flame when tested in accordance with the ASTM standard for flammability listed in appendix G.

slow-burning plastic (check test). A plastic material which burns no faster than two and one-half (2½) inches per minute when tested in accordance with the ASTM standard for flammability listed in appendix C.

thermoplastic material. A solid plastic material which is capable of being repeatedly softened by increase of temperature and hardened by decrease of temperature.

thermosetting material. A solid plastic material which is capable of being changed into a substantially infusible and insoluble product when cured under the application of heat or by mechanical means.

reinforced thermosetting plastic. A thermosetting plastic reinforced with a glass fiber mat having not less than one and one-half (1½) ounces of glass fiber per square foot.

SECTION 2002.0. DESIGN AND INSTALLATION

2002.1. Structural Requirements.—All plastic materials and their assemblies shall be of adequate strength and durability to withstand the loads and forces specified in article 7 for their approved use.

2002.2. Fire and Flameresistance.—In addition to the check tests specified in section 2001.0, all plastic materials and their assemblies shall comply with the fireresistance requirements of table 5 and the flameresistance requirements of article 9, except as modified for glazing of interior and exterior openings in sections 2003.1 and 2004.1, and in sections 2003.4 and 2004.5 for skylights.

2002.3. Connections and Supports.—All fastenings, connections and supports shall be proportioned to transmit two and one-half (2½) times the design live load. Adequate allowance shall be made in the fastenings and supports for differential expansion and contraction of the connected materials.

SECTION 2003.0. ACCEPTED USES FOR THERMOPLASTICS

Subject to the provisions of the Basic Code governing structural requirements in article 7, protection of wall openings and other fireresistance requirements in articles 8 and 9 except as herein modified with respect to glazing, approved thermoplastics shall comply with the following provisions for specific uses.

2003.1. Glazing.—Where approved fire doors and fire windows are not specifically required under the Basic Code, exterior and interior door and window openings may be glazed with approved plastics, except that such glazing shall not be allowed in exterior openings which are located more than four (4) stories or fifty (50) feet in height above grade.

2003.2. Luminous Ceilings.—Flameresistant plastic panels securely mounted on approved noncombustible frames and suspended from noncombustible floor or roof construction may be employed as luminous ceilings in classrooms with an occupancy load of less than seventy-five (75) and in other rooms or spaces, not including exitways, not more than seven thousand five hundred (7500) square feet in area, in other than high hazard, assembly and institutional use groups. In spaces protected by approved automatic sprinkler systems, approved plastics may be installed without limitation in area of the room or space.

2003.3. Transparent Roof Sheathing.—Outside of the fire limits, where class 4 roof coverings are permitted under section 928.3 and in industrial buildings for other than high hazard uses, approved plastics may be used as transparent roof sheathing as follows:

2003.31. Structural.—The assembly shall meet the structural requirements of section 711;

2003.32. Limiting Area.—Each transparent or translucent section shall be not more than one hundred (100) square feet in area and the aggregate area on any one building shall not exceed fifteen (15) per cent of the total roof area;

2003.33. Panel Separation.—All individual sections of plastic covering shall be separated in every direction by not less than eight (8) feet of approved non-combustible construction; and

2003.34. Form of Panels.—The transparent panels shall be pitched or arched in the direction of the minor dimension of the opening which shall be not more than eight (8) feet.

2003.4. Skylights.—Skylight assemblies in all locations other than over places of assembly may be glazed with approved thermoplastics under the following conditions:

2003.41. Limiting Area.—The roof opening shall be not more than fifty (50) square feet in area; and not more than twenty (20) per cent of the roof area shall be occupied by such installations;

2003.42. Form of Skylight.—The skylight assembly shall be constructed with a pitch of not less than thirty (30) degrees to the horizontal or shall be dome-shaped with a minimum rise at the center equal to ten (10) per cent of the maximum dimension but not less than five (5) inches;

2003.43. Location of Units.—The units shall be installed on the roof with a minimum distance of three (3) feet between adjoining units and shall have a curb not less than four (4) inches in height above the level of the roof and no unit shall be installed within twenty (20) feet of any wall in which the exterior openings are required to be protected;

2003.44. Maximum Unit Size.—The total area enclosed within the curb of a single unit shall not exceed fifty (50) square feet and no dimension shall be greater than ten (10) feet;

2003.45. Sash and Frames.—The plastic material shall be mounted in a steel or other approved metal frame.

2003.5. Dormer Windows.—Where class 3 and class 4 roof coverings are permitted under the provisions of section 928, dormer windows may be glazed with approved plastics.

2003.6. Sign Construction.—Approved plastic materials for use in billboards, ground, marquee, roof and wall signs shall comply with the provisions of article 14.

SECTION 2004.0. ACCEPTED USES FOR REINFORCED THERMOSETTING PLASTICS

The use of reinforced thermosetting plastics shall comply with the structural requirements of article 7, the protection of wall openings and the fireresistance requirements of article 9 except as herein modified.

2004.1. General Glazing.—Where fire doors, fire windows or other opening protectives are not specifically required under the Basic Code, exterior

and interior door and window openings may be glazed with approved thermosetting plastics, provided such openings in exterior walls are located not more than four (4) stories nor more than fifty (50) feet above grade and as further regulated by the provisions of sections 2004.21 to 2004.24.

2004.2. Wall Siding.—In storage (use group B) and industrial (use group D) buildings, not including high hazard uses, reinforced thermosetting plastics shall be permitted as follows:

2004.21. Outside Fire District No. 1.—A continuous run of thermosetting plastics shall be permitted not more than one hundred (100) feet in length and twelve (12) feet in height in enclosure walls of noncombustible (type 2-C) construction, provided such walls are located eleven (11) feet or more from interior lot lines or from any other building. In Fire District No. 2, the total area of this material shall not exceed thirty (30) per cent of the wall area, and outside of the fire limits shall not exceed fifty (50) per cent of the wall area. The glazing of openings in masonry enclosed (type 3) and in wood frame (type 4) construction shall not exceed the limits prescribed in section 2004.24 and shall be in compliance with the required fire separations of the Basic Code.

2004.22. Segregation of Continuous Panels.—Not less than eight (8) feet of approved noncombustible siding shall be provided longitudinally between the ends of consecutive bands of continuous siding and not less than ten (10) feet vertically between adjacent parallel rows.

2004.23. Access Panels.—Access panels shall be provided in all continuous runs to comply with the requirements of section 861.0.

2004.24. Within Fire District No. 1.—Wall panel units of reinforced thermosetting plastics shall be limited to the covering of individual window openings as provided in section 2004.1 and shall not exceed twenty-five (25) per cent of the total wall area of the story on that side.

2004.3. Translucent Roofing.—Approved reinforced thermosetting plastic construction shall be permitted in roofs of storage and industrial buildings for other than high hazard uses as herein provided:

2004.31. Pitched Roofs Outside Fire Limits.—Approved reinforced thermosetting plastics may be used on pitched roofs in continuous rows or bands but not more than one hundred (100) feet in length and twelve (12) feet in width on storage (use group B) and industrial (use group D) buildings for other than high hazard uses, with eight (8) feet separation longitudinally between the ends of consecutive rows and ten (10) feet transversely between adjacent parallel rows. The total area of this material shall not exceed thirty (30) per cent of the roof area.

2004.32. Within Fire Limits.—The size of roof panel units within the fire limits shall be limited as provided for skylights in section 2004.5.

2004.4. Construction of Wall and Roof Units.—All reinforced thermosetting plastic wall and roof panel units shall be directly attached to the building framework or shall be mounted individually in steel or other approved metal frames.

2004.5. Skylights.—Both within and without fire limits, approved reinforced thermosetting plastics shall be permitted for use as skylights

except over rooms and spaces used as places of assembly as herein provided, in buildings of all use groups and of other than fireproof (type 1) buildings. Skylights installed over stairway or other shafts shall be constructed to be self-venting or equipped with automatic means of removing hot air and gases to comply with sections 516.1 and 516.2.

2004.51. Construction.—On flat roofs the skylight may be directly attached to the wood or steel framework of the building and not more than thirty (30) per cent of the area of a flat roof shall be occupied by such installations.

2004.6. Partitions.—Reinforced thermosetting partitions shall be permitted wherever wood and glass construction is acceptable in buildings of masonry enclosed (type 3) and wood frame (type 4) construction, and in rooms and spaces not exceeding five thousand (5000) square feet in area enclosed in three-quarter (¾) hour fireresistive construction in buildings of fireproof (type 1) and non-combustible (type 2) construction as provided in section 910.42.

2004.7. Luminous Ceiling and Wall Panels. — Approved reinforced thermosetting plastic panels supported from noncombustible floor or roof construction or attached to noncombustible walls or partitions may be used in luminous ceiling and wall assemblies in rooms and spaces, not including exitways, not more than seventy-five hundred (7500) square feet in area of other than assembly or institutional occupancy. When such spaces are protected by an approved automatic sprinkler system, such luminous panels shall be permitted without limitations in the area of the room or space. The luminous panels shall be installed so as not to interfere with the operation of the sprinkler heads. All sprinkler heads located within the area to be covered by panels, shall be installed below the level of the panels.

2004.8. Roof Coverings Over Terrace.—Roof coverings over terraces and patios of one- and two-family dwellings shall be permitted in reinforced thermosetting plastic construction. The supports for such construction shall comply with the requirements of the Basic Code.

2004.9. Accessory Structures and Miscellaneous Equipment.

2004.91. Greenhouses, Fences and Windbreaks.—Wherever wood frame and unprotected steel construction is permitted under the provisions of sections 301 and 302, reinforced thermosetting plastics shall be permitted within the limitations therein specified.

2004.92. Lighting and Other Decorative Fixtures.—Approved reinforced thermosetting plastics shall be permitted for light diffusion media and decorative hangings within the limitations specified for decorative materials in section 925.

2004.93. Bathroom Accessories.—Approved thermosetting plastics shall be permitted as a substitute for glass in shower stalls and doors, bathtub enclosures and similar accessory units.

GENERAL NOTES CONCERNING STANDARDS CITED IN THE BASIC BUILDING CODE

The standards issued by the accredited authoritative agencies listed herein are intended to serve as criteria for accepted safe practice for various materials, products, systems of construction, or specific uses as required or used under the provisions of the code. The text of the code referring to any standard indicates whether conformance with that standard is mandatory or permissive.

In the following appendixes an effort has been made to group the standards according to the principal subjects to which they apply. Some standards cover both accepted engineering practice and material specifications, or other combinations of subject matter, so that it is sometimes necessary for convenience to list them in more than one of the appendixes.

Wherever possible the standards have been listed under the designation of the principal authoring agency. Many of these standards are reissued by one or more agencies, in addition to the authoring agency, under their own designations. While there may be some variation in details in the various versions of the same standard issued by several agencies, these differences are generally of such minor nature that any of the versions is acceptable even though not specifically listed herein.

For example, the standard fire test procedure for building construction and materials originating in a committee of the American Society for Testing Materials and issued as

ASTM E119—Methods of Fire Tests of Building Construction and Materials is also published by the National Fire Protection Association and issued as

NFPA 251—Standard Methods of Fire Tests of Building Construction and Materials and by Underwriters' Laboratories, Incorporated, which issues it as

UL 263—Standards for Fire Tests of Building Construction and Materials.

In addition to the standards listed, there are a number of listings of materials, devices, products and assemblies that are accepted for specified performances. Among such listings which are generally recognized in the Basic Building Code are:

Test reports; inspection service; lists of building materials, fire protection and extinguishing equipment and devices; and electrical equipment, issued by UNDERWRITERS' LABORATORIES, INC.
Test investigations; reports and lists of fire protection equipment; special hazards; electrical equipment; building construction and mill fire prevention organizations, issued by FACTORY MUTUAL LABORATORIES.

Building Materials and Structures report on Fire-Resistance Classifications of Building Constructions (BMS92) issued by NATIONAL BUREAU OF STANDARDS.

Fire-Resistance Ratings of Construction Assemblies issued by AMERICAN INSURANCE ASSOCIATION.

Approved Fire-Resistance Ratings of Assemblies of Common Materials (columns; beams, girders and trusses; walls and partitions; floor and roof assemblies) recognized in the Basic and Abridged Building Codes, issued by BUILDING OFFICIALS CONFERENCE OF AMERICA, INC.

Material Approval Structural Bureau Reports of recommended approval of specific performance of trade-name products issued by BUILDING OFFICIALS CONFERENCE OF AMERICA, INC.

APPENDIX A

ACCREDITED AUTHORITATIVE AGENCIES

CONCRETE

American Concrete Institute
P.O. Box 4754 Redford Station
22400 West Seven Mile Road
Detroit, Michigan 48219.....ACI

Concrete Reinforcing Steel Institute
228 North LaSalle Street
Chicago, Illinois 60601.....CRSI

Gypsum Association
201 North Wells Street
Chicago, Illinois 60606.....GA

National Concrete Masonry Association
2009 Fourteenth Street, North
Arlington, Virginia 22201.....NCMA

National Lime Association
4000 Brandywine Street, NW
Washington, D. C. 20016.....NLA

Portland Cement Association
33 West Grand Avenue
Chicago, Illinois 60610

Research and Development Division
5420 Old Orchard Road
Skokie, Illinois 60078.....PCA

ELECTRICAL

American Institute of Electrical Engineers
33 West 39th Street
New York, New York 10018.....AIEE

Illuminating Engineers Society
1860 Broadway
New York, New York 10023.....IES

International Association of Electrical Inspectors
201 East Erie Street
Chicago, Illinois 60611 .....IAEI

National Electrical Manufacturers Association
155 East 44th Street
New York, New York 10017.....NEMA

National Electric Sign Association
10912 South Western Avenue
Chicago, Illinois 60612.....NESA

EQUIPMENT

Air-Conditioning and Refrigeration Institute
1815 North Fort Myer Drive
Arlington, Virginia 22209.....ACRI

American Gas Association
1032 East 62nd Street
Cleveland, Ohio 44103.....AGA

American Petroleum Institute
1625 K Street, NW
Washington, D. C. 20005.....API

American Society of Heating, Refrigerating and Air-Conditioning Engineers
United Engineering Center
345 East 47th Street
New York, New York 10017....ASHRAE

The American Society of Mechanical Engineers
United Engineering Center
345 East 47th Street
New York, New York 10017.....ASME

Home Ventilating Institute
1108 Standard Building
Cleveland, Ohio 44113.....HVI

Incinerator Institute of America
630 Third Avenue
New York, New York 10017.....IIA

The Institute of Boiler and Radiator Manufacturers
608 Fifth Avenue
New York, New York 10020.....IBRM

(Continued on next page)

EQUIPMENT *(Continued from previous page)*

National Elevator Manufacturing Industry, Inc.
101 Park Avenue
New York, New York 10017.....NEMI

National LP-Gas Association
79 West Monroe Street
Chicago, Illinois 60603.....NLPGA

National Oil Fuel Institute, Inc.
60 East 42nd Street
New York, New York 10017.....NOFI

National Warm Air Heating and Air Conditioning Association
640 Engineers Building
Cleveland, Ohio 44114.....NWAHACA

Uniform Boiler and Pressure Vessel Laws Society, Inc.
57 Pratt Street
Hartford 3, Connecticut.....UBPVLS

GOVERNMENT AGENCIES

Bureau of Yards and Docks
Navy Department
Washington, D. C. 20390.....BY&D

Department of Commerce
Office of Commodity Standards
Washington, D. C. 20234.....CS

Federal Aviation Agency
Systems Research and Development Service
Washington, D. C. 20553.....FAA

Federal Specifications
Superintendent of Documents
Government Printing Office
Washington, D. C. 20234.....FS

Forest Products Laboratory
United States Department of Agriculture
Madison, Wisconsin 53705.....FPL

Housing and Home Finance Agency
Division of Housing Research
Washington, D. C. 20410.....HHFA

Joint Army-Navy Specifications
Bureau of Supplies and Accounts
Navy Department
Washington, D. C. 20225
Air Material Command
Wright-Patterson Air Force Base
Dayton, Ohio .....JAN

National Bureau of Standards
(Department of Commerce)
Superintendent of Documents
Government Printing Office
Washington, D. C. 20234.....NBS

National Research Council of Canada
Division of Building Research
Ottawa, Ontario, Canada.....NRCC

Navy Specifications
Bureau of Supplies and Accounts
Navy Department
Washington, D. C. 20225.....NS

Public Health Service
Federal Security Agency
Washington, D. C. 20225.....PHS

Simplified Practice Recommendations
National Bureau of Standards
Washington, D. C. 20234.....SPR

United States Department of Agriculture
Washington, D. C. 20225.....USDA

United States Department of Commerce
Construction Division
Washington, D. C. 20225.....USDC

United States Forest Service
Madison, Wisconsin 53705.....USFS

United States Naval Supply Depot
5801 Tabor Avenue
Philadelphia, Pennsylvania 19120
.....USNSD

INTERIOR FINISHES AND MASONRY

Acoustical Materials Association
335 East 45th Street
New York, New York 10017.....AMA

American Hardboard Association
20 North Wacker Drive
Chicago, Illinois 60606.....AHA

Asphalt and Vinyl Asbestos Tile Institute
101 Park Avenue
New York, New York 10017.....AVATI

Facing Tile Institute
1520—18th Street, NW
Washington, D. C. 20036.....FTI

Gypsum Association
201 North Wells Street
Chicago, Illinois 60606.....GA

The Indiana Limestone Institute
431 South College Avenue
Bloomington, Indiana.....ILI

(Continued on next page)

INTERIOR FINISHES AND MASONRY *(Continued from previous page)*

Insulation Board Institute
111 West Washington Street
Chicago, Illinois 60602.....IBI

Marble Institute of America, Inc.
Pennsylvania Building
Washington, D. C. 20004.....MIA

National Association for Indiana Limestone, Inc.
431 South College Avenue
Bloomington, Indiana .....NAILI

National Building Granite Quarries Association, Inc.
P.O. Box 444
Concord, New Hampshire 03302
.....NBGQA

National Concrete Masonry Association
2009 Fourteenth Street, North
Arlington, Virginia 22201.....NCMA

National Lime Association
4000 Brandywine Street, NW
Washington, D. C. 20016.....NLA

National Particleboard Association
711 Fourteenth Street, NW
Washington, D. C.....NPA

Perlite Institute, Inc.
45 West 45th Street
New York, New York 10036.....PI

Portland Cement Association
33 West Grand Avenue
Chicago, Illinois 60610

Research and Development Division
5420 Old Orchard Road
Skokie, Illinois 60078.....PCA

The Society of the Plastics Industry, Inc.
250 Park Avenue
New York, New York 10017.....SPI

Structural Clay Products Institute
1520—18th Street, NW
Washington, D. C. 20036.....SCPI

Tile Council of America
800 Second Avenue
New York, New York 10017.....TCA

Vermiculite Institute
208 South LaSalle Street
Chicago, Illinois 60604.....VI

METAL AND STEEL

Aluminum Association
420 Lexington Avenue
New York, New York 10017.....AA

American Institute of Steel Construction, Inc.
101 Park Avenue
New York, New York 10017.....AISC

American Iron and Steel Institute
150 East 42nd Street
New York, New York 10017.....AISI

American Welding Society, Inc.
United Engineering Center
345 East 47th Street
New York, New York 10017.....AWS

Architectural Aluminum Manufacturers Association
35 East Wacker Drive
Chicago, Illinois 60601 .....AAMA

Cast Iron Soil Pipe Institute
1824-26 Jefferson Place, NW
Washington, D. C. 20036.....CISPI

Concrete Reinforcing Steel Institute
228 North LaSalle Street
Chicago, Illinois 60601.....CRSI

Copper Development Association, Inc.
405 Lexington Avenue
New York, New York 10017.....CDA

Lead Industries Association, Inc.
420 Lexington Avenue
New York, New York 10017.....LIA

Metal Building Manufacturers Association
2130 Keith Building
Cleveland, Ohio 44115.....MBMA

Metal Lath Association
Engineers Building
Cleveland, Ohio 44114.....MLA

National Association of Architectural Metal Manufacturers
228 North LaSalle Street
Chicago, Illinois 60601.....NAAMM

Rail Steel Bar Association
38 South Dearborn Street
Chicago, Illinois 60603.....RSBA

Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation
United Engineering Center
345 East 47th Street
New York, N. Y. 10017.....RCRBSJEF

Steel Deck Institute
53 West Jackson Boulevard
Chicago, Illinois 60604 .....SDI

(Continued on next page)

METAL AND STEEL *(Continued from previous page)*

Steel Door Institute
2130 Keith Building
Cleveland, Ohio 44115 ..... SDI

Steel Joist Institute
1346 Connecticut Avenue, NW
Washington, D. C. 20006 ..... SJI

Steel Scaffolding & Shoring Institute
2130 Keith Building
Cleveland, Ohio 44115 ..... SSSI

Wire Reinforcement Institute
5034 Wisconsin Avenue, NW
Washington, D. C. 20016 ..... WRI

GENERAL STANDARDS AND TESTING LABORATORIES.

American Insurance Association
85 John Street
New York, New York 10038 ..... AIA

American Society for Testing and Materials
1916 Race Street
Philadelphia, Pennsylvania 19102 .. ASTM

American Standards Association, Inc.
10 East 40th Street
New York, New York 10016 ..... ASA

Factory Mutual Engineering Division
Standards-Laboratories Department
1151 Boston-Providence Turnpike
Norwood, Massachusetts 02062 .... FMED

National Fire Protection Association
60 Batterymarch Street
Boston, Massachusetts 02110 ..... NFPA

Underwriters' Laboratories, Inc.
207 East Ohio Street
Chicago, Illinois 60611 ..... ULI

Fire Testing Laboratories (Floor, Walls, Roof and Similar Tests)

National Bureau of Standards
(Department of Commerce)
Superintendent of Documents
Government Printing Office
Washington, D. C. 20234 ..... NBS

The Ohio State University
Engineering Experiment Station
156 West 19th Avenue
Columbus, Ohio 43210 ..... OSU

Underwriters' Laboratories, Inc.
207 East Ohio Street
Chicago, Illinois 60611 ..... ULI

Flamespread Testing Laboratories

Southwest Research Institute
8500 Culebra Road
San Antonio 6, Texas ..... SWRI

Underwriters' Laboratories, Inc.
1655 Scott Boulevard
Santa Clara, California ..... ULI

Structural Testing Laboratories

W. R. Chance and Associates, Inc.
1715 Lee Highway
Arlington, Virginia ..... WRCA

The Detroit Testing Laboratory, Inc.
554 Bagley Avenue
Detroit, Michigan 48226 ..... DTL

Forest Products Laboratory
United States Department of Agriculture
Madison, Wisconsin 53705 ..... FPL

Robert W. Hunt Company
810 South Clinton
Chicago, Illinois 60607 ..... RWH

IIT Research Institute
(formerly Armour Research Foundation)
10 West 35th Street
Chicago, Illinois 60616 ..... IITRI

NAHB Research Foundation, Inc.
Research Laboratory
Rockville, Maryland ..... NAHB

H. C. Nutting Company
4120 Airport Road
Cincinnati, Ohio 45226 ..... HCN

The Pennsylvania State University
Research Institute
University Park, Pennsylvania ..... PSU

Pittsburgh Testing Laboratory
1330 Locust Street
Pittsburgh, Pennsylvania 15219 ..... PTL

University of Detroit
Research Institute
Detroit, Michigan 48221 ..... UD

UNCLASSIFIED MISCELLANEOUS

The American Institute of Architects
1735 New York Avenue, NW
Washington, D. C. 20006 ..... AIA

American Public Health Association
1790 Broadway
New York, New York 10017 ..... APHA

American Society of Civil Engineers
United Engineering Center
345 East 47th Street
New York, New York 10017 ..... ASCE

American Society of Sanitary Engineering
4328 South Western Avenue
Chicago, Illinois 60609 ..... ASSE

American Water Works Association
2 Park Avenue
New York, New York 10016 ..... AWWA

Building Officials Conference of America, Inc.
1313 East 60th Street
Chicago, Illinois 60637 ..... BOCA

Building Research Advisory Board
Division of Engineering and Industrial Research
2101 Constitution Avenue
Washington, D. C. 20418 ..... BRAB

Clay Products Association
111 West Washington Street
Chicago, Illinois 60602 ..... CPA

Clay Sewer Pipe Association
50 Broad Street—Suite 1902
Columbus 15, Ohio ..... CSPA

Home Manufacturers Association
Suite 1117 Barr Building
910 Seventeenth Street, NW
Washington, D. C. 20006 ..... HMA

International Conference of Building Officials
50 South Los Robles
Pasadena, California 91101 ..... ICBO

Manufacturing Chemists' Association, Inc.
1825 Connecticut Avenue, NW
Washington, D. C. 20006 ..... MCA

Mineral Fiber Products Bureau
509 Madison Avenue
New York, New York 10022 ..... MFPB

Mobile Homes Manufacturers Association
20 North Wacker Drive
Chicago, Illinois 60606 ..... MHMA

National Association of Home Builders
National Housing Center
1625 L Street, NW
Washington, D. C. 20036 ..... NAHB

National Clay Pipe Institute
P.O. Box 310
350 West Terra Cotta Avenue
Crystal Lake, Illinois ..... NCPI

National Insulation Manufacturers Association
441 Lexington Avenue
New York, New York 10017 ..... NIMA

National Mineral Wool Insulation Association
Rockefeller Center
1270 Sixth Avenue
New York, New York 10020 ..... NMWIA

National Society of Professional Engineers
1121 Fifteenth Street, NW
Washington, D. C. 20005 ..... NSPE

Southern Building Code Congress
750 Brown-Marx Building
Birmingham 3, Alabama ..... SBCC

Truss Plate Institute
P.O. Box 47-836
7525 NW 37th Avenue
Miami, Florida 33147 ..... TPI

Western Plumbing Officials Association
520 Mission Street
South Pasadena, Calif. 91031 ..... WPOA

WOOD AND WOOD PRODUCTS

American Hardboard Association
20 North Wacker Drive
Chicago, Illinois 60606 ..... AHA

American Institute of Timber Construction
1700 K Street, NW
Washington, D. C. 20006 ..... AITC

American Plywood Association
1119 A Street
Tacoma, Washington 98401 .. APA-DFPA

American Wood Preservers Association
839 Seventeenth Street, NW
Washington, D. C. 20006 ..... AWPA

American Wood Preservers Institute
1707 L Street, NW
Washington, D. C. 20036 ..... AWPI

Appalachian Hardwood Manufacturers, Inc.
1015 Mercantile Library Building
414 Walnut Street
Cincinnati, Ohio 45202 ..... AHM

California Redwood Association
617 Montgomery Street
San Francisco, California 94111 ..... CRA

(Continued on next page)

WOOD AND WOOD PRODUCTS *(Continued from previous page)*

Hardwood Plywood Manufacturers Association
P.O. Box 6246
Arlington, Virginia 22206.....HPMA

Insulation Board Institute
111 West Washington Street
Chicago, Illinois 60602.....IBI

National Forest Products Association
1619 Massachusetts Avenue, NW
Washington, D. C. 20036.....NFPA

National Particleboard Association
711 Fourteenth Street, NW
Washington, D. C. .....NPA

Northeastern Lumber Manufacturers Association, Inc.
271 Madison Avenue
New York, New York 10016.....NLMA

Northern Hardwood and Pine Manufacturers Association
207 Northern Building
Green Bay, Wisconsin.....NHPMA

Plywood Fabricator Service, Inc.
an affiliate of the American Plywood Association
14741 Oakley
Harvey, Illinois .....PFS

Red Cedar Shingle and Handsplit Shake Bureau
5510 White Building
Seattle, Washington 98101 .....RCSHSB

Southern Hardwood Producers, Inc.
805 Sterick Building
Memphis 3, Tennessee .....SHP

Southern Pine Association
National Bank of Commerce Building
New Orleans 4, Louisiana.....SPA

Timber Engineering Company
1619 Massachusetts Ave., NW
Washington, D. C. 20036 .....TECO

Western Wood Products Association
700 Yeon Building
Portland, Oregon 97204 .....WWPA

APPENDIX B

ACCEPTED ENGINEERING PRACTICE STANDARDS

See also appendixes, C, D, E, F, and G for standards on specific materials or tests of units or assemblies, some of which include engineering practice standards for specific applications.

High Hazard materials handling and storage; fire protection devices; heating equipment rules, specifications and standards .....NFPA
National Fire Codes; Handbook of Fire Protection; standards and reports .....NFPA
Technical bulletins of building construction data .....HHFA

CONCRETE

Floor and Roof Units, Precast Concrete—Minimum Standard Requirements for .....ACI 711—1958
Gypsum Concrete, Reinforced—Specifications for .....ASA A 59.1—1954
Reinforced Concrete—Building Code Requirements for .....ACI 318—1963
Reinforced Concrete Structures, Manual of Standard Practice for Detailing .....ACI 315—1965
Welding Reinforcing Steel, Metal Inserts and Connections in Reinforced Concrete Construction, Recommended Practices for .....AWS D 12.1—61

ELECTRICAL ILLUMINATION

Daylighting—Recommended Practices of .....IES—1950
Electrical Code—National .....NFPA No. 70—1965
Electrical Safety Code—National .....NBS Handbook H 30
Farmstead Wiring .....IES—1950
Home Lighting—Recommended Practice .....IES—1953
Industrial Lighting .....ASA A 11.1—1952
Lighting Handbook .....IES—1952
Lighting Performance for Residence Luminaries .....IES—1946
Measuring Illumination in Buildings—Standard Method for .....IES—1948
Office Lighting—Recommended Practice .....IES—1947
Residence Lighting—Recommended Practice .....IES—1953
School Lighting—Recommended Practice .....IES—1948 and AIA 31-F—1928
Wiring Handbook—Residential .....IES—1947

EQUIPMENT

Air Conditioning and Ventilating

Air Conditioning and Ventilating Systems of other than Residence Type .....NFPA 90A—1964
Air Conditioning Systems, Warm Air Heating and—Residence Type .....NFPA 90B—1964
Blower and Exhaust Systems for Dust, Stock and Vapor Removal or Conveying .....NFPA 91—1961
Heating, Warm Air, and Air Conditioning Systems, Residence Type .....(See Air Conditioning Systems)
Residence Type—Warm Air Heating and Ventilating Systems .....(See Air Conditioning Systems)
Warm Air Heating and Air Conditioning Systems, Residence Type .....(See Air Conditioning Systems)

Elevators and Lifts

Automotive Lifts ..... USDC CS 142—62
Elevators, Dumbwaiters, and Escalators—Safety Code for ..... ASA A 17.1—1960
Elevators, Dumbwaiters and Escalators—
Safety Code for (Supplement) ..... ASA A 17.1a—1963
Manlifts—Safety Code for ..... ASA A 90.1—1949
Moving Walks—Safety Code Rules for ..... ASA A 17.1.13—1962

Heating

Boiler Code and Unfired Pressure Vessel Code ..... ASME—1952
Central Heating Gas Appliances—Approved Requirements for
—Gravity and Fan Type Floor Furnaces ..... ASA Z 21.13.3—1962
—Gravity and Fan Type Vented Recessed Heaters ..... ASA Z 21.13.4—1962
—Gravity and Forced Air Central Furnaces ..... ASA Z 21.13.2—1961
—Steam and Hot Water Boilers ..... ASA Z 21.13.1—1961
Gas-Burning Equipment in Power Boilers—Requirements for
Installation of ..... ASA Z 21.33—1950
Gas-Fired Duct Furnaces—Approved Requirements for ..... ASA Z 21.34—1964
Gas-Fired Room Heaters—Approved Requirements for ..... ASA Z 21.11—1959
Gas Piping and Gas Appliance—Installation of ..... (See Plumbing and Piping)
Gravity Warm Air Heating Systems ..... ASHVE—1953
Heating, Ventilating and
Air Conditioning ..... (See **Air Conditioning and Ventilating**)
High Pressure Boilers ..... ASME Boiler Code—1952
Low Pressure Boilers ..... HPACA Std.—1948
Oil Burners, Automatic Mechanical Draft Designed for
Domestic Installation ..... USDC CS 75—56
Oil Burning Equipment ..... NFPA 31—1964
Oil Burning Floor Furnaces Equipped with Vaporizing
Pot Type Burners ..... USDC CS 113—63
Residence Type—Warm Air Heating and
Air Conditioning Systems ..... (See **Air Conditioning and Ventilating**)
Solid Fuel Burning Forced Air Furnaces ..... USDC CS 109—47
Warm Air Heating and
Air Conditioning Systems ..... (See **Air Conditioning and Ventilating**)

Incinerators

Incinerator Standards ..... IIA—April 1963

Plumbing and Piping (Gas or Water)

Gas Piping and Gas Appliances—Installation of ..... ASA Z 21.30—1964
Gas Piping in Buildings, Gas Appliances and—Installation of ..... NFPA 54—1964
National Plumbing Code ..... ASA A 40.8—1955

Refrigeration

Mechanical Refrigeration—Safety Code for ..... ASHRAE 15—1964
Also ASA B 9.1—1964

Unclassified—Miscellaneous

Mobile Home Standards for Plumbing, Heating, and
Electrical Systems ..... MHMA—1959
Swimming Pools and Other Public Bathing Places, Equipment
and Operation—Recommended Practice for Design ..... APHA—1949
Travel Trailer Standards for Electrical, Plumbing, Heating
and LP-Gas Consuming Appliances Systems ..... MHMA—1960

FIRE PROTECTION AND SAFETY PRACTICES

Aircraft Hangars ..... NFPA 409—1962
Building Exits Code ..... NFPA 101—1963

NOTE: NFPA 101—1963 is acceptable for matters of design of exits not provided for by the BOCA Codes. Finish and construction requirements incorporated therein are not approved.

Cutting and Welding—Gas Systems for ..... NFPA 51—1964
Dry Cleaning and Dry Dyeing Plants ..... NFPA 32—1964
Dust Explosions and Ignition
—in Country Grain Elevators—Prevention of ..... NFPA 64—1959
—in Flour and Feed Mills and Allied Grain Storage
Elevators—Prevention of ..... NFPA 61C—1962
—in Industrial Plants—Fundamental Principles
for the Prevention of ..... NFPA 63—1964
—Pulverized Fuel Systems—Installation and Operation of ..... NFPA 60—1961
—in Starch Factories—Prevention of ..... NFPA 61A—1962
—in Terminal Grain Elevators—Prevention of Dust Explosions ..... NFPA 61B—1959
Fibers, Combustible—Storage and Handling of ..... NFPA 44—1953
Film, Motion Picture, Cellulose Nitrate—Storing and Handling of ..... NFPA 40—1962
Garages ..... NFPA 88—1962
Gas, Liquefied Petroleum at Utility Gas Plants—Storage
and Handling of ..... NFPA 59—1963
Heating, Ventilating and Air Conditioning ..... (See **EQUIPMENT—Heating**)
Incinerators, Rubbish Handling ..... NFPA 82—1960
and NFPA 82A—1960
Liquids, Flammable, Code ..... NFPA 30—1964
Outdoor Assembly, Places of (Grandstands and Tents) ..... NFPA 102—1957
Piers and Wharves—Construction and Protection of ..... NFPA 87—1963
Pyroxylin Plastics in Factories Making Articles Therefrom—
Storage, Handling and Use of ..... NFPA 42—1962
Pyroxylin Plastics in Warehouse and Retail Stores ..... NFPA 43—1962
Recommended Safe Practices for Inert-Gas Metal-Arc Welding ..... AWS A 6.1
Safe Practices for Welding and Cutting Containers
That Have Held Combustibles ..... AWS A 6.0
Safety in Welding and Cutting ..... ASA Z 49.1—1958
Spray Finishing Using Flammable Materials ..... NFPA 33—1963

GLASS

Safety Glazing Materials for Glazing Motor Vehicles
Operating on Land Highways, Safety Code for ..... ASA Z26.1—1950
—Fully-Tempered ..... No. 8, ASA Z26.1—1950
—Laminated ..... Nos. 4, 9 and 12, ASA Z26.1—1950
—Wired ..... No. 11, ASA Z26.1—1950

INTERIOR FINISHES

Gypsum Lathing, Plastering and Furring—Specifications for ..... ASA A 42.4—1955
Gypsum Plastering—Specifications for ..... ASA A 42.1—1964
Gypsum Plastering—Specifications for ..... Gypsum Association
Gypsum Wallboard Finishes—Specifications for ..... ASA A 97.1—1958
Lathing and Furring, Interior—Specifications for ..... (See Gypsum Lathing)
Marble, Interior—Specifications for ..... ASA A 94.1—1961
Portland Cement Plastering—Specifications for ..... ASA A 42.3—1946
Portland Cement Stucco—Specifications for ..... ASA A 42.2—1946
Tile, Ceramic, Installed in Dry-set Portland Cement Mortar ..... ASA A 108.5—1960
Tile, Ceramic Mosaic, Installed in Portland Cement Mortar ..... ASA A 108.2—1958
Tile, Glazed Ceramic Wall, Installed in Portland Cement Mortar ..... ASA A 108.1—1958
Tile, Quarry, and Pavers, Installed in Portland Cement Mortar ..... ASA A 108.3—1958
Vermiculite Plastering and Vermiculite Acoustical Plastic
for Sound Conditioning—Standard Specifications for ..... VI—1963

MASONRY

Lime-Cement Stucco—Standard Specifications for ..... ASA A 42.5—1960
Marble, Exterior Thin Veneer—Specifications for ..... ASA A 94.2—1961
Marble, Exterior Thin, in Curtain or Panel Walls—
Specifications for ..... ASA A 94.3—1961
Marble, Interior—Specifications for ..... (See INTERIOR FINISHES)
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Mortars, Hydraulic Cement—Method of Test for Compressive Strength of (Using 2 in. cube Specimens) ..... ASTM C 109—64
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See also appendix D for standards for tests of unit materials.

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Organic Impurities in Sand for Concrete—Method of Test for ..... ASTM C 40—60

MASONRY AND MASONRY PRODUCTS

Ceramic Glazed Structural Clay Facing Tile, Facing Brick and Solid Masonry Units—Specifications for (Autoclave Test) ..... ASTM C 126—62
Freezing and Thawing Tests (See Specifications for Materials)
—Bricks—Methods of Sampling and Testing ..... ASTM C 67—62
—Drain Tile—Specifications for ..... ASTM C 4—62
—Structural Clay Tile—Methods of Sampling and Testing ..... ASTM C 112—60

PLASTICS

Accelerated Weathering Tests of Plastics—Recommended Practice for ..... ASTM D 795—57T
Water Absorption of Plastics—Method of Test for ..... ASTM D 570—63

ROOFING AND SIDING

Asphalt Roll Roofing, Cap Sheets, and Shingles—Methods of Testing ..... ASTM D 228—64
Bituminous Materials, Accelerated Weathering Test of—Recommended Practice for ..... ASTM D 529—62
Felted and Woven Fabrics Saturated with Bituminous Substance for Use in Waterproofing and Roofing—Methods of Sampling and Testing ..... ASTM D 146—59

UNCLASSIFIED MISCELLANEOUS

Fibre Building Boards—Method of Accelerated Aging ..... NBS BMS 4—38
Fibre Building Boards—Method of Accelerated Aging ..... ASTM D 1037—63T
Gypsum Products, Wood Fibre Content in—Method of Test for ..... ASTM C 26—59
Textile Fabrics—Method of Test for Water Resistance of ..... ASTM D 583—63

APPENDIX G

FIRE TEST AND FLAME SPREAD TEST STANDARDS

COMBUSTIBLE OR NONCOMBUSTIBLE PROPERTIES

Fire-Retardant Treatments of Building Materials ..... NFPA 703—1961
Noncombustibility of Elementary Materials—
Method of Test for Determining ..... ASTM E 136—59T
Textile Fabrics, Treated—Specifications for
Fire-Retardant Properties of ..... ASTM D 626—55T
Wood, Treated—Method of Test for Combustible Properties of
—by the Crib Test ..... ASTM E 160—50
—by the Fire Tube Apparatus ..... ASTM E 69—50

FIRE RESISTANCE PROPERTIES

Building Construction and Materials—Methods of
Fire Test of ..... ASTM E 119—61
Ceiling Construction—(See Building Construction)
Door Assemblies—Methods of Fire Tests of ..... ASTM E 152—58
Roof Coverings—Methods of Fire Test of ..... ASTM E 108—58

FLAME SPREAD PROPERTIES

Flame Resistance Tests—Acoustical Units,
Prefabricated ..... Fed. Spec. SSA 00118c—60
Surface Burning Characteristics of Building Materials—
Method of Test for ..... ASTM E 84—61

FLASH POINT

Fuel Oils, by Pensky-Masters Closed Tester—
Method of Test for Flash Point ..... ASTM D 93—62
Liquids other than Fuel Oil, by Tag Closed Tester—
Method of Test for Flash Point ..... ASTM D 56—64
Flash and Fire Points by Cleveland Open Cup—
Method of Test for ..... ASTM D 92—57

APPENDIX H

STANDARD TIME TEMPERATURE TEST CONTROLS

Time Hours—Minutes	Temperature Degrees F.	Curve Area Above 68 Degrees F. Degrees F. X. Minutes	Degrees F. X Hours
0:00	68	00	0
0:05	1,000	2,330	39
0:10	1,300	7,740	129
0:15	1,309	14,150	236
0:20	1,462	20,970	350
0:25	1,510	28,050	468
0:30	1,550	35,360	589
0:35	1,584	42,860	714
0:40	1,613	50,510	842
0:45	1,638	58,300	971
0:50	1,661	66,200	1,103
0:55	1,681	74,220	1,237
1:00	1,700	82,330	1,372
1:05	1,718	90,540	1,509
1:10	1,735	98,830	1,647
1:15	1,750	107,200	1,787
1:20	1,765	115,650	1,928
1:25	1,779	124,180	2,070
1:30	1,792	132,760	2,213
1:35	1,804	141,420	2,357
1:40	1,815	150,120	2,502
1:45	1,826	158,890	2,648
1:50	1,835	167,700	2,795
1:55	1,843	176,550	2,942
2:00	1,850	185,440	3,091
2:10	1,862	203,330	3,389
2:20	1,875	221,330	3,689
2:30	1,888	239,470	3,991
2:40	1,900	257,720	4,295
2:50	1,912	276,110	4,602
3:00	1,925	294,610	4,910
3:10	1,938	313,250	5,221
3:20	1,950	332,000	5,533
3:30	1,962	350,890	5,848
3:40	1,975	369,890	6,165
3:50	1,988	389,030	6,484
4:00	2,000	408,280	6,805

APPENDIX I

FIRE PROTECTION STANDARDS

ALARM AND DETECTING SYSTEMS

Alarm Systems, Municipal—Installations, Maintenance and Use of ..... NFPA 73—1964
Signaling Systems, Central Station Protective—Installation, Maintenance and Use of ..... NFPA 71—1964
Signaling Systems, Proprietary, Auxiliary and Local Protective—Installation, Maintenance and Use of ..... NFPA 72—1964

PREVENTION OF SPREAD OF FIRE

Air Conditioning and Ventilating Systems
—other than Residence Type ..... NFPA 90A—1964
—Residence Type ..... NFPA 90B—1964
Aircraft Hangars ..... NFPA 409—1962
Doors, Tin-Clad Fire ..... ULI 10a—56
Dust Explosion Prevention ..... (See App. B)
Fire Doors and Windows—Installation of ..... NFPA 80—1962
Fire Protection and Fire Hazard Devices ..... FML Bulletin
Hardware, Sliding, for Standard Tin-Clad Fire Doors ..... ULI 14(b) Nov. 1953
Hardware, Swinging, for Standard Tin-Clad Fire Doors ..... ULI 14(c) May 1943

PROTECTION SYSTEMS

Carbon Dioxide Extinguishing Systems ..... NFPA 12—1964
Extinguishers, Portable Fire ..... NFPA 10—1963
Foam Extinguishing Systems ..... NFPA 11—1963
Foam-Water Sprinkler and Foam-Water Spray Systems ..... NFPA 16—1962
Hose Connections for Sprinkler and Standpipe Systems, Fire Department ..... NFPA 23—1963
Hose Systems ..... (See Standpipe and Hose Systems)
Outside Protection (Yard Mains for Sprinklers, Standpipes, etc.) ..... NFPA 24—1963
Private Fire Brigades—Organization, Training and Equipment of ..... NFPA 27—55
Pumps, Centrifugal Fire—Installation of ..... NFPA 20—1964
Sprinkler Systems
—Installation of ..... NFPA 13—1964
—Care and Maintenance of ..... NFPA 13A—58
Standpipe and Hose Systems ..... NFPA 14—1963
Valves Controlling Water Supplies for Fire Protection—Supervision of ..... NFPA 26—58
Water Tanks for Private Fire Protection Service—Construction and Installation ..... NFPA 22—1962
Water Spray Systems ..... NFPA 15—1962

APPENDIX J

UNIT DESIGN DEAD LOADS FOR STRUCTURAL DESIGN PURPOSES

WALLS AND PARTITIONS (Unplastered)	Pounds per Square Foot
12 inch common brick	120
12 " pressed brick	130
12 " sand-lime brick	105
12 " hollow concrete block—Stone Aggregate	74
Lightweight	55
10 " hollow concrete block—Stone Aggregate	62
Lightweight	46
8 " hollow concrete block—Stone Aggregate	50
Lightweight	36
6 " hollow concrete block—Stone Aggregate	42
Lightweight	36
4 " hollow concrete block—Stone Aggregate	27
Lightweight	20
12 " solid concrete block—Stone Aggregate	108
Lightweight	72
10 " solid concrete block—Stone Aggregate	84
Lightweight	62
8 " solid concrete block—Stone Aggregate	67
Lightweight	48
6 " solid concrete block—Stone Aggregate	50
Lightweight	37
4 " solid concrete block—Stone Aggregate	45
Lightweight	34
12 " combination brick and clay tile	80
8 " " " " " "	60
12 " combination brick and concrete block	90
8 " " " " " "	72
12 inch load-bearing clay tile	60
8 " " " " "	40
6 " " " " "	36
4 " " " " "	24
10 " non-load-bearing clay tile	40
8 " " " " " "	36
6 " " " " " "	30
4 " " " " " "	20
3 " " " " " "	18
2 " " " " " "	11
8 " non-load-bearing hollow concrete block	40
6 " " " " " " "	30
4 " " " " " " "	20
T.C. 1½ inch split terra cotta furring	8
2 inch split terra cotta furring	10
3 " " " " "	12
6 " hollow gypsum block	24
5 " " " "	18
4 " " " "	15
3 " " " "	10

	Pounds per Square Foot
4 inch solid gypsum block	24
3 " " " "	18
2 " " " "	12
4 " glass block	18

	Pounds per Cubic Foot
Cast stone solid	144
Granite ashlar	168
Limestone ashlar	168
Marble ashlar	168
Sandstone ashlar	156
Rubble stone masonry	156
Terra cotta architectural (filled)	120
Terra cotta architectural (unfilled)	72
Concrete, stone (plain)	144
Concrete, stone (reinforced)	150
Concrete, cinder	108
Fill, cinder	60
Earth (dry)	96
Earth (damp)	108
Earth (wet)	120
Cork	15
Timber, Ash	40
Timber, Douglas Fir	36
Timber, Cypress	30
Timber, Hemlock	30
Timber, Oak	48
Southern Pine, Short Leaf	36
Southern Pine, Long Leaf	48
Redwood	28
Spruce	30

PLASTER WORK

	Pounds per Square Foot
Gypsum (one side)	5
Cement (one side)	10
Gypsum on wood lath	8
Gypsum on metal lath	8
Gypsum on plaster board or fiber board	8
Cement on wood lath	10
Cement on metal lath	10

SUSPENDED CEILINGS

	Pounds per Square Foot
Cement on wood lath	12
Cement on metal lath	15
Gypsum on wood or metal lath	10

LATH AND PLASTER PARTITIONS

	Pounds per Square Foot
2 inch solid cement on metal lath	25
2 " solid gypsum on metal lath	18
2 " " " on gypsum lath	18
2 " metal studs gypsum & metal lath both sides	18
3 " " " " " " " " "	19
4 " " " " " " " " "	20

	Pounds per Square Foot
6 inch wood studs plaster and wood lath, both sides	18
6 " " " " " " metal lath, both sides	18
6 " " " " " " plaster boards, both sides	18
6 " " " unplastered gypsum board, both sides (dry wall)	10

FLOOR AND ROOF CONSTRUCTION

	Pounds per Square Foot
Cinder fill per inch depth	5
Cinder concrete per inch depth	9
Stone concrete per inch depth	12
Floor finish tile per inch depth	12
Cement finish per inch depth	12
Gypsum slabs per inch depth	4
Precast concrete plank per inch depth (as determined by test)	
Hardwood flooring per inch depth	4
Underflooring per inch depth	3
Linoleum	2
Asphalt tile	2

ROOFS AND ROOFING

	Pounds per Square Foot
Metal Skylights	10
3-ply roofing	4
4 " "	5
5 " "	6
Wood sheathing (1")	3
Plywood sheathing (5/16")	1
Corrugated iron roofing	3
Formed steel decking	3
Slate tile roofing	10
Cement tile	16
Spanish tile	20
Shingles, asbestos	6
Shingles, asphalt	6
Shingles, wood	6

APPENDIX K

UNIT WORKING STRESSES FOR ORDINARY MATERIALS

Unless otherwise specified herein, the allowable working stresses for ordinary materials, as defined in sections 701 and 722, shall be reduced ten (10) per cent below the recommended values of the accepted engineering standards listed in appendix B. When the structural material is identified in regard to manufacture and grade and the identification is accompanied by satisfactory mill tests or the strength and stress grade of the materials are otherwise confirmed to the satisfaction of the building official, the allowable working stresses may be increased to comply with the accepted engineering standards.

K-1. MASONRY STRESSES

K-1-A. Mortar for Unit Masonry.—Mortar for unit masonry shall comply with either the proportion specifications as set out in section 816.2, or shall meet the property specifications of the accepted engineering standard listed in appendix C. Unless laboratory data are presented to show that the mortar meets the requirements of the property specifications, the proportion specifications shall govern.

K-1-B. Compressive Stresses.—Except as permitted in other sections of the Basic Building Code, the compressive stresses in masonry shall not exceed the following values:

Allowable compressive stresses gross cross-sectional area (except as noted)

Type of Masonry and Grade of Masonry Unit (psi gross area)	Type of Mortar			
	M	S	N	O
	psi	psi	psi	psi
Solid masonry of brick and other solid units of clay or shale; sand lime or concrete:				
8000 plus psi	400	350	300	200
from 4500 to 8000 psi	250	225	200	150
from 2500 to 4500 psi	175	160	140	100
from 1500 to 2500 psi	125	115	100	75
Grouted masonry of solid masonry units:				
from 4500 to 8000 psi	350	275	200	—
from 2500 to 4500 psi	275	215	155	—
from 1500 to 2500 psi	225	175	125	—
Solid masonry of solid concrete masonry units:				
1800 plus psi	175	160	140	100
from 1200 to 1800 psi	125	115	100	75
Masonry of hollow units	85	75	70	—
Hollow walls (cavity or masonry bonded)*				
Solid masonry units				
2500 plus psi	140	130	110	—
from 1500 to 2500 psi	100	90	80	—
Hollow masonry units	70	60	55	—
Stone ashlar masonry				
Granite	800	720	640	500
Limestone or marble	500	450	400	325
Sandstone or cast stone	400	360	320	250
Rubble stone, coursed, rough or random	140	120	100	80

*On gross cross-sectional area of wall minus area of cavity between wythes. The allowable compressive stresses for cavity walls are based upon the assumption that the floor loads bear upon but one (1) of the two (2) wythes. Where hollow walls are loaded concentrically, the allowable stresses may be increased by twenty-five (25) per cent.

K-1-C. Shear and Tensile Stresses.—Except as permitted in other sections of the Basic Building Code, the allowable shear or tensile stresses in unreinforced brick masonry shall not exceed the following values:

Allowable stresses in shear or tension in flexure for unreinforced brick masonry*

Construction	Allowable Working Stresses, psi Gross Cross-Sectional Area, Except as Noted	
	Mortar	
	Type M or S	Type N
Single wythe walls of solid clay masonry units; or walls of grouted brick masonry	36	28
Solid walls, brick and other solid clay masonry units, masonry bonded or metal tied	28	20
Cavity and masonry-bonded hollow walls, brick and brick**	28	20

*Allowable stresses apply to brick and other solid clay masonry units laid in portland cement-lime-sand mortars. If other masonry units or mortars are used, allowable stresses for such masonry construction shall be established by tests specified in section 803.

**Net area.

K-2. REINFORCED CONCRETE STRESSES

The allowable working stresses for ordinary materials shall be based on the following proportions by dry volumetric measurement and maximum water content per sack of cement in accordance with the standard building code requirements for reinforced concrete specified in appendix B subject to the ten (10) per cent reduction prescribed for ordinary materials.

28-day strength of concrete in pounds per square inch	*Concrete proportions*	*Gallons of water per sack of cement*
2000	1:5½	7½
2500	1:4½	6¾
3000	1:3½	6

K-3. REINFORCED GYPSUM CONCRETE STRESSES

When ordinary materials are used, the allowable working stresses shall be based on the following proportions, measured dry by weight with sufficient water to make a plastic mix that will fill the forms: 100 per cent neat calcined gypsum; 97 per cent gypsum and 3 per cent wood chips, shavings or fibers; and 87.5 per cent gypsum and 12.5 per cent wood chips, shavings or fibers; with ultimate compressive strengths of 1,800, 1000 and 500 pounds per square inch respectively.

The working stresses shall not exceed the values prescribed in the standard for reinforced gypsum concrete listed in appendix B subject to the ten (10) per cent reduction prescribed for ordinary materials.

K-4. STEEL REINFORCEMENT STRESSES

The allowable working stresses for reinforcement specified in the standard building code requirements for reinforced concrete listed in appendix B shall be used in all reinforced construction, including reinforced concrete, reinforced gypsum concrete and all forms of reinforced masonry subject to the ten (10) per cent reduction specified for ordinary, unidentified materials except as follows:

Type of Steel Element	*Maximum stress in pounds per square inch*
High Yield Strength Steel (50 per cent of Yield Point)	30,000
Steel Pipe, Concrete-filled (45 per cent of Yield Point)	16,000

K-5. STRUCTURAL STEEL STRESSES

When ordinary materials which are not identified as to manufacture and grade are used, the allowable working stresses specified in the standard for the design, fabrication and erection of structural steel listed in appendix B shall be reduced ten (10) per cent.

K-6. CAST STEEL STRESSES

The allowable working stresses for cast steel in compression and bearing shall be the same as those specified for structural steel and shall not exceed seventy-five (75) per cent of the values specified for all other applicable stresses in the standard.

K-7. CAST IRON STRESSES

	Maximum stress in pounds per square inch
Tension	3,000
Extreme Tension (Fiber Stress in Bending)	3,000
Extreme Compression (Fiber Stress in Bending)	16,000
Shear	3,000
Column Compression	$9{,}000 \text{ minus } 40\frac{1}{r}$

Ratio $\frac{1}{r}$ not to exceed seventy (70)

K-8. OPEN-WEB STEEL JOIST STRESSES

The allowable working stresses specified for open-web steel joists shall be in accordance with the standard specifications for steel joist construction listed in appendix B. For all other steel joists, unless otherwise specifically approved and identified, the allowable working stresses specified by the standard shall be reduced ten (10) per cent.

K-9. FORMED STEEL CONSTRUCTION STRESSES

The allowable working stresses for light gage formed steel structural members shall be based on the following grades of flat rolled carbon steel with yield points of 25,000, 30,000 and 33,000 pounds per square inch as specified in the standard specification for the design of light gage steel structural members listed in appendix B, subject to a reduction of ten (10) per cent on all stress values for ordinary materials.

K-10. LUMBER STRESSES

When the grade of lumber is not identified as provided in section 722 for controlled materials, the maximum allowable working stresses for the species of lumber used shall be determined in accordance with the principles for stress grade lumber as set forth in the National Design Specification for Stress-Grade Lumber and Its Fastenings.

K-11. EARTHQUAKE LOAD DESIGN

When required to withstand lateral forces under section 719.0 buildings and structures shall be designed in accordance with the following sections according to the zone in which they are located on the seismic probability map in table 14C.

K-11-A. Application of Provisions.—These lateral force requirements are intended to make buildings earthquake-resistive. The provisions apply to the buildings as a unit and also to all parts thereof, including the structural frame or walls, floor and root systems, and other structural features. In specific cases, they may be interpreted or added to as to detail by rulings of the building official in order that the intent shall be fulfilled.

K-11-A-1. Additions.—Where applicable, every addition to an existing building or structure shall be designed and constructed to resist and withstand the forces provided for herein, and in any case where an existing building or structure is increased in height all portions thereof affected by such increased height shall be reconstructed to resist and withstand the forces provided for herein.

K-11-A-2. Alterations.—Where applicable, no existing building or structure shall be altered or reconstructed in such a manner that the resistance to the forces provided for herein will be less than that before such alteration of reconstruction was made; provided, however, that this provision shall not apply to non-bearing partitions, and shall not apply to other minor alterations which are made in compliance with all requirements of the Basic Code.

K-11-B. Plans and Design Data.—Where earthquake loads are applicable, a brief statement of the following items shall be included with each set of plans filed:

(a) A summation of the dead and live load of the building, floor by floor, which was used in figuring the shear for which the building is designed.

(b) A brief description of the bracing system used, the manner in which the designer expects such system to act and a clear statement of any assumptions used. Assumption as to location of all points of counterflexure in members must be stated.

(c) Sample calculation of a typical bent or equivalent. For combined stresses due to the lateral forces and other loads, the allowable unit stresses and the allowable load in connections may be increased as provided in section 720.0.

K-11-C. Lateral Force Requirements.—Where earthquake loads are applicable, every building or structure and every portion thereof, except as exempted in section 719.1 shall be designed and constructed to resist stresses produced by lateral forces as provided herein. Stresses shall be calculated as the effect of a force applied horizontally at each floor or roof level above the foundation. The force shall be assumed to come from any horizontal direction.

K-11-C-1. Bracing Systems.—All bracing systems both horizontal and vertical shall transmit all forces to the resisting members and shall be of sufficient extent and detail to resist the horizontal forces provided for herein and shall be located symmetrically about the center of mass of the building or the building shall be designed for the resulting rotational forces about the vertical axis.

K-11-C-2. Junctures Between Wings.—Junctures between distinct parts of buildings, such as wings which extend more than twenty (20) feet from the main portion of the building, shall be designed at the juncture with other parts of the building for rotational forces, or the juncture may be made by means of sliding fragile joints having a minimum width of not less than eight (8) inches. The details of such joints shall be made satisfactory to the building official.

K-11-D. Horizontal Force Formula.—The horizontal force shall be calculated according to the following formula:

$$F = CW$$

Where

F = the horizontal force in pounds.

W = the total dead load, tributary to the point under consideration, except for warehouses and tanks, in which case W shall equal the total live load tributary to the point under consideration. Machinery or other fixed concentrated loads shall be considered as part of the dead load.

C = a numerical constant as shown in table 14B and section K-11-D-1 to K11-D-3 inclusive.

TABLE 14B.—HORIZONTAL FORCE FACTORS

Part or Portion	Value of C in Zone 1*	Direction of Force
Floors, roofs, columns and bracing in any story of a building or the structure as a whole**	0.15*** N + 4½	Any direction horizontally
Bearing walls, non-bearing walls, partitions, free standing masonry walls over 6 ft. in height	.05 With a minimum of five pounds per sq. ft.	Normal to surface of wall
Cantilever parapet and other cantilever walls, except retaining walls	.25	Normal to surface of wall
Exterior and interior ornamentations and appendages	.25	Any direction horizontally
When connected to or part of a building: towers, tanks, towers and tanks plus contents, chimneys, smokestacks and penthouses	.05	Any direction horizontally
Elevated water tanks and other tower-supported structures not supported by a building	.03	Any direction horizontally

*For zones, see table 14C. For requirements in zones see section K-11-D-1 to K-11-D-3 inclusive.
**Where specified wind load would produce higher stresses, this load shall be used in lieu of the factor shown. (See section 720.0.)
***N is number of stories above the story under consideration, provided that for floors or horizontal bracing, N shall be only the number of stories contributing loads.

K-11-D-1. Requirements for Zone 1.—Where earthquake loads are applicable to buildings or structures in Zone 1 on map in table 14C, the value of "C" shall be as shown in table 14B.

K-11-D-2. Requirements for Zone 2.—Where earthquake loads are applicable to buildings or structures in Zone 2 on map in table 14C, the value of "C" shown in table 14B shall be doubled.

K-11-D-3. Requirements for Zone 2.—Where earthquake loads are applicable to buildings or structures in Zone 3, on map in table 14C, the value of "C" shown in table 14B shall be multiplied by four (4).

K-11-D-4. Location of Zones.—For the purpose of determining the value of "C" in table 14B, the map in table 14C shall govern.

K-11-E. Foundation Ties.—Where earthquake loads are applicable in the design of buildings, other than lightly loaded structures of type 2 and 4 construction, where the foundations rest on piles or on soil having a safe bearing value of less than two thousand (2000) pounds per square foot, the foundations shall be completely interconnected in two directions approximately at right angles to each other. Each such interconnecting member shall be capable of transmitting by both tension and compression at least ten (10) per cent of the total vertical load carried by the heavier only of the footings or foundations connected. The minimum gross size of each such member if of reinforced concrete shall be twelve (12) inches by twelve (12) inches and shall be reinforced with not less than the minimum reinforcement specified elsewhere in the Basic Code. If the interconnecting members are of structural steel, they shall be designed as provided elsewhere in the code, and encased in concrete. A reinforced

concrete slab may be used in lieu of interconnecting tie members, providing the slab thickness is not less than one forty-eighth (1/48) of the clear distance between the connected foundations; also providing the thickness is not less than six (6) inches.

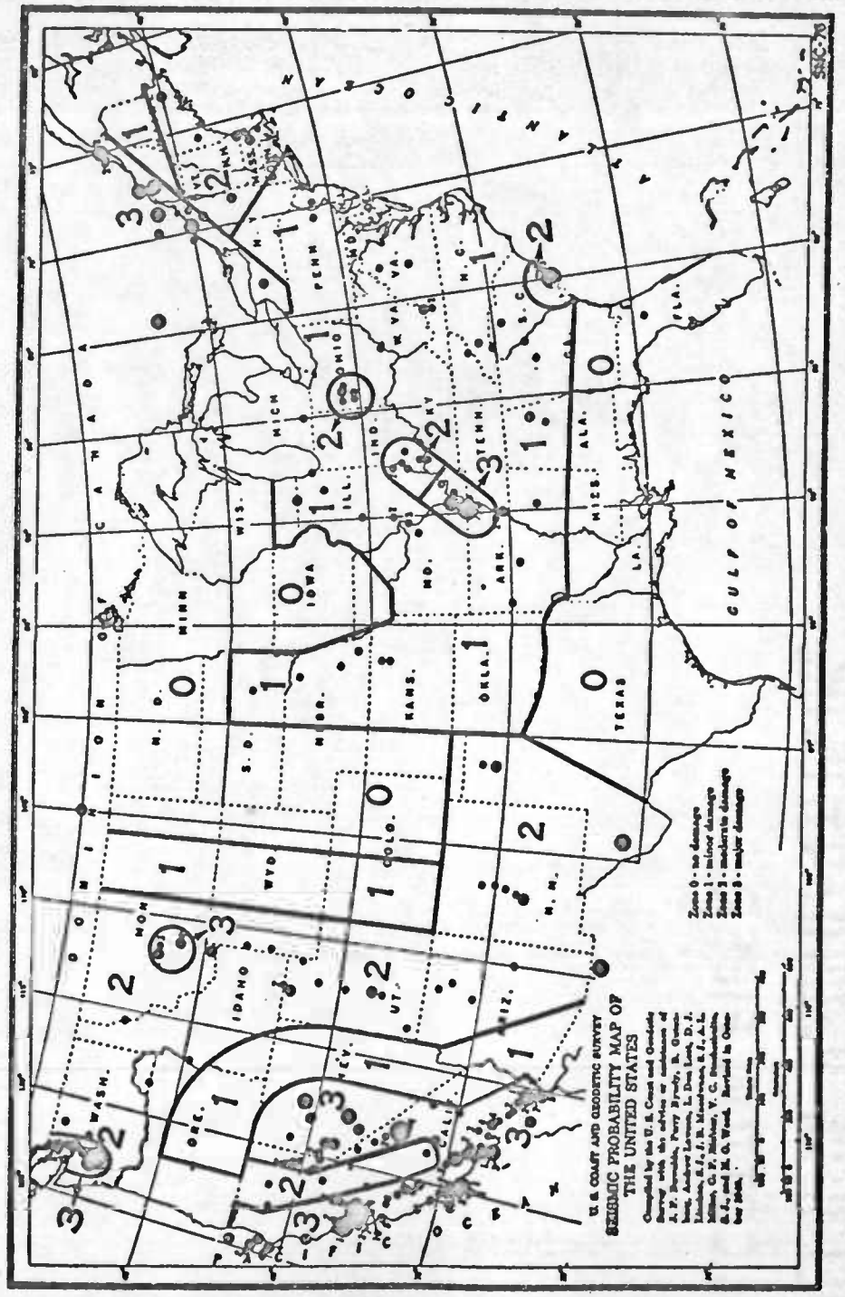
Interconnecting slabs shall be reinforced with not less than eleven-hundredths (.11) square inch of steel per foot of slab in a longitudinal direction and the same amount of steel in a transverse direction. The bottom of such slab shall not be more than twelve (12) inches above the tops of at least eighty (80) per cent of the piers or foundations. The footings and foundations shall be tied to the slab in such manner as to be restrained in all horizontal directions.

K-11-F. Bonding and Tying.—Where earthquake loads are applicable, cornices and ornamental details shall be bonded into the structure so as to form an integral part of it. This applies to the interior as well as to the exterior of the building.

K-11-F-1. Veneer Ties.—Veneer ties shall be of sufficient strength to support four times the weight of the attached veneer.

K-11-G. Overturning Moment.—In no case shall the calculated overturning moment of any building or structure due to the forces provided for herein exceed two-thirds (⅔) of the moment of stability of such building or structure. Moment of stability shall be calculated using the same loads as used in calculating the overturning moment for wind forces.

TABLE 14C.—SEISMIC PROBABILITY MAP OF THE UNITED STATES



K-12. GLASS DESIGN CRITERIA

When glass is used as a major portion of walls of buildings and is required by the code to withstand wind, or impact loads or to meet minimum thickness standards, the following design procedure and criteria shall be used.

K-12-A. Design Wind Loads for Glass.—The wind pressure in pounds per square foot to be used in the design of glass as required in section 714.4 shall be that shown in table A corresponding to the opening elevation and wind velocity shown in table B for the geographic location of the building.

K-12-A-1. Elevation and Terrain.—The elevation of a glazed opening shall be computed by adding the distances from grade to the head and sill, respectively, and dividing the sum by two (2). Elevation correction factors given in table A shall be applied to the fastest mile wind velocity in miles per hour. Correction factors for terrain given in table A also shall be applied to the fastest mile wind velocity in miles per hour. These factors shall not be applied to the design wind load in pounds per square foot.

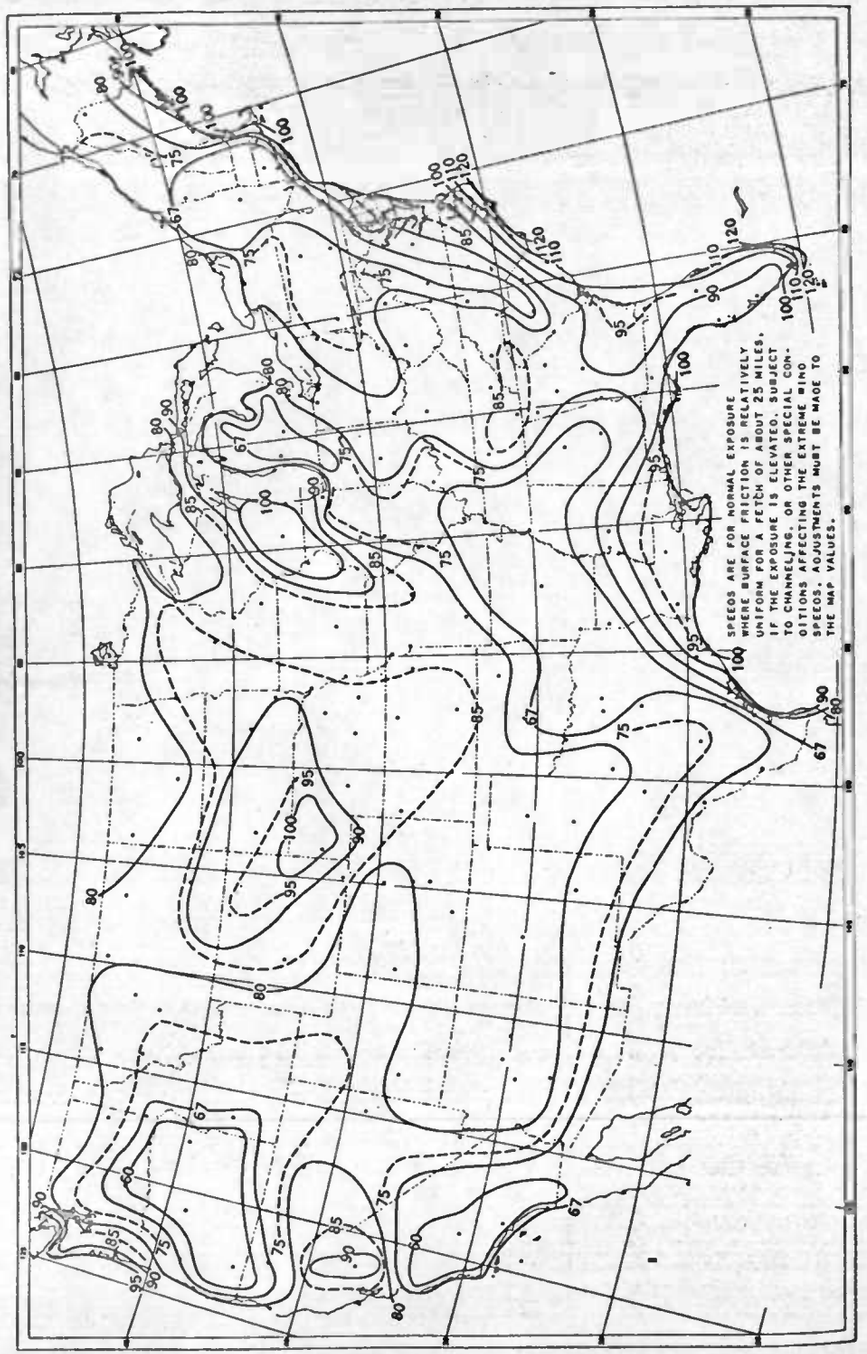
K-12-B. Impact Loads.—To qualify as materials of special impact resistance characteristics, fully-tempered, laminated and wired glass shall comply with the requirements of the applicable standards listed in appendix B.

TABLE A
DESIGN WIND LOAD—GLASS IN POUNDS PER SQUARE FOOT AT VARIOUS ELEVATIONS ABOVE GRADE FOR VARIOUS FASTEST MILE WIND VELOCITIES*
(50-year recurrence interval)

Elevation above grade (feet)	FASTEST MILE VELOCITIES—V* Design loads—p For flat open country																					
	V	p	V	p	V	p	V	p	V	p	V	p	V	p	V	p	V	p	V	p	V	p
0-10	42	6	46	7	49	8	52	9	55	10	59	11	62	12	66	14	69	15	76	19	83	22
10-20	52	9	58	11	61	11	65	14	70	16	74	18	79	20	83	22	87	24	96	30	105	35
20-30	60	12	67	14	70	16	75	18	80	20	85	23	90	26	95	29	100	32	110	39	120	46
30-60	66	14	74	18	77	19	83	22	88	25	94	28	99	31	104	35	110	39	121	47	132	56
60-120	73	17	82	21	85	23	92	27	98	31	104	35	110	39	116	43	122	48	134	57	146	68
120-240	81	21	91	26	95	29	101	33	108	37	115	42	122	48	128	52	135	48	149	71	162	84
240-480	90	26	100	32	104	35	112	40	119	45	127	51	134	57	142	65	149	71	164	86	179	102
480-960	98	31	110	39	115	42	123	49	131	55	139	62	148	70	156	78	164	86	180	104	197	124
over 960	98	31	110	39	115	42	123	49	131	55	139	62	148	70	156	78	164	86	180	104	197	124

*Select from U. S. Weather Bureau Map Table B

TABLE B
FASTEST MILE WIND VELOCITY AT 30 FEET ABOVE GROUND, 50-YR. MEAN RECURRENCE.



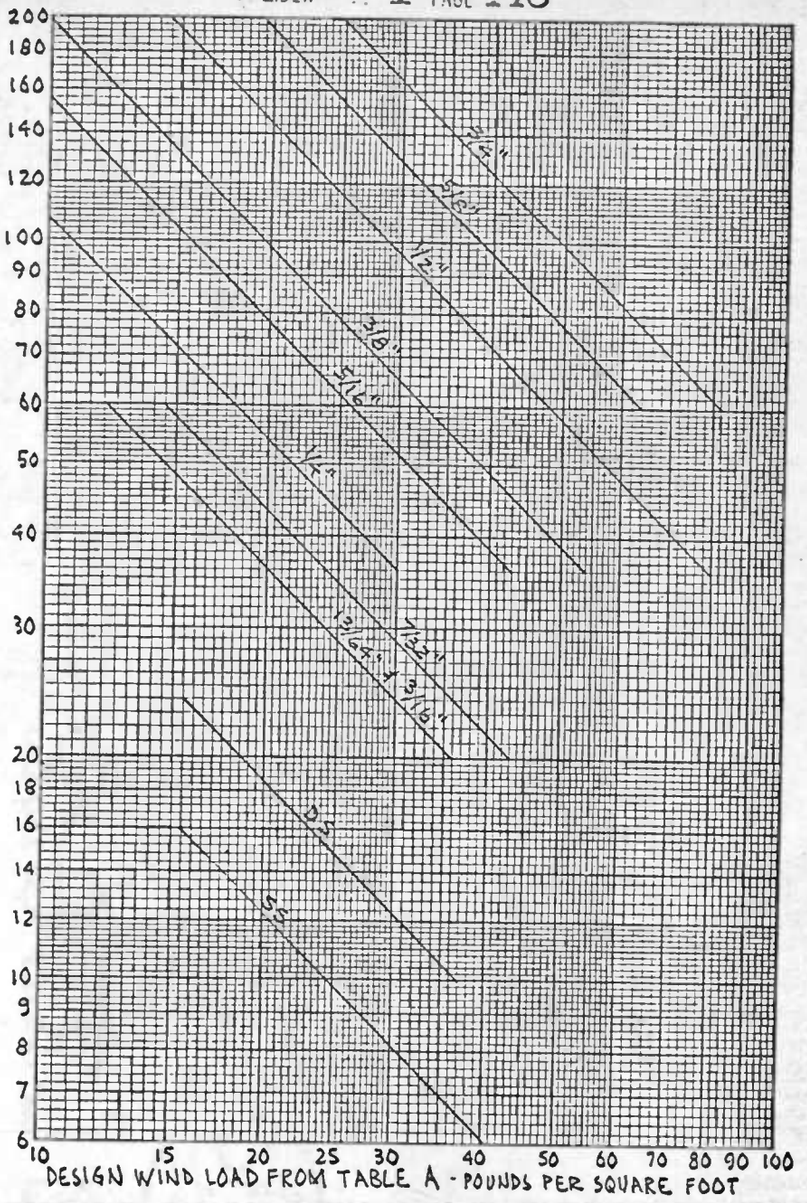


TABLE C
REQUIRED NOMINAL THICKNESS OF REGULAR PLATE OR SHEET GLASS
Based on minimum thicknesses allowed in Federal Specification DD-G-451a
Design Factor = 2.5

TABLE D
RELATIVE RESISTANCE TO WIND LOAD
(Assuming Equal Thickness)

Glass Type	Approximate Relationship*
Laminated	0.6
Wired Glass	0.5
Heat Strengthened	2.0
Fully-Tempered	4.0
Factory Fabricated Double Glazing**	1.5
Rough-Rolled Plate	1.0
Sandblasted	0.4
Regular Plate or Sheet	1.0

*Before using table C divide the design wind load from table A by the value shown here for the glass type involved.
**Use thickness of the thinner of the two lights, not thickness of unit.

APPENDIX L. – Recommended Nailing Schedule

Building Element	*Nail Type*	*Number & Distribution*
Stud to sole plate	Common-toe-nail	4—8d
Stud to cap plate	Common-toe-nail	2—16d
Double studs	Common-direct	10d 12″ o.c. or 16d 24″ o.c.
Corner studs	Common-direct	16d 24″ o.c.
Sole plate to joist or blocking	Common	16d 16″ o.c.
Double cap plate	Common-direct	16d 16″ o.c.
Cap plate laps	Common-direct	2—16d
Ribbon strip—6″ or less	Common-direct	2—10d each bearing
Ribbon strip—over 6″	Common-direct	3—10d each bearing
Roof rafter to plate	Common-toe-nail	3—8d
Roof rafter to ridge	Common-toe-nail	2—16d
Jack rafter to hip	Common-toe-nail	3—10d
Floor joists to studs (no ceiling joists)	Common-direct	5—10d or 3—16d
Floor joists to studs (with ceiling joists)	Common-direct	2—10d
Floor joists to sill or girder	Common-toe-nail	3—8d
Ledger strip	Common-direct	3—16d at each joist
Ceiling joists to plate	Common-toe-nail	3—16d
Ceiling joists to parallel rafters	Common-direct	3—16d
Ceiling joists (laps over partition)	Common-direct	3—16d
Collar beam	Common-direct	3—10d
Bridging to joists	Common-direct	2—8d each end
Diagonal brace (to stud & plate)	Common-direct	2—8d each bearing
Tail beams to headers (when nailing permitted)	Common-end	1—20d each 4 sq. ft. floor area
Header beams to trimmers (when nailing permitted)	Common-end	1—20d each 8 sq. ft. floor area
1″ Sub-flooring (6″ or less)	Common-direct	2—8d each joist
1″ Sub-flooring (8″ or more)	Common-direct	3—8d each joist
2″ Sub-flooring	Common-direct	2—16d each joist
1″ Wall sheathing (8″ or less in width)	Common-direct	2—8d each stud
1″ Wall sheathing (over 8″ in width)	Common-direct	3—8d each stud
Plywood Roof and Wall Sheathing		
½″ or less	Common-direct	6d—6″ o.c. edges and 12″ o.c. intermediate
⅝″ or greater	Common-direct	8d—6″ o.c. edges and 12″ o.c. intermediate
5/16″, ⅜″, ½″	16 ga. galvanized wire staples. ⅜″ minimum crown. Length of 1″ plus plywood thickness	4″ o.c. edges and 8″ o.c. intermediate
⅝″		2½″ o.c. edges and 5″ o.c. intermediate
Plywood Subflooring		
½″	Common-direct	6d—6″ o.c. edges and 10″ o.c. intermediate
⅝″, ¾″	Common-direct	8d—6″ o.c. edges and 10″ o.c. intermediate
1″, 1⅛″	Common-direct	10d or 8d ring shank—6″ o.c. edges and 6″ o.c. intermediate
½″	16 ga. galvanized wire staples. ⅜″ minimum crown. 1⅝″ length	4″ o.c. edges
⅝″		7″ o.c. intermediate
		2½″ o.c. edges and 4″ o.c. intermediate

Building Element	*Nail Type*	*Number & Distribution*
1" Roof decking (6" or less in width)	Common-direct	2—8d each rafter
1" Roof decking (over 6" in width)	Common-direct	3—8d each rafter
Built-up girders and beams	Common-direct	20d at 32" o.c.
Continuous header to stud	Common-toe-nail	4—8d
Continuous header—two pieces	Common-direct	16d at 16" o.c.
½" Fiberboard sheathing	1½" Galvanized Roofing Nail 6d Common Nail 16 gage staple, 1⅛" long with minimum crown of 7/16"	3" o.c. exterior edge 6" o.c. intermediate
25/32" Fiberboard sheathing	1¾" Galvanized Roofing Nail 8d Common Nail 16 gage staple, 1½" long with minimum crown of 7/16"	3" o.c. exterior edge 6" o.c. intermediate
Gypsum sheathing	12 gage 1¼" Large head Corrosion-resistive	4" o.c. on edge 8" o.c. intermediate
Shingles—wood	Corrosion-resistive	2—No. 14 B&S each bearing
Weather boarding	Corrosion-resistive	2—8d each bearing

Shingle nails shall penetrate not less than ¾ inch into nailing strips, sheathing or supporting construction except as otherwise provided in section 855.51.

APPENDIX M

GUIDE TO PRINCIPAL REGULATIONS BY USE GROUPS

The listings in this appendix are intended solely as a guide to the principal requirements for the several occupancy classifications for the convenience of those using the code. They are not necessarily the only, nor all of the requirements which must be complied with for any specific occupancy or use classification.

The text of the code shall apply in all cases with respect to any requirement. Omission of reference to any requirement herein under any specific occupancy classification shall not nullify any requirement of the code nor be construed as exempting any occupancy from such requirement where clearly applicable under the text of the code.

USE GROUP A — HIGH HAZARD — Sec. 203.1

Location and Exposure	Table 5 Table 6 Protected Exterior, 302.31 Restricted Locations, 400.9 Opening Protectives, 916.3	Explosive Air-Vapor Mixtures, 402.0 Grain Elevators, etc., 411.3 Coal Pockets and Sand Bins, 411.4
Height and Area	General Requirements, 307.0 and 308. 0	Table 6 Dry Cleaning Plants, 413.21
Fire Districts	District No. 1, 302.3 Table 5, note "b"	Table 6 Roof Structures, 927.0 Plastics, 2003.0 and 2004.0
Mixed Occupancy	Two (2) or more uses, 213.0	Prohibited with Assembly, Institutional and Residential, 400.9, 413.21 and 418.11
Stairs and Exits	General Requirements, 611.0 Projecting Rooms, 409.32 Boiler Rooms, 400.6 Occupancy Load, 608.0 Location, 609.0	Capacity, 610.0 Horizontal Exits, 616.0 Enclosures, 618.92 Access to Roof, 619.0
Vertical Openings	Enclosures, 911.0 Conveyor Openings, 1620.2	Shafts, 516.0
Special Hazards	Explosion Hazards, 400.1 and 402.0 Special High Hazards, 400.2 Boiler and Equipment Rooms, 400.6 and 1115.2	Segregation of Storage Spaces, 400.8 Firestopping, 921.0 Flammable Vapor Systems, 1122.0 Truck Loading and Shipping Areas, 905.5
Light and Ventilation	Toilet Rooms, 513.0 Shafts, 516.0 Elevator Shafts, 1610.3	Plastic Glazing Limitations, 2004.0
Fire Protection	General Requirements, 400.7 Standpipes, 1207.0 and 1209.0 Sprinklers, 1213.0	Special Fire Protection, 1217.0 Fire Alarms, 1219.0
Exceptions and Deviations	General Exceptions, 400.0 Combustible Dust, 411.0	One Story Building Roof Construction, Table 5, note "f"
Existing Buildings	Alterations, 106.0 General Requirements, 306.0 and 406.0 Light and Ventilation, 506.0 Exits, 606.0 and 607.0 Posting of Buildings, 706.0 Exhaust Opening, 1806.0	Chimneys and Flues, 1006.0 and 1011.36 Heating Equipment Maintenance, 1105.0 and 1106.0 Fire Service Equipment, 1205.0 and 1206.0 Protection of Adjacent Property, 1306.0

USE GROUP B-1 — MODERATE HAZARD STORAGE — Sec. 204.1

Location and Exposure	Table 5 Opening Protectives, 916.0	Motor Vehicle Repair Shops, 417.1
Height and Area	Table 6 General Requirements, 307.0 and 308.0 Unlimited Area, 309.0	Garages, 415.11 Public Parking Decks, 905.2 Petroleum Storage Buildings, 905.3
Fire Districts	Frame Construction-Prohibited, 302.5	Boat Houses, 304.3 Roof Structures, 927.0 Plastics, 2003.0 and 2004.0
Mixed Occupancy	Two (2) or more uses, 213.1 Incidental Uses, 213.2 Prohibited Uses, 413.22	Garage Separation, 415.13 Exitways, 603.2
Stairs and Exits	Unlimited One Story Buildings, 604.0 General Requirements, 611.0 Occupancy Load, 608.0 Capacity, 610.0	Location, 609.0 Horizontal Exits, 616.0 Enclosures, 618.92 Access to Roof, 619.0
Vertical Openings	Same as Use Group A	
Special Hazards	Basements of Dry Cleaning Plants, 413.27 Heating—Dry Cleaning Plants, 413.3 Heating—Garages, 415.4 and 415.5	Window Safety Hooks, 523.0 Firestopping, 921.0 Boiler Rooms, 1115.0 Garages—Flammable Solvent, 415.3
Light and Ventilation	Dry Cleaning Plants, 413.4 Garages, 415.2 Toilet Rooms, 513.0	Truck Loading and Shipping Areas, 905.5 Shafts, 516.0 Elevator Shafts, 1610.3 Plastic Glazing, 2003.0 and 2004.0
Fire Protection	Dry Cleaning Plants, 413.7 Sprinklers, 1213.0	Standpipes, 1207.0 and 1209.0
Exceptions and Deviations	Height Exceptions, 310.0	
Existing Buildings	Alteration, 106.0 Public Garages, 905.1 General Requirements, 306.0 and 406.0 Light and Ventilation, 506.0 Exits, 606.0 and 607.0 Posting of Buildings, 706.0 Chimneys and Flues, 1006.0 and 1011.36	Heating Equipment Maintenance, 1105.0 and 1106.0 Fire Service Equipment, 1205.0 and 1206.0 Protection of Adjacent Property, 1306.0 Exhaust Openings, 1806.0

USE GROUP B-2 — LOW HAZARD STORAGE — Sec. 204.2

Location and Exposure	Table 5	Opening Protectives, 916.0
Height and Area	Table 6 Unlimited Area, 309.0	General Requirements, 307.0 and 308.0
Fire Districts	Frame Construction Prohibited, 302.5	Roof Structures, 927.0 Plastics, 2003.0 and 2004.0
Mixed Occupancy	Two (2) or more uses, 213.1 Incidental Uses, 213.2	Prohibited Uses, 413.22 Exitways, 603.2
Stairs and Exits	Same as Use Group B-1	
Vertical Openings	Same as Use Group A	
Special Hazards	Window Safety Hooks, 523.0	Firestopping, 921.0 Truck Loading and Shipping Areas, 905.5

Light and Ventilation	Toilet Rooms, 513.0 Shafts, 516.0 Elevator Shafts, 1610.3	Plastic Glazing, 2003.0 and 2004.0
Fire Protection	Standpipes, 1207.0 and 1209.0	Sprinklers, 1213.0
Exceptions and Deviations	Height Exceptions, 310.0	
Existing Buildings	Same as Use Group B-1 except Public Garages in Use Group B-1 only	

USE GROUP C — MERCANTILE — Sec. 205.0

Location and Exposure	Table 5	Opening Protectives, 916.0
Height and Area	Table 6	General Requirements, 307.0 and 308.0
Fire Districts	Same as Use Group B-2	
Mixed Occupancy	Two (2) or more uses, 213.1 Incidental Uses, 213.2	Exitways, 603.2
Stairs and Exits	Same as Use Group B-1 except for "Unlimited One Story Buildings"	
Vertical Openings	Same as Use Group A	
Special Hazards	Window Safety Hooks, 523.0 Firestopping, 921.0	Packing and Shipping Rooms, 905.4 Truck Loading and Shipping Areas, 905.5
Light and Ventilation	Toilet Rooms, 513.0 Shafts, 516.0 Elevator Shafts, 1610.3 Open Wells, 522.0 Plastic Glazing, 2003.0 and 2004.0	Required Air Changes, 505.1 and 510.0 Windowless Buildings, 517.0 and 521.0
Fire Protection	Standpipes, 1207.0 and 1209.0	Sprinklers, 1213.0 Fire Alarms, 1219.15
Exceptions and Deviations	Height Exceptions, 310.0	Combustible Partitions, 910.4
Existing Buildings	Same as Use Group B-2	

USE GROUP D — INDUSTRIAL — Sec. 206.0

Location and Exposure	Table 5	Opening Protectives, 916.0
Height and Area	Table 6 Unlimited Area, 309.0	General Requirements, 307.0 and 308.0
Fire Districts	Same as Use Group B-2	
Mixed Occupancy	Same as Use Group C	
Stairs and Exits	Same as Use Group B-1	
Vertical Openings	Same as Use Group A	
Special Hazards	Window Safety Hooks, 523.0	Firestopping, 921.0 Truck Loading and Shipping Areas, 905.5
Light and Ventilation	Toilet Rooms, 513.0 Shafts, 516.0 Elevator Shafts, 1610.3 Windowless Buildings, 517.0 and 521.0	Plastic Glazing, 2003.0 and 2004.0 Required Air Changes, 505.1

Fire Protection	Fire Vents, 521.0 Standpipes, 1207.0	Sprinklers, 1213.0 Fire Alarms, 1219.16 and 1219.19
Exceptions and Deviations	Height Exceptions, 310.0 Special Uses, 400.0 and 905.0	Combustible Partitions, 910.4
Existing Buildings	Same as Use Group B-2	

USE GROUP E — BUSINESS — Sec. 207.0.

Location and Exposure	Table 5	Opening Protectives, 916.0
Height and Area	Table 6 General Requirements, 307.0 and 308.0	Unlimited Area, 309.0 Motor Fuel Service Station, 416.0
Fire Districts	Same as Use Group B-2	
Mixed Occupancy	Two (2) or more uses, 213.1 Incidental Uses, 213.2	Exitways, 603.2 With Residential, 905.6
Stairs and Exits	Same as Use Group B-1	
Vertical Openings	Same as Use Group A	
Special Hazards	Window Safety Hooks, 523.0 Shipping Areas, 905.5	Firestopping, 921.0
Light and Ventilation	Same as Use Group D	
Fire Protection	Standpipes, 1207.0 and 1209.0 Sprinklers, 1213.0	Fire Alarms, 1219.17
Exceptions and Deviations	Height Exceptions, 310.0 One Stairway Required, 611.32	Combustible Partitions, 910.4
Existing Buildings	Same as Use Group B-2	

USE GROUP F1-A — ASSEMBLY THEATRES — WITH STAGE — Sec. 208.11

USE GROUP F1-B — ASSEMBLY THEATRES — WITHOUT STAGE — Sec. 208.12

	Use Group F1-A	Use Group F1-B
Location and Exposure	Table 5 Restricted Location, 400.9	Street Frontage, 418.14 Opening Protectives, 916.32
Height and Area	Table 6	General Requirements, 307.0 and 308.0
Fire Districts	Roof Structures, 927.0	Plastics, 2003.0 and 2004.0
Mixed Occupancy	Two (2) or more uses, 213.1 Incidental Use, 213.2 Exitways, 603.2	Prohibited With High Hazard Uses, 400.9, 413.21 and 418.11
Stairs and Exits	General Requirements, 418.2 and 611.0 Seating Requirement, 418.3 Panic Hardware, 614.42 Occupancy Load, 608.1	Location, 609.0 Capacity, 610.0 Horizontal Exit, 616.0 Enclosures, 618.92 Access to Roof, 619.0
Vertical Openings	Shafts, 516.0	Enclosures, 911.0
Special Hazards	Flammable Film, 409.0 Stage Construction, 418.6 Basement Occupancy, 905.74	Firestopping, 921.0 Interior Finish, 922.1 Boiler Rooms, 1115.0

Light and Ventilation	Artificial Lighting, 418.8 and 627.3 Toilet Rooms, 513.0 Shafts, 516.0 Elevator Shafts, 1610.3	Open Wells, 522.0 Plastic Glazing, 2003.0 and 2004.0
Fire Protection	Sprinklers and Standpipes, 418.9, 1207.0, 1209.0 and 1213.0	Extinguishers, 418.95 and 1218.11
Exceptions and Deviations	Standpipe, 418.92	
Existing Buildings	Same as Use Group B-2; also: Shaftways, 911.6	Continued Use, 418.16

USE GROUP F-2 — ASSEMBLY (Night Clubs and Similar Uses) — Sec. 208.2

USE GROUP F-3 — ASSEMBLY (Lecture Halls, Recreation Centers, Terminals, Restaurants Other Than Night Clubs) — Sec. 208.3

	Use Group F-2	Use Group F-3
Location and Exposure	Same as Use Group F-1	Same as Use Group F-1
Height and Area	Same as Use Group F-1	Same as Use Group F-1
Fire Districts	Same as Use Group F-1	Same as Use Group F-1
Mixed Occupancy	Same as Use Group F-1	Same as Use Group F-1
Stairs and Exits	Same as Use Group F-1 except for "Seating Requirements"	Same as Use Group F-2
Vertical Openings	Same as Use Group F-1	Same as Use Group F-1
Special Hazards	Basement Occupancy, 905.74 Firestopping, 921.0 Interior Finish, 922.1 Boiler Rooms, 1115.0 Kitchens, 419.4 Aisles for Tables and Chairs, 419.3	Flammable Film, 409.0 Bowling Alleys, 419.5 Skating Rinks, 419.6 Basement Occupancy, 905.74 Firestopping, 921.0 Interior Finish, 922.1 Boiler Rooms, 1115.0 Kitchens, 419.4 Aisles for Chairs and Tables, 419.3
Light and Ventilation	Same as Use Group F-1	Same as Use Group F-1
Fire Protection	Sprinklers, 1213.0 Standpipes, 1207.0 and 1209.0	Sprinklers and Standpipes, 418.9, 1207.0, 1209.0 and 1213.0
Exceptions and Deviations	Sec. 419.0	
Existing Buildings	Same as Use Group F-1	Same as Use Group F-1

USE GROUP F-4 — CHURCHES AND SCHOOLS — Sec. 208.4

Location and Exposure	Same as F-1; except Churches, 916.0	
Height and Area	Same as Use Group F-1	
Fire Districts	Roof Structures, 927.0 Plastics, 2003.0 and 2004.0	Frame Construction Prohibited, 302.5
Mixed Occupancy	Same as Use Group F-1	
Stairs and Exits	Same as Use Group F-2	
Vertical Openings	Same as Use Group F-1	

Special Hazards	Flammable Film, 409.0 Basement Occupancy, 905.74 Firestopping, 921.0	Interior Finish, 922.1 Boiler Rooms, 1115.0
Light and Ventilation	Same as Use Group F-1	
Fire Protection	Standpipes, 1207.0 and 1209.0 Sprinklers, 1213.0	Alarm Systems (School), 1219.14
Exceptions and Deviations	Auditoriums and Gymnasiums, 915.2	Church Auditoriums—Table 6, note "g" Church Side Aisles, 612.3
Existing Buildings	Same as Use Group F-1	

USE GROUP F-5 — GRANDSTANDS, BLEACHERS, ETC. — Sec. 208.5

Covered by Sections 420.0, 421.0 and 422.0

USE GROUP H-1 — INSTITUTIONAL (Restrained) — Sec. 209.1

USE GROUP H-2 — INSTITUTIONAL (Incapacitated) — Sec. 209.2

Location and Exposure	Table 5 Restricted Location, 400.9	
Height and Area	Table 6 General Requirements, 307.0 and 308.0	
Fire Districts	Roof Structures, 927.0	Plastics, 2003.0 and 2004.0
Mixed Occupancy	Two (2) or more uses, 213.1 Incidental Uses, 213.2	Prohibited With High Hazard Uses, 400.9 and 413.21
Stairs and Exits	General Requirements, 611.0 Enclosure, 618.92 Fire Escapes, 624.3 Location, 609.0 Capacity, 610.0	Horizontal Exits, 616.0 Interior Stairways, 618.0 Access to Roof, 619.0
Vertical Openings	Shafts, 516.0 Enclosures, 911.0	
Special Hazards	Flammable Film, 409.0 Revolving Doors Prohibited, 615.11	Firestopping, 921.0 Interior Finish, 922.1 Boiler Rooms, 1115.0 Incinerators, 1015.0, 1138.0 and 1139.0
Light and Ventilation	Rooms, 512.0 Bathrooms, 513.0 Rear Yards, 519.0	Shafts, 516.0 Plastic Glazing, 2003.0 and 2004.0
Fire Protection	Fire Alarms, 1219.12 Sprinklers, 1213.0 Standpipes, 1207.0 and 1209.0	Vent Stack, 521.0
Existing Buildings	Same as B-2, also: Shaftways, 911.6	

USE GROUP L-1 — HOTELS — Sec. 210.1

USE GROUP L-2 — MULTI-FAMILY — Sec. 210.2

Location and Exposure	Table 5	
Height and Area	Table 6 General Requirements, 307.0 and 308.0	
Fire Districts	Wooden Fire Escapes, 624.33 Roof Structures, 927.0	Plastics, 2003.0 and 2004.0

Mixed Occupancy	Two (2) or more uses, 213.1 Incidental Use, 213.2	Prohibited With High Hazard Use, 400.9 and 413.21 Private Garages, 414.0
Stairs and Exits	Same as Use Group H-1	
Vertical Openings	Same as Use Group H-1	
Special Hazards	Firestopping, 921.0 Interior Finish, 922.1 Boiler Rooms, 1115.0	Incinerators, 1015.0, 1138.0 and 1139.0 Air Recirculation, 1119.7
Light and Ventilation	Same as Use Group H-1 except: Rooms	
Fire Protection	Unenclosed Stairs, 1217.6 Fire Alarms, 1219.11 Sprinklers, 1213.0	Standpipes, 1207.0 and 1209.0 Vent Stacks, 521.0
Exceptions and Deviations	Cellar Rooms, 509.0 Basement Recreation Rooms, 611.4	Private Garages, 414.0
Existing Buildings	Same as Use Group H-1, also: Stair Enclosures, 606.32	Wood Surface Preservatives, 855.5

USE GROUP L-3 — ONE AND TWO-FAMILY DWELLINGS — Sec. 210.3

Location and Exposure	Table 5	Lot Line Separations, 305.1 Accessory Buildings, 305.1
Height and Area	Table 6 General Requirements, 307.0 and 308.0	
Fire Districts	Wood Fire Escapes, 624.3	Conversions, 304.1 and 306.11
Mixed Occupancy	Two (2) or more uses, 213.1 Incidental Use, 213.2 Prohibited With High Hazard Use, 400.9 and 413.21	Private Garages, 414.0 Service Shops, 213.2 Professional Offices, 213.2 Retail Stores, 905.6
Stairs and Exits	One Stair, 611.3 Stair Width, 618.21	Handrails, 618.5
Special Hazards	Ratproofing, 875.0 Firestopping, 921.0	Air Recirculation, 1119.7 Incinerators, 1137.0
Light and Ventilation	Rooms, 507.0 Rear Yards, 519.0	Bathrooms, 513.0 Plastic Glazing, 2003.0 and 2004.0
Fire Protection	Firestopping, 921.0	
Exceptions and Deviations	Cellar Rooms, 509.0 Private Garages, 414.0	
Existing Buildings	Wood Surface Preservatives, 855.5 Ratproofing, 875.0	

USE GROUP M — MISCELLANEOUS AND TEMPORARY — Sec. 211.0

General Requirements, 211.0
- Ratproofing, 875.0
- Opening Protectives, 916.3
- Termination of Approval, 220.0

Storm Enclosures, 303.2 and 314.2

Builders' Shanties and Reviewing Stands, 303.5

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Open Shelter Sheds, 303.4

Coal and Lumber Bins, 303.7

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ISSUED EVERY FIVE YEARS

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kept up-to-date by Annual Supplements

BUILDING CODE

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BUILDING OFFICIALS CONFERENCE of AMERICA, Inc.

FOUNDED 1915

LIBER 1 PAGE 491

BOCA *Basic*
BUILDING CODE

ACCUMULATIVE
SUPPLEMENT
1967

Containing

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EDITORIAL CHANGES—SECOND PRINTING

Page 43 Note "K" inserted in table 6, L-2 Use Group, Types 2B-3B

Page 217 Section 903.5, 929 changed to 928

Page 392 National Plumbing Code, Standard changed to ASA A 40.8—1955

Page 393 NFPA 101—1960, Date changed to 1963

EDITORIAL CHANGES—THIRD PRINTING

Page 179 Section 828.2
Deleted—No Requirements

Page 180 Sections 828.4 and 828.41
Deleted—No Requirements

Page 449 Grounding Metal Roofs, changed to 928.6 and 928.61

PREFACE

This supplement to the 1965 edition of the BOCA Building Codes contains changes approved by the membership of the Building Officials Conference of America, Inc., and is recommended to local governments for adoption to bring the codes up to date in line with current progress in the construction industry. Some of these changes represent new technological developments. Their adoption will allow the public the use of new materials resulting from this research.

This supplement is a part of the Building Code Program of the Building Officials Conference of America, Inc., which offers any municipality the most economical method for securing, maintaining and administering a building code. This is a three-fold program which consists of:

1. The adoption of Building Codes by reference, where permitted by statutes, without obligation; with or without amendments, when necessary to adapt them to local conditions;

2. A system of code changes, carefully reviewed to guard against preferential influences and undue pressures and made available annually ready for adoption so as to allow the free use of any product or system;

3. Providing administrative counsel and technical data to assist local officials in rendering better service to the public; this includes evaluation of materials and methods, examination of plans and special surveys and consulting service.

Before being approved, the changes included in this supplement have been reviewed by building officials from all sections of the country. Each change has been carefully processed as follows:

1. Studied by a subcommittee whose members have contributed their best thinking gleaned from their varied experiences and backgrounds;

2. Reviewed by a code changes committee at a public hearing for discussion of facts and arguments for and against each change;

3. Presented in open session of the annual national conference of the organization for debate and final disposition by vote of the Active (building official) Members present.

Full details of this program as well as its many advantages and benefits may be obtained from the executive offices or any officer or member of the association.

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Sec. 217.1 (S17-66 pt. 1).

Change subsection to read as follows:

217.1. Type 3A.—Buildings and structures of heavy timber construction are those in which fire resistance is attained by placing limitations on the minimum sizes of wood structural members and on minimum thickness and composition of wood floors and roofs; by the avoidance, or by the proper protection by firestopping or other acceptable means, of concealed spaces under floors and roofs; by the use of approved fastenings, construction details, and adhesives for structural members; and by providing the required degree of fire resistance in exterior and interior walls. (See section 854.0 for construction details.)

Columns.—Wood columns may be sawn or glued laminated and shall be not less than eight (8) inches, nominal, in any dimension when supporting floor loads and not less than six (6) inches, nominal, in width and not less than eight (8) inches, nominal, in depth when supporting roof and ceiling loads only.

Floor framing.—Beams and girders of wood may be sawn or glued laminated and shall be not less than six (6) inches, nominal, in width and not less than ten (10) inches, nominal, in depth. Framed or glued laminated arches which spring from the floor line and support floor loads shall be not less than eight (8) inches, nominal, in any dimension. Framed timber trusses supporting floor loads shall have members of not less than eight (8) inches, nominal, in any dimension.

Roof framing.—Framed or glued laminated arches for roof construction which spring from the floor line or from grade and do not support floor loads shall have members not less than six (6) inches, nominal, in width and not less than eight (8) inches, nominal, in depth for the lower half of the height and not less than six (6) inches, nominal, in depth for the upper half. Framed or glued laminated arches for roof construction which spring from the top of walls or wall abutments, framed timber trusses, and other roof framing which do not support floor loads, shall have members not less than four (4) inches, nominal, in width and not less than six (6) inches, nominal, in depth. Spaced members may be composed of two (2) or more pieces not less than three (3) inches, nominal, in thickness when blocked solidly throughout their intervening spaces or when such spaces are tightly closed by a continuous wood cover plate of not less than two (2) inches, nominal, in thickness, secured to the underside of the members. Splice plates shall be no less than three (3) inches, nominal, in thickness. When protected by approved automatic sprinklers under the roof deck, framing members shall be not less than three (3) inches, nominal, in width.

Flooring.—Floors shall be without concealed spaces and shall be of sawn or glued laminated plank, splined, or tongue-and-groove, of not less than three (3) inches, nominal, in thickness covered with one (1) inch, nominal, dimension tongue-and-groove flooring, laid crosswise or diagonally, or of planks not less than four (4) inches, nominal, in width set on edge close together and well spiked, and covered with one (1) inch, nominal, dimension flooring.

Roof decking.—Roofs shall be without concealed spaces and roof decks shall be sawn or glued laminated, splined or tongue-and-groove plank, not less than two (2) inches, nominal, in thickness, one and one-eighth (1⅛) inches thick interior plywood (exterior glue), or of planks not less than three (3) inches, nominal, in width, set on edge close together and laid as required for floors. Other types of decking may be used if providing equivalent fire resistance and structural properties.

Bearing walls.—Bearing portions of exterior and interior walls shall be of approved noncombustible material and shall have a fire resistance rating of not less than two (2) hours.

Nonbearing walls.—Nonbearing portions of exterior walls shall be of approved noncombustible materials except as otherwise noted and; where horizontal separation of less than twenty (20) feet is provided, nonbearing exterior walls shall have a fire resistance rating of not less than two (2) hours. Where a horizontal separation of twenty (20) feet to thirty (30) feet is provided, nonbearing exterior walls shall have a fire resistance rating of not less than one (1) hour. Where a horizontal separation of thirty (30) feet or more is provided, no fire resistance rating is required. Where a horizontal separation of twenty (20) feet or more is provided wood columns and arches conforming to heavy timber sizes may be used externally.

Table 5. (S3-66) (S24-67)

Revise the ½ hour fire ratings for type 4-A construction to be ¾ hour wherever requirements for such ratings appear in table 5 or are referred to elsewhere in the code:

Change line 8 of table to read as follows:

TABLE 5.—FIRE-RESISTANCE RATINGS OF STRUCTURAL ELEMENTS IN HOURS

	STRUCTURAL ELEMENT		TYPE OF CONSTRUCTION FRAME PROTECTED 4A
	EXTERIOR WALLS	Note a	
1	On Street Lot Lines or with Fire Separation of 30' or More from Interior Lot Lines or Any Building	Bearing	¾
		Non-Bearing	¾
	On Interior Lot Lines or Less Than 6' Therefrom or From Any Building	Bearing	¾
		Non-Bearing	¾
	6' or More But Less Than 11'	Bearing	¾
		Non-Bearing	¾
	11' or More But Less Than 30'	Bearing	¾
		Non-Bearing	¾
2	Interior Bearing Walls and Partitions		¾
3	Fire Walls		2
4	Fire Divisions		
5	Fire Enclosure of Exitways, Elevator Hoistways, Public Hallways and Stairways	Note e	¾
6	Shafts Other Than Stairways		¾
7	Corridor Partitions & Vertical Separation of Tenant Spaces		¾
	Other Non-Bearing Partitions (See Art. 9)		0
8	Columns, Girders, Trusses, (Other Than Roof Trusses) and Framing	Supporting One Floor or Roof	¾
		Supporting More Than One Floor	¾
9	Structural Members Supporting Wall		
10	Floor Construction Including Beams	Note i	¾
11	Roof Construction Including Beams—15' or Less in Hght.	Note i	¾
12	Roof Trusses and Framing Including Arches and Roof Deck	More than 15' But Less Than 20' in Height to Lowest Member	¾
		20' or More in Height to Lowest Member	0

Table 6. (S9-67 pt. 2).

Change Use Group F-4 and Note b of table to read as follows:

USE GROUP		
F-4	Churches ASSEMBLY—Schools	Notes b, n and o

Note b.—In use groups B-1, B-2, C, D, E and F-4, the tabular areas may be increased two hundred (200) per cent for one (1) story buildings and one hundred (100) per cent for buildings over one (1) story in height when such buildings are equipped with automatic sprinkler systems not specifically required by law. (See section 308.)

Table 6. (S19-66).

Add new note c as follows:

Note c.—Type 1 buildings permitted unlimited tabular heights and areas are not subject to special requirements that allow increased heights and areas for other types of construction.

Sec. 303.0. (S1-66 pt. 5).

Add new paragraph to read as follows:

SECTION 303.0. RESTRICTIONS OF FIRE DISTRICT NO. 1

All buildings and structures, and all additions to existing buildings and structures, hereafter erected within the boundaries of Fire District No. 1 shall be of fireproof (type 1), protected noncombustible (types 2-A and 2-B), heavy timber (type 3-A), or ordinary protected (type 3-B) construction as defined in article 2 and regulated in table 5; and shall be constructed within the height and area limitations of table 6; except as herein provided.

Open parking structures may be constructed as permitted under section 905.2.

Sec. 303.0. (S18-67 pt. 1).

Add new subsection to read as follows:

303.10. Store Fronts.—Wood veneers of one (1) inch nominal thickness or exterior grade plywood not less than three-eighths (3/8) inch thick or exterior grade particle board not less than three-eighths (3/8) inch thick may be used on store fronts when facing public streets; provided the veneer does not exceed one (1) story in height and is applied to noncombustible backing or is furred not to exceed one and five-eighths (1 5/8) inches and firestopped in accordance with sections 877 and 921.2.

Sec. 308.0. (S9-67 pt. 1).

Change subsection to read as follows:

308.2. Sprinkler Increase.—When a building of low hazard or moderate hazard storage, or mercantile, industrial, business or assembly (use group F-4) use group is equipped with an approved one-source automatic sprinkler system, unless such sprinkler system is required by the provisions of article 4 or article 12 for structures of special use and occupancy, the tabular areas may be increased by two hundred (200) per cent for one (1) story buildings and one hundred (100) per cent for buildings more than one (1) story in height.

Sec. 427.2. (S7-66).

Change subsection to read as follows:

427.2. Construction.—All towers shall be constructed of approved corrosion-resistive noncombustible materials. Within the limitations of section 303 for fire districts and the provisions of section 928, isolated radio towers may be constructed of lumber sizes qualifying for mill type construction when not more than one hundred (100) feet in height.

Sec. 430.0. (S10-65-66 pt. 9).

Add new section and subsections to read as follows:

SECTION 430.0. OPEN PARKING STRUCTURES

430.1. Protective Guard Rails.—All walls, shafts and other open exposed spaces throughout, except first floor, shall be enclosed and protected with continuous walls or protective guard rails at least three (3) feet six (6) inches in height, except that in those structures wherein vehicles are hoisted to the desired level and placed in the parking space entirely by approved mechanical means, the three (3) foot six (6) inch high continuous wall or protective guard rail may be omitted on the side of the parking levels adjacent to the space occupied by the hoisting and placing equipment.

430.2. Wheel Guards.—Wheel guards made of noncombustible material shall be placed wherever required.

Sec. 431.0. (S16-67 pt. 1).

Add new section as follows:

SECTION 431.0. FALLOUT SHELTERS

This article shall establish the minimum criteria which must be met before a building or building space can be constructed, occupied, used, or designated as a fallout shelter and must be constructed in accordance with the applicable standards as listed in appendix B.

Sec. 611.5. (S10-65-66 pt. 8).

Add new subsection to read as follows:

611.5. Open Parking Structures.—Parking structures shall have not less than two (2) exitways from each parking tier, except that where vehicles are mechanically parked, only one (1) exitway need be provided in structures not exceeding eighty-five (85) feet in height. The maximum distance from any point on a parking tier to an exitway at that tier shall not exceed one hundred and fifty (150) feet. Ramps used for the movement of vehicles need not be enclosed and may be considered as required exitways in structures not exceeding eighty-five (85) feet in height where vehicles are attendant parked and in other structures having not less than two (2) enclosed stairways. The construction of stairways, ramps and stairway enclosures shall comply with the applicable requirements of this code except that stairways in a structure where vehicles are attendant parked and the height of the structure does not exceed fifty (50) feet, or in structures not exceeding eighty-five (85) feet in height where vehicles are mechanically parked, only one (1) stairway need be enclosed.

Sec. 623.0. (S9-66).

Change section and subsections to read as follows:

SECTION 623.0. ELEVATOR EXIT CORRIDORS

623.1. Grade Exit Corridor.—The width of grade exit corridor into which stairways and elevators discharge shall be not less than three-quarters (¾) of the combined required width for stairways and elevators; but in no case shall the width of corridor be less than five (5) feet when accommodating the discharge from five (5) or less elevators; and not less than one-half (½) foot additional for each additional elevator.

623.2. Deleted.—No Requirements.

623.3. Deleted.—No Requirements.

623.4. Deleted.—Changed to 623.1.

Sec. 707.1. (S11-66 pt. 1).

Change table 13 to read as follows:

TABLE 13.—MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS

Use	Pounds per square foot
Alleys, driveways, yards and terraces	
Pedestrian	100
Vehicular	250
Armories and drill rooms	150
Assembly:	
Fixed seats	60
Removable or no seats	100
Balcony (exterior)	100
Bowling alleys, pool rooms and similar recreational areas	75
Class Rooms	60
Fixed seats	60
Removable seats	100
Cornices	75
Corridors:	
Hotels, hospitals and multi-family dwellings	60
One- and two-family dwellings	40
Serving public rooms in hotels	100
Corridors and entrance hallways other than residential buildings	100
Corridors (other than those specifically designated):	
Private	Same as occupancy served.
Public	100
Court rooms	100
Dance halls and gymnasiums	100
Dwellings:	
Dwelling units (Multi-family dwellings)	40
First floor	40
Second floor and habitable attic	30
Uninhabitable attics	20(c)
Elevator machine rooms	100
Garages and stables, passenger cars not exceeding 6,000 lbs. wt.	75
Garages, buses and trucks not exceeding 20,000 lbs. wt.; (b)	
Columns, beams and girders	120
Floor slabs	175
Grandstands, reviewing stands and bleachers	100
Hospitals:	
Operating rooms	60
Private rooms	40
Wards	40
Libraries:	
Reading rooms	60
Stack rooms	150(a)
Loft buildings and light manufacturing	125
Manufacturing:	
Heavy	Not less than actual loads.
Light (See Loft buildings . . .)	
Marquees	75
Office buildings:	
Lobbies	100
Rooms	50
Open parking structures, passenger cars only	50
Penal institutions: cell blocks	40
Restaurants and public dining rooms	100
Reviewing stands and bleachers (See Grandstands . . .)	
Sidewalks	250
Skating rinks	75
Stairs, fire escapes and exitways	100
Storage warehouse:	
Heavy	250
Light	125
Stores and shops:	
Retail, and banking rooms	100
Grade floor	75
Upper floors	125
Wholesale	
Theatres:	
Aisles, corridors and lobbies	100
Balconies	60
Orchestra floors	60
Stage floors	150

Note a. Mihimum 150 lb./sq. ft. but not less than actual weight of loaded shelves.
Note b. For garages for vehicles exceeding 20,000 lbs. wt.: See sec. 707.2.
Note c. Live load need be applied to joists or to bottom chords of trusses or trussed rafters only in those portions of attic space having a clear height of forty-two (42) inches or more between joist and rafter in conventional rafter construction; and between bottom chord and any other member in trussed or trussed rafter construction. However, joists or the bottom chords or trusses or trussed rafters shall be designed to sustain the imposed dead load or ten pounds per square foot (10 p.s.f.), whichever be greater, uniformly distributed over the entire span.

Sec. 708.0. (S11-66 pt. 2).

Change table 14 to read as follows:

TABLE 14.—CONCENTRATED LOADS

Location	Pounds
Elevator machine room grating (on area of 4 sq. in.)	300
Finish light floor plate construction (on area of 1 sq. in.)	200
Garages, and parking structures for passenger cars	2000
Garages, trucks (not less than 150 per cent maximum wheel load)	2000
Office floors	2000
Parking structures for passenger cars	200
Scuttles and skylight ribs	8000
Sidewalks	300
Stair treads (on center of tread)	

Sec. 825.0. (S30-67 pt. 1).

Change subsection to read as follows:

825.1. Quality.—All plywood when used structurally shall meet the performance standards and all other requirements of U. S. Product Standard PS 1 listed in appendix C for the type, grade and identification index or species group of plywood involved, and shall be so identified by an approved agency. Working stresses shall conform to the standards of accepted engineering practice as listed in appendix B.

Sec. 825.0. (S17-66-67 Pts. 2 & 3).

Change subsection to read as follows:

825.3. Spans.—The maximum spans for plywood roof sheathing and subflooring shall be limited by the allowable stresses and deflections for the design live load but shall have not less than the following identification index, provided it is continuous over two (2) or more spans and laid with face grain perpendicular to the supports.

Delete present table and notes and substitute to read as follows:

ALLOWABLE SPANS FOR PLYWOOD FLOOR AND ROOF SHEATHING CONTINUOUS OVER TWO (2) OR MORE SPANS AND FACE GRAIN PERPENDICULAR TO SUPPORTS[1]

Panel Identification Index[2]	Roof				Floor
	Maximum Span (Inches)		Load (psf)		Maximum Span[4] (Inches)
			Total Load	Live Load	
	Edges Blocked	Edges Unblocked			
12/0	12	12	130	100	0
16/0	16	16	75	55	0
20/0	20	20	55	45	0
24/0	24[5]	24	60	45	0
30/12	30	26	55	40	12[6]
32/16	32	28	50[3]	40	16[7]
36/16	36	30	50[3]	35[3]	16[7]
42/20	42	32	45[3]	35[3]	20[7]
48/24	48	36	40[3]	40	24

1—These values apply for Structural I and II, Standard Sheathing and C-C grades only. Spans shall be limited to values shown because of possible effect of concentrated loads.

2—Identification Index appears on all panels in the construction grades listed in footnote (1).

3—For roof live load of 40 psf or total load of 55 psf, decrease spans by thirteen (13) per cent or use panel with next greater identification index.

4—Plywood edges shall have approved tongue-and-groove joints or shall be supported with blocking, unless one-fourth (¼) inch minimum thickness underlayment is installed, or finish floor is twenty-five thirty-seconds (25/32) inch wood strip. Allowable uniform load based on deflection of 1/360 of span is 100 psf.

5—½ inch Structural I, when continuous over one (1) support, may be laid with face grain parallel to supports provided all panel edges are blocked or other approved type edge support is provided, the spacing of the supports does not exceed twenty-four (24) inches on center, and the live load does not exceed thirty (30) pounds per square foot. For other grades, a thickness of five-eighths (⅝) inch is required.

6—May be sixteen (16) inches if twenty-five thirty-seconds (25/32) inch wood strip flooring is installed at right angles to joists.

7—May be twenty-four (24) inches if twenty-five thirty-seconds (25/32) inch wood strip flooring is installed at right angles to joists.

Delete present subsection and substitute the following:

825.31. Plywood Combination Subfloor-Underlayment.—

ALLOWABLE SPAN FOR PLYWOOD COMBINATION SUBFLOOR-UNDERLAYMENT(1)

Plywood Continuous over Two (2) or More Spans and Face Grain Perpendicular to Supports

Species Groups	Maximum Spacing of Joists (inches)		
	16	20	24
1	½	5/8	¾
2, 3	¾	¾	7/8
4	¾	7/8	1

1—Applicable to Underlayment grade, C-C (Plugged) and all grades of sanded exterior type plywood. Spans limited to values shown because of possible effect of concentrated loads. Allowable uniform load based on deflection of 1/360 of span is 100 psf. Plywood edges shall have approved tongue-and-groove joints or shall be supported with blocking, unless one-fourth (¼) inch minimum thickness underlayment is installed, or finish floor is twenty-five thirty-seconds (25/32) inch wood strip. If wood strips are perpendicular to supports, thicknesses shown for sixteen (16) inch and twenty (20) inch spans may be used on twenty-four (24) inch span.

Sec. 855.3. (S12-66 pts. 1 & 2).

Change table of subsection to read as follows:

Brick masonry veneers	2 inches
Stone veneers	2 inches
Clay tile veneers	¼ to 1 inch
Stucco or exterior plaster	¾ inch
Precast stone facing	5/8 inch
Wood siding (without sheathing)	5/8 inch
Wood siding (with sheathing)	½ inch
Protected fiber board siding	½ inch
Wood shingles	3/8 inch
Exterior plywood (without sheathing)	See sec. 825.2
Exterior plywood (with sheathing)	5/16 inch
Asbestos shingles	5/32 inch
Asbestos cement boards	1/8 inch
Aluminum clapboard siding	.024 inch
Formed steel siding	29 gage
Hardboard siding	¼ inch

Change subsection to read as follows:

855.32. Metal Veneers.—Veneers of metal shall be fabricated from approved corrosion-resistive materials or shall be protected front and back with porcelain enamel or shall be otherwise treated to render the metal resistant to corrosion. Such veneers shall be not less than No. 29 gage in thickness mounted on wood or metal furring strips or approved sheathing on the frame construction.

Sec. 855.0. (S2-67).

Change subsection to read as follows:

855.61. Bridging.—Except as hereinafter noted, in all floor, attic and roof framing, there shall be not less than one (1) line of bridging for each eight (8) feet of span. The bridging shall consist of not less than one (1) by three (3) inch lumber, double-nailed at each end, or of equivalent metal bracing of equal rigidity. A line of bridging shall also be required at supports where adequate lateral support is not otherwise provided.

Midspan bridging is not required for floor, attic or roof framing in one- and two-family dwellings (use group L-3) and multi-family dwellings (use group L-2) except when the joist depth exceeds twelve (12) inches nominal and/or when the Minimum Uniformly Distributed Live Load exceeds forty (40) pounds per square foot.

Sec. 859.0. (S25-67 pts. 1 & 2).

Change subsection to read as follows:

859.52. Glass Dimensional Tolerance.—Glass thickness tolerances shall comply with those established in the following table. Where thickness is to be controlled, nominal values are stated subject to these tolerances:

Nominal Thickness	*Plate Glass Min. Thickness (Inches)*	*Sheet Glass Min. Thickness (Inches)*
SS	....	0.085
DS	....	0.115
1/8	0.094	....
3/16	0.156	0.182
15/64	0.172	....
7/32	....	0.205
¼	0.218	0.236
5/16	0.281	....
3/8	0.343	0.357
½	0.468	0.478
5/8	0.562	....
¾	0.689	....
7/8	0.750	....
1	0.875	....
1¼	1.125	....

Change subsection to read as follows:

859.55. Jalousies.—In jalousie windows and doors regular plate, float, sheet or rolled glass thickness shall be not less than three-sixteenths (3/16) inch; glass length shall not be more than forty-eight (48) inches; glass edges shall be smooth. Other types of glass may be used if detailed shop drawings, specifications and analysis by methods described in appendix K, or test data assuring safe performance for the specific installation, are prepared by engineers experienced in this work and approved by the building official.

Sec. 866.0. (S26-67)

Change and delete subsections to read as follows:

866.4. Grounding Metal Veneers.—Grounding of metal veneers on all buildings shall comply with the requirements of Article 15 and the National Electrical Code.

866.41. Deleted.—No Requirements.

866.42. Deleted.—No Requirements.

866.43. Deleted.—No Requirements.

866.44. Deleted.—No Requirements.

Sec. 901.0. (S1-67 parts 1 & 2).

Add new definition as follows:

fire damper. A damper arranged to seal off air flow automatically through part of an air duct system, so as to restrict the passage of heat. The fire damper may also be used as a smoke damper if location lends itself to the dual purpose.

Sec. 903.0. (S1-67 part 2).

Add new subsection as follows:

903.66. Labeled Fire Dampers.—Only fire dampers which have been tested, listed and labeled by Underwriters' Laboratories, Inc., or an equivalent test and labeling by other accredited testing laboratories shall be deemed to meet the requirements of the Basic Code for the recommended locations and use as listed in section 1812.1.

Sec. 905.2. (S10-65-66 pts. 1, 2, 3, 4, 5, 6, & 7).

Delete present subsection and substitute the following:

905.2. Open Parking Structures.—Open passenger vehicle parking structures are those structures used for the parking or storage of passenger motor vehicles designed to carry not more than nine (9) persons, and include the following two (2) general types:

Ramp type parking structures are those employing a series of continuously rising floors or a series of interconnecting ramps between floors permitting the movement of passenger automobiles under their own power to and from the street level.

Mechanical type parking structures are those employing specially designed parking machines, elevators, lifts, conveyors, moving cranes, dollies or other devices for moving passenger automobiles to and from the street level.

For exit requirements see section 611.5. For Guard Rail and Wheel Guard requirements see sections 430.1 and 430.2.

Delete present subsection and substitute the following:

905.21. General Requirements.—Passenger vehicle structures shall be constructed of noncombustible materials throughout, including structural framing, floors, roofs and walls. Any enclosed rooms or spaces on the premises shall comply with the applicable requirements of this code.

Transfer to section 905.24 and substitute to read as follows:

905.22. Separations.—Parking structures may be erected without enclosure walls except that an enclosure wall with not less than two (2) hours fireresistance, without openings therein, shall be provided when located within six (6) feet of interior lot lines.

Delete present subsection and substitute the following:

905.23. Basements.—Basements, if used for parking of vehicles, shall be sprinklered in accordance with the provisions of section 1213.12 and shall be ventilated in accordance with the provisions of section 415.21.

Transfer to section 905.26 and substitute former section 905.22 without change:

905.24. Gasoline Dispensing.—Areas used for dispensing of gasoline in parking structures shall be located on the grade floor and shall comply with the requirements of section 416.

Add the following new subsection:

905.25. Heights and Areas.—Heights and areas of open parking structures shall not exceed the limits in the following table:

HEIGHT AND AREA LIMITATION FOR OPEN PARKING STRUCTURES

Type of Construction	*Height*	*Area in Square Feet*
1-A and 1-B	Unlimited	Unlimited
2-A	12 Stories—120 feet	Unlimited
2-B	10 Stories—100 feet	50,000
2-C	8 Stories— 85 feet	30,000
2-B and 2-C	2 Stories— 25 feet	Unlimited

The areas of structures wherein more than twenty-five (25) per cent of the perimeter has frontage on street or other open space leading to a street, each of which is not less than thirty (30) feet wide may be increased as provided in section 308.1. When a sprinkler system is installed in accordance with section 1215 in types 2-B and 2-C construction, the area may be unlimited. The above limits of height permit parking on the roof.

Add the following new subsection. (Formerly section 905.24 unchanged.):

905.26. Electrical Wiring.—Electrical wiring, equipment and appliances in such structures shall not be required to be of explosion type unless located below grade or within twenty (20) feet horizontally of gasoline dispensing pumps.

Sec. 914.2. (S13-66).

Delete present subsection without substitution:

914.2. Deleted.—No Requirements.

Sec. 926.0. (S18-67 part 2).

Add new subsection to read as follows:

926.5. Wood Veneers.—In Fire Districts No. 1 and No. 2 wood veneers are permitted in accordance with section 303.10.

Sec. 1130.0. (S6-67 parts 1, 2, 3 & 4).

Change subsection to read as follows:

1130.5. Quality of Oil.—Fuel oil for use in oil burners shall be free from acid, grit, fibrous and other foreign matter, with a flash point not lower than one hundred (100) degrees F. and shall comply with the applicable standards listed in appendix C.

Change section to read as follows:

SECTION 1131.0. FUEL OIL TANKS AND EQUIPMENT

All fuel oil storage tanks, piping, vents and valves shall be installed in compliance with the Basic Code and accepted engineering practice as defined in the applicable standards listed in appendix B.

Delete the following section and subsections without substitution:

SECTION 1132.0. INTERIOR STORAGE TANKS

1132.1. Deleted.—No Requirements.

1132.2. Deleted.—No Requirements.

1132.3. Deleted.—No Requirements.

1132.4. Deleted.—No Requirements.

Delete the following section and subsections without substitution:

SECTION 1133.0. EXTERIOR STORAGE TANKS

Deleted.—No Requirements.

1133.1. Deleted.—No Requirements.

1133.2. Deleted.—No Requirements.

1133.3. Deleted.—No Requirements.

1133.4. Deleted.—No Requirements.

Table 21. Deleted.—No Requirements.

1133.5. Deleted.—No Requirements.

Sec. 1700.0. (S44-65-66 pt. 1).

Change section to read as follows:

SECTION 1700.0. SCOPE

The design and installation of plumbing systems, including sanitary and storm drainage, sanitary facilities, water supplies and storm water and sewage disposal in buildings shall comply with the requirements of this article and accepted engineering practice as defined in the National Plumbing Code listed in appendix B, except as modified in section 1707 and except that plastic pipe and fittings meeting the standards in appendix C may be used in the following applications:

a. Drain, Waste and Vent
b. Sewers and Storm Drains

GENERAL NOTES CONCERNING STANDARDS CITED IN THE BASIC BUILDING CODE.

(S63-65-66 pt. 5).

Delete wording in paragraph 10 and substitute to read as follows:

Test investigations; approval reports and lists of building materials, constructions, electrical and fire protection equipment; Handbook of Industrial Loss Prevention; Standards for Fire Protection, issued by FACTORY MUTUAL ENGINEERING DIVISION.

APPENDIX A

ACCREDITED AUTHORITATIVE AGENCIES

(S16-67 part 2) (S17-67) (S23-67) (S27-67) (S28-67) (E1-67 part 1).

Change and add new listings to read as follows:

GOVERNMENT AGENCIES

Department of Defense
Office of Civil Defense
Office of the Secretary of the Army
Washington, D. C. 20390.....DOD-OCD

Naval Facilities Engineering Command
(formerly Bureau of Yards and Docks)
Navy Department
Washington, D. C. 20390.....NFEC

Change listing to read as follows:

METAL AND STEEL

Steel Bar Mills Association
(formerly Rail Steel Bar Association)
38 South Dearborn Street
Chicago, Illinois 60603.....SBMA

Change and add new listings to read as follows:

GENERAL STANDARDS AND TESTING LABORATORIES

National Sanitation Foundation
Testing Laboratory, Inc.
School of Public Health
P.O. Box 1468
Ann Arbor, Michigan 48106.....NSFTL

United States of America
Standards Institute
(formerly American Standards
Association)
10 East 40th Street
New York, New York 10016.....USASI

Fire Testing Laboratories (Floor, Walls, Roof and Similar Tests)

University of California at Berkeley
College of Engineering
Berkeley, California 94720.....OCB

Structural Testing Laboratories
The Detroit Testing Laboratory, Inc.
12800 Northend Avenue
Detroit, Michigan 48237.....DTL

APPENDIX B

ACCEPTED ENGINEERING PRACTICE STANDARDS

(S14-66) (S2I-66) (S23-66) (EI-66) (SI8-66-77 part 1) (S6-67 part 5) (S7-67 part I) (S8-67 parts 1 & 2) (S13-67) (SI6-67 part 3) (S2I-67 part 1) (S25-67 part 4) (S29-67) (EI-67 part 2).

Change and add new standards to read as follows:

EQUIPMENT

Air Conditioning and Ventilating
- Air Conditioning and Ventilating Systems of other than Residence Type ..... NFPA 90A—1966
- Air Conditioning Systems, Warm Air Heating and—Residence Type ..... NFPA 90B—1965

Heating
- Chimneys, Fireplaces and Venting Systems—Standard for ..... NFPA 211—1966
- Oil Burning Equipment ..... NFPA 31—1965

Plumbing and Piping (Gas or Water)
- National Plumbing Code ..... ASA A 40.8—1955

Change and add new standards to read as follows:

FIRE PROTECTION AND SAFETY PRACTICES

- Aircraft Hangars ..... NFPA 409—1966
- Gases, Liquefied Petroleum—Storage and Handling of ..... NFPA 58—1965
- Liquids, Flammable and Combustible, Code ..... NFPA 30—1966
- Outdoor Assembly, Places of (Grandstands and Tents) ..... NFPA 102—1966
- Safety to Life from Fire in Buildings and Structures ..... NFPA 101—1967
  - NOTE: NFPA 101—1967 is acceptable for matters of design of exits not provided for by the BOCA Codes. Finish and construction requirements incorporated therein are not applicable.
- Spray Finishing Using Flammable and Combustible Materials ..... NPFA 33—1966

Delete the following standard and substitute to read as shown above:

- Building Exits Code ..... NFPA 101—1963

Delete the following standards and substitute to read as follows:

GLASS

- —Fully-Tempered ..... No 8, ASA Z26.1—1950
- —Laminated ..... Nos. 4, 9 and 12, ASA Z26.1—1950
- —Wired ..... No. 11, ASA Z26.1—1950

Add new standard to read as follows:

- Methods of Test for Transparent Safety Glazing Material Used in Buildings—United States Standard Performance Specifications and ..... USAS Z97.1—1966

Add new standard to read as follows:

MASONRY

- Engineered Brick Masonry—Recommended Requirements for ..... SCPI—1966
  - NOTE: This standard (SCPI—1966) is only applicable to brick masonry of solid masonry units made from clay or shale.

Change and add new standards to read as follows:

STEEL

- Design, Fabrication and Erection of Structural Steel for Buildings
  - —Structural Joints Using ASTM A 325, or A 490 Bolts—Specifications for ..... AISC—1966

- Steel Joist, Open Web
  - —Longspan Steel Joists LJ and LH Series—Standard Specifications for ..... SJI-AISC—1966
- Structural Applications of Steel Cables for Buildings—Tentative Criteria for ..... AISI—1966
- Welding in Building Construction, Code for ..... AWS—1966

Delete the following standards without substitution:

- Steel Joist, Open Web
  - Steel Joist Construction, Open Web—Long Span or LA Series—Standard Specifications for ..... AISC-SJI—1961
  - —Longspan or LH Series—Standard Specifications for ..... SJI-AISC—June 21—1962

Change and add new standards to read as follows:

WOOD AND WOOD PRODUCTS

- Maximum Spans for Joists and Rafters in Residential Construction ..... NFPA—1961 incl. 1962 Supplement
- Plywood Beams—Design and Fabrication of ..... APA—1966
- Plywood Construction Systems ..... APA—1967
- Plywood Curved Panels—Design and Fabrication of ..... APA—1964
- Plywood Design Specification ..... APA—1966
- Plywood Folded Plate Fabrication Specification No. FP-62 ..... APA—1966
- Plywood Stressed Skin Panels—Design and Fabrication of ..... APA—1964
- Timber Construction Standards ..... AITC 100—65
- Timber Structural Glued Laminated—Inspection Manual for ..... AITC 200—63 with 1967 supplement

Delete the following standards and substitute to read as shown above:

- Plywood Beams—Specifications for Design and Fabrication of ..... DFPA Spec. No. BB-8—1963
- Plywood, Fir—Technical Data Handbook ..... DFPA—1960
- Plywood Folded Plates—Specifications for Fabrication of ..... DFPA Spec. No. FP-62—1962
- Plywood-Lumber Structural Assemblies—Specifications for Design of ..... DFPA Spec. No. 1—1964
- Plywood Panels, Curved—Specifications for Design of ..... DFPA Spec. No. CP-8—1963
- Plywood Panels—Flat with Stressed Covers—Specifications for Design and Fabrication of ..... DFPA Spec. No. SS-8—1963

Add new standards to read as follows:

UNCLASSIFIED-MISCELLANEOUS

- Fallout Shelters—Suggested Building Code Provision for ..... DOD-OCD TR-36—1966
- Pile Foundations, Fourth Edition ..... AISI—1963

Delete the following standard without substitution:

- Fuel Oils—Classification of ..... USDC CS 12—1948

APPENDIX C

MATERIAL STANDARDS

(S44-65-66 part 2) (S15-66) (S16-66 part 1) (S22-66) (S18-66-67 part 2) (S6-67 part 6) (S7-67 part 2) (S14-67) (S21-67 part 2) (S31-67) (S32-67).

Change and add new standards to read as follows:

METAL

Alloy Steel Bolts, Quenched and Tempered, for Structural Steel Joints—Standard Specifications for ..... ASTM A 490—66
Bolts, High Strength, for Structural Steel Joints—Specifications for ..... ASTM A 325—66b
Carbon Steel Plates of Structural Quality, Low and Intermediate Tensile Strength—Specifications for ..... ASTM A 283—67
Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Squares—Specification for ..... ASTM A 500—65
Hot-Formed Welded and Seamless Carbon Steel Structural Tubing—Specification for ..... ASTM A 501—64
Reinforced Concrete Construction—Wire Bar Supports for ..... USDC PS 7—66
Structural Steel—Specifications for ..... ASTM A 36—66a
Structural Steel, High Strength—Specifications for ..... ASTM A 440—66
Structural Steel, High Strength Low Alloy—Specifications for ..... ASTM A 242—66a
Structural Steel, High Strength Low Alloy Columbium Vanadium—Specifications for ..... ASTM A 572—66
Structural Steel, High Strength Low Alloy Manganese Vanadium—Specifications for ..... ASTM A 441—66a

Delete the following standard without substitution:

High Strength Steel, Structural—Specifications for ..... ASTM A 94—62T

Change and add new standards to read as follows:

PLUMBING AND PIPING

Non-Metallic Pipe and Fittings ..... USDC CS 254—63 (ABS)
Plastic Pipe and Fittings ..... USDC CS 255—63 (PE)
(Water Supply) ..... USDC CS 256—63 (PVC)
Sewer and Storm Drain ..... USDC CS 228—61 (SRP)
Steel Pipe
—Black and Hot Dipped Zinc Coated (Galvanized) Welded and Seamless, for Ordinary Uses—Specifications for ..... ASTM A 120—65
—Welded and Seamless—Specifications for ..... ASTM A 53—67
Steel Plumbing Fixtures—Porcelain Enameled Formed ..... USDC PS 5—66
Valves, Flanges and Pipe Fittings, Gray Iron Castings—Specifications for ..... ASTM A 126—61T

Delete the following standards without substitution:

Tube and Tubing
—Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Squares—Specification for ..... ASTM A 500—65
—Hot-Formed Welded and Seamless Steel Structural Tubing—Specification for ..... ASTM A 501—64

Add new standards to read as follows:

WOOD AND WOOD PRODUCTS

Glued Laminated Structural Lumber Standards—Structural Glued Laminated California Redwood Timber—Standard for ..... CRA Data Sheet 2A1-4
—Structural Glued Laminated Members Assembled with WWPA Grades of Douglas Fir and Larch Lumber—Standard for ..... WWPA—1966
Particleboard, Mat-Formed Wood—Commercial Standard for ..... USDC CS 23—66
Softwood Plywood, Construction and Industrial—Product Standard for ..... USDC PS 1—66

Delete the following standards without substitution:

Plywood, Douglas Fir—Commercial Standard for ..... USDC CS 45—60
Plywood, Southern Pine—Commercial Standard for ..... USDC CS 259—63
Plywood, Western Softwood—Commercial Standard for ..... USDC CS 122—60

Add new standard to read as follows:

UNCLASSIFIED-MISCELLANEOUS
Fuel Oils—Specification for ..... ASTM D 396—64T

APPENDIX D

STRUCTURAL UNIT TEST STANDARDS

(E1-66).

MASONRY

Change the date of the following standard to read as shown:

Brick, Concrete Building—Specifications for ..... ASTM C 55—64T

APPENDIX F

DURABILITY TEST STANDARDS

(E1-66).

UNCLASSIFIED MISCELLANEOUS

Add new standards as follows:

Gypsum and Gypsum Products, Chemical Analysis of—Standard Methods for ..... ASTM C 471—61
Gypsum Board Products and Gypsum Partition Tile or Block, Physical Testing of—Standard Methods for ..... ASTM C 473—62
Gypsum Plasters and Gypsum Concrete, Physical Testing of—Standard Methods for ..... ASTM C 472—64

Delete the following standard:

Gypsum Products, Wood Fibre Content in—Method of Test for ..... ASTM C 26—59

APPENDIX I

FIRE PROTECTION STANDARDS

(S63-65-66 part 4) (S8-67 part 3) (E1-67 part 3).

Change standard to read as follows:

ALARM AND DETECTING SYSTEMS

Signaling Systems, Central Station Protective—
for Watchman, Fire Alarm and Supervisory Service,
Installation, Maintenance and Use of ..... NFPA 71—1966

Change standard to read as follows:

FIRE PROTECTION STANDARDS

Aircraft Hangars ..... NFPA 409—1966

Change and add new standards to read as follows:

PREVENTION AND SPREAD OF FIRE

Air Conditioning and Ventilating Systems
—other than Residence Type ..... NFPA 90A—1966
—Residence Type ..... NFPA 90B—1965
Fire Doors and Windows—Standard for ..... NFPA 80—1966
Prevention and Spread of Fire Approved Fire Protection
Equipment and Building Materials ..... FMED

Delete the following standard without substitution:

Fire Protection and Fire Hazard Devices ..... FML Bulletin

Change standards to read as follows:

PROTECTION SYSTEMS

Carbon Dioxide Extinguishing Systems ..... NFPA 12—1966
Extinguishers, Portable Fire ..... NFPA 10—1966
Hose Connections for Sprinkler and Standpipe Systems,
Fire Department ..... NFPA 23—1965
Outside Protection (Yard Mains for Sprinklers, Standpipes, etc.) ..... NFPA 24—1966
Pumps, Centrifugal Fire—Installation of ..... NFPA 20—1966
Sprinkler Systems—Installation of ..... NFPA 13—1966
Water Tanks for Private Fire Protection Service—
Construction and Installation ..... NFPA 22—1965

APPENDIX K

UNIT WORKING STRESSES FOR ORDINARY MATERIALS

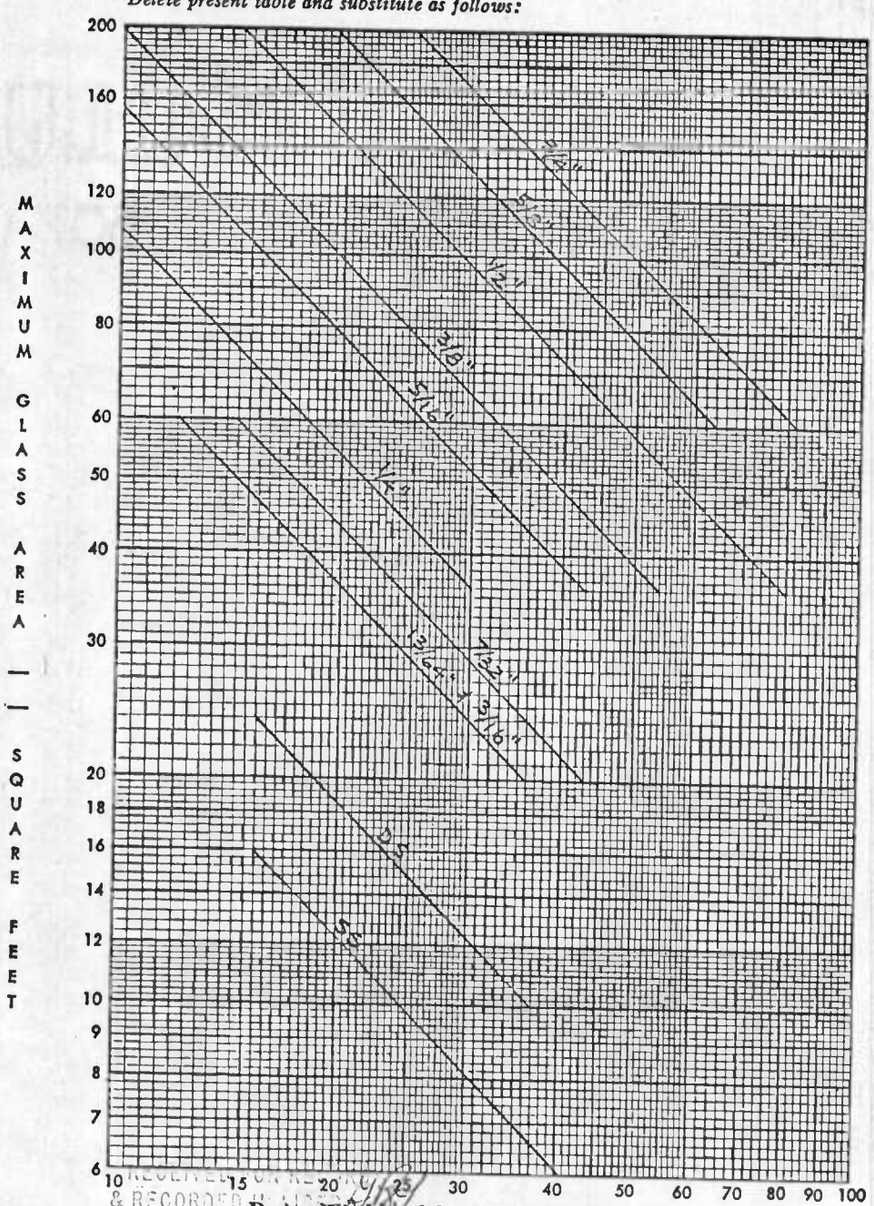
(S25-67 part 5).

Change subsection to read as follows:

K-12-B. Impact Loads.—To qualify as materials of special impact resistance characteristics, fully-tempered, laminated and wired glass shall comply with the requirements of the standard listed in appendix B.

Table C—Required Nominal Thickness of Regular Plate or Sheet Glass

Delete present table and substitute as follows:



Design Wind Load from Table A—lb. per sq. ft.

TABLE C
REQUIRED NOMINAL THICKNESS OF REGULAR PLATE AND SHEET GLASS
Based on minimum thicknesses
allowed in Federal Specification DD-G-00451b.
Design Factor = 2.5