

AUDIOVISUAL CARRIERS

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Audio disk recordings

The most likely form of sound recordings to be found in libraries will be long-playing microgroove disks (12-inch, 33 $\frac{1}{3}$ rpm and 7-inch, 45 rpm), usually pressed on polyvinyl chloride, or the 78 rpm shellac disks.

Shellac disks

The first shellac disks date from the 1890s, and this format was used until the 1950s, when it was gradually replaced by vinyl disks.

Determining the causes of shellac degradation is difficult because a very wide range of qualities of shellac and 'fillers' have been used by manufacturers.

In a proper storage environment, these disks suffer a slow, progressive embrittlement of the shellac. High humidity levels accelerate the embrittlement of shellac disks. This embrittlement causes a fine powder to be shed from the disk after each playback, effectively scraping away groove information. Organic materials in the aggregates are susceptible to fungus attack, while shellac itself is said to be fungus-resistant.

Vinyl disks

Although vinyl is stable, its life is not indefinite. Vinyl discs are made of polyvinyl chloride (PVC), which degrades chemically when exposed to ultraviolet or to heat. Stabilization is therefore achieved by adding a chemical to the resin during manufacture. This does not prevent the degradation but controls it.

Vinyl disks are resistant to fungal growth and are unaffected by high humidity levels.

Handling

- ♦ Remove grooved disks from the jacket (with the inner sleeve) by holding it against the body and applying a slight pressure with a hand and bowing the jacket open. Pull the disk out by holding a corner of the inner sleeve. Avoid pressing down onto the disk with the fingers, as any dust caught between the sleeve and the disk will be pressed into the grooves.
- ♦ Remove grooved disks from the inner sleeve by bowing the inner sleeve and letting it slip gradually into an open hand so that the edge falls on the inside of the thumb knuckle. The middle finger should reach for the centre label. Never reach into the sleeve.
- ♦ To hold a disk, place the thumb on the edge of the disk, and the rest of the fingers of the same hand on the centre label for balance. Use both hands on the edge to place disk on turntable.

Storage

- ♦ Store records in soft polyethylene inner sleeves. Avoid using inner sleeves made of paper, cardboard, or PVC.
- ♦ Do not leave recordings near sources of heat or light (especially ultraviolet), as plastics are adversely affected by both.
- ♦ Do not place heavy objects on top of recordings. Recordings should never be placed on top of each other.

- ♦ Shelf recordings vertically, on edge.
- ♦ Do not use shelving units where supports put more pressure on one area of the recording or where supports are more than 10–15 cm (4–6 inches) apart.
- ♦ Do not interfile recordings of different sizes, as smaller items may get lost or damaged, while larger items may be subjected to uneven pressure.
- ♦ Remove shrink-wrap on long-playing gramophone records (LPs) completely. Shrink-wrap can continue to shrink, thus warping the disk.

Environmental recommendations for storage

A proper environment for the storage of sound recordings is essential to retard degradation. Elevated and rapid fluctuations of temperature and humidity can affect certain chemical properties of the plastics that make up recording media, causing distortion of sound quality and warping of the disk itself. 18 °C (64 °F) and 40% RH is recommended.

Fungi on disk surfaces can cause pitting, which affects playback quality.

Dust, combined with the pressure exerted on the grooves by the stylus, can permanently abrade the walls of the grooves, which affects playback quality; dust can also be embedded permanently into thermoplastic substances.

Magnetic media

Magnetic tapes (audio and video recordings on cassettes, audio and computer reel-to-reel tape, computer diskettes, etc.) are most commonly made of a magnetic layer of chromium or iron oxide bound with an adhesive onto a polyester film base. It is the adhesive binder which is susceptible to deterioration, through hydrolysis and oxidation. As the information is stored on magnetic tape in patterns formed by the magnetized particles, any loss or disarrangement of the magnetic oxide causes loss of information.

Since the early 1950s, there have been more than forty video formats that have varied in size, speed, and the manner in which the tape is held.

Cassette tapes are much thinner and weaker than reel-to-reel tapes, and their useable life expectancy is very short. Use reel-to-reel tape for long-term retention.

Magnetic tape has a much shorter lifespan than is presumed. Magnetic tape that is over 15 years old almost certainly needs careful attention, and most tapes over 20 years old need professional help.

Handling

- ♦ Minimize handling.
- ♦ Avoid touching the surface of any tape or computer diskette. Oil from skin leaves a residue that can coat the equipment's playing head and attract dust.
- ♦ Do not touch the tape surface or the edge of the tape pack unless absolutely necessary, and then wear lint-free gloves.
- ♦ Do not use commercial products advertised to clean tapes and diskettes. Contact an experienced professional to clean or repair dirty or damaged tapes.
- ♦ Return tapes and diskettes to their individual boxes immediately after use to

avoid possible damage and dust.

- ♦ Never use paper clips or adhesive tape to attach notes directly to cassettes, reels, or diskettes.
- ♦ Handle tape only in clean areas.
- ♦ Do not let tape or leader ends trail on the floor.
- ♦ Return tapes to their containers when they are not in use.
- ♦ Do not drop tapes or subject them to sudden shock.
- ♦ Cut off damaged tape or leader/trailer ends from open-reel tapes.
- ♦ Do not use general-purpose adhesive tapes to secure the tape end or for splicing. If necessary, use adhesive products designed for the purpose.

Use

- ♦ Label all tapes.
- ♦ Maintain machines according to manufacturer's specifications to ensure that equipment will not damage tapes.
- ♦ Clean the recorder tape path thoroughly at the recommended intervals.
- ♦ Discard tapes with scratches or any other surface damage, which causes significant debris to be left in the recorder tape path.
- ♦ Use a cleaning cassette after playing a damaged tape.
- ♦ Ensure tapes to be reused are thoroughly erased before they are put back into service.
- ♦ Fast forward and rewind tapes periodically.
- ♦ Do not leave a tape stopped in the middle – always rewind the tape fully.
- ♦ Protect the operating equipment and tapes from dust.

Backup and refreshing

The loss of a single computer diskette can mean the loss of a large quantity of information. For this reason, backup copies are critical to ensuring the preservation of computer-based records. If maintaining an active computer database of records is part of an institutional operation, copy the information recorded on the system's hard drive onto backup diskettes or tapes on a daily basis. As a part of disaster prevention, store backup copies in another secure location.

Audio, video, and computer tapes which are to be retained for long periods of time will require periodic copying/refreshing to ensure access to information. Every three to five years, re-copy all master tapes onto high quality, polyester-based tape in the currently established format for the media. Use this copy master only when making another 'use' copy. Make the copies of masters at different times so they do not age together.

Use reel-to-reel audio tape for master audio copies. A written transcript of an audio or video tape can also be used as a 'use copy' or 'backup copy'. A transcript may contain every word on the original tape, or only a general rendering of the discussion.

Migration

Information formats disappear as new technology emerges. Within the last twenty years, 8-track tapes, beta format video, 1/2-inch videotape, 3-inch, 5/4-inch and 8-

Backup copies are the best insurance for protecting valuable tapes and important diskettes. In the event of media ageing or a natural disaster, a copy may be the only means available to retrieve information from a master that is no longer playable.

inch computer diskettes and countless other formats have become obsolete.

Access to information is limited when machines necessary to read these records fail and cannot be replaced. To ensure access to information, copy older formats onto a stable technology while playback machines remain available.

Be knowledgeable about the formats of all machine-readable records in your care.

Storage

- Keep tapes and diskettes away from magnetic fields – do not stack tapes on top of electrical equipment.
- Keep storage areas clean and free from dust. Dust attracts and traps moisture and will precipitate hydrolysis, a common and serious cause of long-term magnetic tape degradation. Also, dust may cause permanent damage to the tape: the abrasiveness of the dust, along with the pressure exerted between the tape surface and the tape recorder heads, will scratch the oxide layer and the tape recorder heads.
- Do not leave open reel or cassette tapes exposed to the sun.
- Store open-reel and cassette tapes with the reels or tape packs vertical. Reels should be supported by the hub.
- Use high quality reels or cassettes, boxes/containers, and accessories.
- Use protective collars for open-reel tapes.
- Do not store the tapes in poor quality cardboard sleeves/boxes, which may be acidic, or vinyl boxes containing chlorine.

Diskettes should be stored on edge.

Environmental recommendations for storage

- Tape storage areas should be cool and dry: 15 ± 3 °C (59 ± 5 °F) and 30–40% RH are safe practical storage conditions. Extreme heat and frost will damage magnetic media.
- RH above 40% accelerates the deterioration of the tape binder.
- Avoid subjecting tapes to rapid temperature changes. If storage and operating area temperatures differ by more than 8 °C (15 °F), allow an acclimatization time within the operating area of four hours for every 10 °C (18 °F) difference.

Optical media

Laser disks

Laser disks were launched in 1978 and are usually 12-inch (30 cm) disks of glass or plastic. Millions of pits are etched into the surface which are read by a laser beam directed at the surface. A light beam is reflected, which is then converted into a conventional analogue signal.

CD-ROM

CD-ROM (compact disk – read only memory) originated from the audio compact disk which was available in the mid-1980s, and thus its physical dimensions and characteristics are the same. The main difference between CD-ROM and CD-Audio is that CD-Audio contains only audio data, while CD-ROM may contain audio, computer, and video/picture data.

The moulded plastic compact disk incorporates a continuous spiral of pits,

which contain the data. An aluminium reflective layer allows a laser in the compact disk drive to read the encoded information. Data integrity is protected by a lacquer coating on one side and a plastic substrate on the other side.

Handling

The worst handling stresses for an optical disk are caused by severe flexing or application of a sharp point to the top surface. These actions deform the substrate, wiping out pits and causing areas of the disk to become unreadable. A sharp stylus – a ballpoint pen, for example – can cause compression of the polycarbonate substrate and the metallic reflecting layer in the area under the pen point. Do not leave disks in disk drives. Wear lint-free gloves when handling optical media.

Labelling

Applying labels of any kind may unbalance an optical disk and make it difficult for the player to read. Also, labels may peel in humid conditions. Once a label is on the disk, however, it is especially important not to try and remove it. The act of peeling off a label creates a lever action that concentrates stress in a small area. Such stress can cause delamination, especially in a writable CD. If it is necessary to write on the top side of a disk, a soft felt-tip marker is preferable to other writing instruments, but with some solvent-based markers there may be a danger of the solvents migrating into the protective lacquer.

Cleaning

Avoid using cleaning solvents. Light dust or dirt may be safely brushed off with a non-abrasive lens tissue, but the use of an air gun is preferable. Always be gentle and wipe from the centre hub toward the outside edge of the disk. The motion should be in a radial direction (like the spokes of a wheel), not circumferential.

Storage

The acrylic 'jewel cases' provided by many manufacturers and distributors are good protection against scratches, dust, light, and rapid humidity changes. Protect the individually cased CDs further by placing them in a closed box, drawer, or cabinet. This gives additional protection from light, dust, and climate fluctuations. If the manufacturer provides a spacer card or other material as part of the jewel case package, it should be retained.

Environmental recommendations for storage

Optical disks should be stored in a dust-free, cool (below 20 °C or 68 °F), and moderately dry environment (40% RH). Warmer and humid conditions will lead to the oxidation of metallic reflecting layers, dark fading of dyes, and deterioration in polymer substrates and coatings. Do not leave disks in sunlight.

AUDIO-VISUAL CARRIERS

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