



Handout 4.4—Common Drying Methods

Air Drying

Air drying involves drying records at room temperature. Typically materials are spread out on, or interleaved with, absorbent papers. In some instances, materials may be dried under restraint in a stack of weighted blotters.

Air drying is a tried and true method most familiar to many, has been proven through many experiences, and provides the greatest control over the drying process. It provides security and privacy controls if done in-house, and allows separation of materials that require special handling, such as photographs, coated paper, parchment, magnetic media, etc. It also provides for the direct monitoring of the original order and intellectual control of materials, but may result in problems if the materials become disarranged outside of their containers. This method therefore requires a meticulous system for tracking items during the drying process. It is also labor-, space-, and materials-intensive, particularly in terms of the absorbent paper used.

Air drying can be made more efficient with the addition of drier air. The current choices for adding drier air include increasing air circulation with a fan or hiring a contractor to bring in equipment that provides heated, extremely dry air.

Air Drying with Added Heat (Desiccant or Dehumidification Drying)

Materials are dried by pumping cycles of moist air out of a chamber or space and introducing dried (desiccated or dehumidified) air with relative humidity (or moisture content) lower than fifteen percent. One potential problem with this is that air temperatures are usually in the range of 80°–100° F, which can dry paper records too much, resulting in distortion, increased volume, and re-boxing problems.

This method is often cited in the literature as giving excellent results for damp collections, and it allows access to the materials during the drying process, if that is required. It can be performed onsite with equipment rented from a contractor or by employing in-house staff or professionals from the drying service. Items can also be sent directly to the contractor for service. Drying is complete within several days, depending on how wet the items were originally.

Vacuum Freeze Drying

Vacuum freeze drying is almost always recommended for most incidents involving records in boxes, where the quantities are large and the records are of varying levels of wetness. The records will generally be frozen first for transport to the facility, and held in storage in a freezer until the drying process is carried out.



These facilities are all contractor-owned. Contractors dry the materials using a very strong vacuum to lower the pressure while the temperature is held below freezing. Cycles of controlled heat may be used on the shelving. This process sublimates the frozen water; this means that the water passes from a frozen state to a vaporous state without passing through a liquid phase. The items remain frozen throughout the drying process.

Vacuum freeze drying can be performed off-site at a contractor's facility or onsite in mobile vacuum freeze drying chambers. The mobile chambers are smaller than the fixed-site ones, since the walls of the chamber have to be strong enough to withstand the low pressure of the vacuum. On-site drying is more expensive than drying records at the contractor's facility.

Among the advantages of vacuum freeze drying, the procedure:

- Minimizes the feathering and bleeding of soluble media
- Allows coated materials to dry without blocking
- Results in minimal distortion to the records
- Does not require the removal of encapsulations or polyester sleeves from records before drying
- Allows records to be dried in their original containers, thus reducing risk of disruption of original order

The process is performed at the drying facility because of the weight of the structure needed to create a chamber where the pressure can be lowered significantly. Drying time depends on the wetness of the materials, but for each volume of material that fits into the chamber, the drying time is normally less than two weeks.

If records need to be used frequently, the agency will need to indicate to the contractor the order in which to process the records. There may be additional costs for gaining access to the records while they are with the contractor.

Vacuum Thermal Drying

Vacuum thermal drying is similar to vacuum freeze drying in the kind of chamber used, but different in that cycles of warm to hot air are used. Vacuum thermal drying is a cost-effective option for temporary records or archival materials of low intrinsic value. The procedure distorts paper considerably, causes coated records to block, and exacerbates the feathering and bleeding of soluble inks. The drying time is usually less than that for vacuum freeze drying, but also depends on initial wetness.

Most vacuum-drying facilities no longer use this method because of the problems discussed above.



Thermal Vacuum Freeze Drying

Another method is thermal vacuum freeze drying. This technique is similar to vacuum freeze drying in that a vacuum is used, but controlled heat is applied to vaporize the water, and this method also has a patented procedure to compress the materials into shape. It is more expensive per cubic foot than vacuum freeze drying.

Freeze Drying

Freeze drying is a very slow technique. Records are packed in permeable containers and kept in a cold storage vault for months. Over time, moisture sublimates out of the records in the same way that food gets freezer burn. This is a slow process that will dry damp and partially wet records, but the records are inaccessible for a long period of time and the energy used to keep them frozen is very expensive.

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