AvSAP
Audio-Visual Self-Assessment Program

Audiovisual Formats

Optical Media

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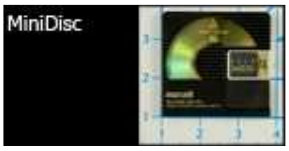
DVDs

Compact Disc (CD)

Laserdiscs



MiniDisc (MD)

DVDs

Description: DVD is a digital optical disc format which can hold moving image or recorded sound material. DVDs (Digital Versatile Disc or Digital Video Disc) are the same dimensions as CDs: 120 mm in diameter and 1.2 mm thick. DVDs, however, are made up of two discs of 0.6mm thickness, which are bonded together (Bradley, 2006). A disc may hold content on a single side or on both sides. The amount of content stored on the disc depends on how the content is compressed; if the data is heavily compressed, more data will fit on the disc. Some discs are recordable (DVD-/+R) and some discs can be written, erased, and recorded multiple times (DVD-RW).

History DVDs were introduced to the marketplace in 1996-1997. It has since supplanted videocassette and is presently the industry leader for consumer movie releases.

Prone to the Following Problems Most DVD damage is incurred through poor storage and handling. Surface scratches, gouges, and smudges can inhibit playback of the disc. There may be some inherent vice within the materials used to create DVDs, but signal loss due to inherent vice is not as frequent in newer DVDs. Scratches on the label side of commercially produced DVDs are less damaging than they are to CDs, as DVDs have an extra layer of polycarbonate that protects the metallic recording layer within the disc. All optical media should be stored in cool, dry, and dark conditions. Data on DVDs, especially non-replicated, recordable/rewritable DVDs, is subject to loss over time. All optical media should be regularly checked for data degradation. "relies on the interaction of the individual burner, the medium, and the individual player" (Bradley, 2006, p. ii). Discs recorded at higher speeds tend to use less dye when encoding the signal, which is "a contributing factor in the long term failure of recordable optical media" (p. 9).

Risk Level Inherent in Format Playback equipment and media are still readily available for this format. Recordable discs, especially those recorded at high speeds, may have significantly shorter life spans than other discs. Optical media should not be considered an archival format due to the high cost of maintenance and error-checking. Recordable discs may be appropriate as a temporary solution for small oral history archives that hold a small collection of compact cassettes that are in need of immediate

reformatting, and who are under funding restraints (ARSC Technical Committee, 2009). However, transfer to optical media should not be considered the final stage for this type of archival preservation.

Issues Related to Playback Commercial DVDs may contain region code information. Discs with this encoded information require playback equipment that corresponds to the discs' region code. Recordable/rewritable DVDs can be recorded at varying speeds. Since the recording speed of more recent players has increased, older DVD players may not be able to handle discs recorded at higher speeds. If you encounter an issue playing back a DVD in one machine, try playing it back in another machine before concluding that the fault lies with the DVD.

Recommended Storage Conditions(+/- 2)

Best Temp (degrees F)	Good Temp (degrees F)
45-54 º	55-68º

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CDs


Compact Disc (CD)

Description: Compact Disc (CD) is a digital optical disc format that can hold a variety of digital material, including recorded sound and moving image. Data capacity, however, prevents the storage of extremely large movie files. CDs are the same dimensions as DVDs: 120 mm in diameter and 1.2 mm thick. Content is only stored on one side of the disc. The amount of content on the disc depends on how the content is compressed; if the data is heavily compressed, more data will fit on the disc. Some discs are recordable (CD-/+R) and some discs can be written, erased, and recorded multiple times (CD-RW).

History CDs were introduced in 1983.The format supplanted audiocassettes and vinyl discs. Presently, non-physical digital media (such as MP3s) have begun to edge out CDs as a popular content delivery method.

Prone to the Following Problems Most CD damage is incurred through poor storage and handling. Surface scratches, gouges, and smudges can inhibit playback of the disc. There may be some inherent vice within the materials used to create CDs, but signal loss due to inherent vice is not as frequent in newer CDs. If the seal encasing the aluminum recording surface is somehow compromised, the aluminum layer can oxidize, resulting in data loss. This deterioration is colloquially referred to as "disc rot" or "laser rot." Indications of disc rot include: pin-sized holes in the reflective layer, a bronze coloring on the non-labeled side of the disc, and crazing. Crazing can be seen in snowflake-like or fractal-like milky-white patterns on the disc. Crazing typically only affects early CDs because as manufacturing processes improved, the issue became less of a problem. Scratches on the label side of CDs can also affect playback, since CDs are relatively thin and composed of a single layer of reflective aluminum encased in polycarbonate. Any discs that exhibit these signs of deterioration should be error checked and/or replaced. Data on CDs, especially non-replicated, recordable/rewritable CDs, is subject to loss over time. All optical media carriers should be regularly error checked for data degradation. Recordable and rewritable CDs contain a dye layer that can cause numerous problems such as signal loss and failure, due to several factors. The quality of the recorded signal "relies on the interaction of the individual burner, the medium, and the individual player" (Bradley, 2006, p. ii). Discs recorded at higher speeds tend to use less dye when encoding the signal, which is "a contributing factor in the long term failure of recordable optical media" (p. 9). In order to slow data loss, all optical media should be stored in cool, dry, and dark conditions.

Risk Level Inherent in Format Playback equipment and media are still readily available for this format. Recordable discs, especially those recorded at high speeds, may have significantly shorter life spans than commercially replicated discs. Optical media should not be considered an archival format due to the high cost of maintenance and error-checking. Recordable discs may be appropriate as a temporary solution for small oral history archives that hold a small collection of compact cassettes that are in need of immediate reformatting, and who are under funding restraints (ARSC Technical Committee, 2009). However, transfer to optical media should not be considered the final stage for this type of archival preservation.

Issues Related to Playback Although all CDs look the same, there are several different formats: CD+G (Compact Disc plus Graphics), CD-I (Compact Disc-Interactive), CD-R (Compact Disc-Recordable) and CD -RW (Compact Disc-Rewritable). These formats may require specific playback equipment (e.g. CD+G), playback equipment that supports delivery of both audio and video content (e.g. CD-I), and/or equipment that can read discs written at lower/higher spin speeds. CD-R and CD-RW, depending upon when they were created and the disc writer capabilities, may not be playable in all CD players or CD-Rom drives. Differing CD formats and technical considerations are detailed in various "color book" standards. Compact Disc Digital Audio (CDDA) conforms to the Red Book Standard, which specifies a number of technical aspects, including maximum playing time (74 minutes).

Color Standard	CD Format
Red Book	CDDA (Compact Disc-Digital Audio)
Yellow Book: Mode 1	CD-ROM data with Logical Error Correction Code (LECC); will allow virtually all PC's to access its data
Yellow Book: Mode 2	CD-ROM data (without LECC); allows for more content to be written to the disc. CD-ROM/XA, Bridge discs (including Photo CD, Karaoke CD, and Video CD), and Green Book, or CD-I, fall under the Mode 2 standard of Yellow Book. These discs generally require specialized playback equipment.
Orange Book	Standard for CD-R discs. Allows discs recorded on CD-Rs to be read by standard CD -ROM and audio drives.
Green Book	Standard for CD-I discs. This standard not only specifies data and disc elements, but also defines hardware and operating platform. This format is designed to operate with televisions and stereo systems.
Blue Book	A subset of the Orange Book standard. Designed to support multi-session disc playback in standard CD-Rom and audio drives.
White Book	Video CD standard. Due to storage space limitations and other issues, this format has largely been replaced by the DVD.

Recommended Storage Conditions(+/- 2)

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45-54 º	55-68º

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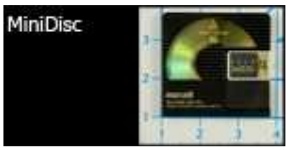
MiniDisc (MD)



Description: MiniDisc is a digital recorded sound format. It uses similar encoding technology as CD, although the disc is enclosed in a 7cm x 7cm cartridge. There are two distinct types of MiniDisc: Prerecorded, which is very similar to CD in operation and manufacture, and Recordable MDs, which can be recorded repeatedly and employ magneto-optical technology (MiniDisc.org, n.d.).

History MiniDiscs were introduced in the early 1990s by the Sony Corporation. It was marketed as a medium for recording and distributing near-CD quality consumer audio and was designed to replace the analog cassette tape.

Prone to the Following Problems Information encoded on MiniDiscs is stored in a compressed format. As MiniDiscs are recorded, the data stream is compressed. Audio quality begins to degrade when subsequent copies are made and the disc undergoes multiple re-compression. Thus, copies made from MiniDiscs, even digital copies, are not true clones and will be more compressed than the master disc. This will affect the audio quality (MiniDisc.org, n.d.).

Risk Level Inherent in Format Specific playback equipment is required to access the content. Since the information encoded on a MiniDisc is compressed, and since the format is not as widely adopted as other formats, it is not an archival medium. Equipment obsolescence is not yet a high risk; however, the compression scheme employed in recordable MiniDiscs (ATRAC) is proprietary and unpublished (IASA, 2003). It is not yet clear if previous generations of ATRAC recordings will be retrievable in future iterations. Pre-recorded MiniDiscs are relatively stable and similar to CDs, and may be a low priority for transfer. However, unique content contained on a recordable MiniDisc should be considered a high priority for preservation reformatting (IASA, 2003).

Issues Related to Playback Specific playback equipment corresponding to the media is required to access content.

Recommended Storage Conditions(+/- 2)

Best Temp (degrees F)	Good Temp (degrees F)
45-54 º	55-68º

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This page is part of the Audiovisual Self-Assessment Program (AvSAP), an IMLS-funded audiovisual preservation assessment tool. AvSAP was designed at the University of Illinois at Urbana -Champaign Library. More information about AvSAP and a link to the program can be found here: http://www.library.illinois.edu/prescons/services/av_self_assesment_program.html

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