

X-RAYS

DISPOSITION

Medical x-rays (unless otherwise scheduled) have a retention period of 75 years.

The Code of Federal Regulations (CFR) 1228.154 (which deals with the transfer of employee medical folders to the National Personnel Records Center (NPRC)) states that only x-rays which can easily fit into employee medical folders may be transferred to the NPRC upon employee separation. Oversized x-rays remain with the Department. Instructions on how to obtain large x-rays must be placed in the employee medical folder. X-rays are not scheduled separately (apart from the folder). They carry the same 75-year retention period.

FILM TYPES AND CHARACTERISTICS

Nitrate

Manufacturers ceased production of nitrate x-rays in the late 1930s; however, they were still in use until the mid-1950s. They do not store well and are a potential fire hazard. If you discover nitrate x-rays, remove them from storage immediately.

Polyester

Polyester film has been in use since the 1960s. It is stable and can be stored for relatively long periods in an office environment (conditions of about 72 degrees, 40-50 percent humidity). Most film used today is polyester.

Acetate

Acetate is much less stable than polyester and is not as widely used. It does not, however, present problems such as those associated with nitrate x-rays.

Life Span

Life span varies with film type.

Under optimum conditions:

acetate - 100 years

nitrate - unstable/potential fire hazard (remove from storage immediately)

polyester - 500 years

X-rays are reasonably durable. If stored in a controlled environment, x-rays will be legible for the designated retention period and beyond.

STORAGEEnvironmental Conditions

Excellent:

- Temperature and humidity controls
- 35-40 percent humidity
- Store at or below 60 degrees

Adequate: (Office environment)

- 72 degrees or cooler
- 40-50 percent humidity

Poor:

- High humidity - greater than 50 percent
- Temperature extremes/fluctuations

Applications

Recommended for:

- Permanent Records
- Epidemiology Records
- Litigation or potentially litigation records

- Any other records

- Not advisable for any x-ray (X-rays will age poorly)

Recommended storage for unprocessed film: 70 degrees Fahrenheit
20-30 percent relative humidity

Under all conditions, air circulation is desirable.

Enclosures/Shelving

X-rays are heavy and require special shelving.

X-rays should not be stored in contact with other x-rays or film. They should be stored in separate enclosures (individually in a sleeve, envelope, or folder) to avoid increased acidity and chemical reaction. Alkaline paper envelopes will counteract the acidity of the x-rays. The paper should be Ph neutral and Lignin free. Acid-free paper will help prevent deterioration. If x-ray envelopes or sleeves contain adhesive, ideally it should be located on the side instead of the middle of the envelope.

If at all possible, x-rays should be stored in controlled conditions. Generally, microform storage standards (attached) may be applied to x-rays.

Determining Storage

1. When in doubt, do a risk vs. cost assessment when selecting storage.
2. Determine type of record (permanent or temporary), record use (litigation or potentially litigation), and retention period.
Note: Unscheduled records are considered permanent.

3. Check with your Federal Records Center (FRC) to determine humidity/temperature of storage space before transferring x-rays. FRCs do not usually offer environmentally controlled storage.
4. Note: FRC storage shall not be used for permanent or litigation x-rays unless space meeting the excellent environmental standards is made available. If such x-rays are currently stored at an FRC without environmental controls, they shall be removed no later than 3 years after placement. Deterioration is a risk if x-rays are stored for a longer period.

Options

6. If possible, offer permanent records directly to the National Archives. This will ensure that the records are housed in space meeting the excellent environmental standards either in the National Archives and Records Administration (NARA) in Washington, DC, or a Regional Archives Branch. Note: Make sure that records are no longer needed by the Department as ownership will transfer to the Archives.
7. One relatively inexpensive storage option for small collections is a frost-free refrigerator.
8. If appropriate conditions are not available otherwise, a small air conditioner and dehumidifier may provide adequate improvement to existing storage space.

PROBLEMS

Poor storage conditions will result in deterioration, wrinkles, distortions, and brittleness. Outgassing and sticking are also resulting problems.

Outgassing is smelly, but is not a health problem. The smell is usually a sign of deterioration in action. When odor is detected, x-rays are starting to "go." At this point, x-rays will deteriorate quickly.

Too much humidity will cause sticking, as will storing x-rays together in envelopes or folders.

CORRECTION

To slow deterioration, move the x-rays into cool, dry storage.

Low temperatures will slow chemical reactions.

Low moisture levels slow the aging process.

DUPLICATION

X-rays should not be scanned. Greater resolution is needed than can be obtained from scanning.

Reproductions of x-rays from optical disk systems cannot be used in court. Too much opportunity exists for information manipulation during the copying process.

Special microfilm is available for x-rays; however, admissibility in court has not yet been determined.

AUDIO/VISUAL AND MICROFORM RECORDS

Handling, Preservation, and Storage

Audio/Visual

Master and use copies, such as negatives and prints, should be filed separately for convenience and to make it easier to care for the film negative or master (which is the most valuable copy of any audiovisual record).

Allow only trained staff to handle masters. No bare hands please - use white cotton gloves.

Set environmental controls for storage at 70°F or cooler with 40 to 60 percent relative humidity. Even colder and drier storage conditions are recommended for color films (which are very sensitive to heat, humidity, and light).

Secure the storage area for masters against unauthorized access and protect it from fire, water, and chemical damage.

Store jacket-cut film negatives individually in acid-free envelopes. Store other audiovisual masters in noncorroding metal or inert plastic containers.

Microforms

There are three microform types: (1) silver, (2) diazo, and (3) vesicular. Silver gelatin is the only type suitable to produce an archival microform of permanent records. Silver gelatin is the camera "master"; diazo and vesicular are considered printing or working copies.

Diazo and vesicular emit gases that attack silver gelatin film. It is vitally important that silver and non-silver microforms be separated. You may even wish to store them at different sites if the silver master and a working copy are your only source of record.

ANSI standards for storage conditions are provided on the attached chart. Ideally, silver masters should be stored where environmental conditions are maintained at approximately 50°F and 30 percent relative humidity.

Refer to Title 36 CFR 1230 for standards that identify the materials and construction of reels, containers, and related supplies for storing archival microform.

Acidic paper will "eat" away at the chemical infrastructure of microform, causing deterioration. Each microform unit should be placed in its own non-acidic cartridge, box, or paper envelope. Note: This does not constitute the separate storage necessary for silver and non-silver films. "Separate storage" means separate rooms with separate circulating air systems.

Microfiche, like other types of film, will stick together when relative humidity is higher than 40 percent. Envelopes of non-acidic, low Lignin paper or inert plastic will prevent sticking and protect microfiche from dust and abrasion.

Aperture cards cause special problems. They are usually temporary, working copies, and are not intended to meet archival standards. (The silver gelatin master should always be retained in its original, uncut format.) The adhesive, tape, card stock, and ink (that comprise the aperture card) will contribute to the deterioration of the microfilm. Microfilm also has the tendency to become detached from the card and possibly misplaced.

NARA does not encourage the use of aperture cards. A suggested alternative is card jackets. Which, unlike aperture cards, allow for easy replacement and update.

Blemish or Measles Prevention

Potassium iodide added to the fixing bath during processing provides some protection against blemish development. The results of preliminary experiments also indicate that selenium sulfate toning (which adds approximately 15 percent to the cost of film processing) will eliminate the possibility of micro-blemishes. Increased processing costs may not be justifiable for all copies, but certainly will be for silver masters. Prompt copying of film upon blemish detection will avoid any appreciable loss of information. (Recovery process is under investigation. Information to follow in a later transmittal.)

Inspections

The handling and storage requirements and preventive measures mentioned previously will help to retard the oxidation that produces deterioration. However, you may save yourself time and effort by performing regular inspections (not less than every 2 years) which will detect fading, staining, curling, wrinkling, redox blemishes or "measle" spots, separation, fungus, stiffness, and cracking before the microfilm becomes illegible and unreproducible.

Inspection of permanent records is required by regulation, and inspection of all microforms is encouraged by DOE.

For additional information, refer to the NARA Instructional Guide: Managing Audiovisual Records (1990) and the NARA Study: The Management of Micrographic Records in Federal Agencies (1993).

Table 1
Recommended Relative Humidity and Temperature Conditions for Storage

Sensitive Layer	Base Type	Medium-Term Storage		
		Relative Humidity Range (%)	Maximum Temperature (°C)	Relative Humidity (%)
Microfilm:				
Silver-gelatin	Cellulose ester	15-60	25 77°F	15-
Silver-gelatin	Polyester	30-60	25	30-
Heat-processed silver	Polyester	15-60	25	15-
General:				
Silver-gelatin	Cellulose ester	15-60	25	15-
Silver-gelatin	Polyester	30-60	25	30-
Color	Cellulose ester	15-30	10 50°F	15-
Color	Polyester	25-30	10	25-
Diazo	Cellulose ester	15-50	25 77°F	15-
Diazo	Polyester	15-50	25	15-
Vesicular	Polyester	15-60	25	15-
Electrophotographic	Polyester	15-60	25	15-
Photoplastic	Polyester	15-60	25	15-