

## OPTICAL DISC MEDIA

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Compact discs are comprised of a core, a reflective layer and a lacquer layer. The core is usually made from polycarbonate plastic but it can also be metal or etched glass. The reflective layer is usually aluminum but is occasionally gold. The lacquer layer is added for protection in handling and use.

A variety of CD formats are available. Each type of CD can vary in laminate components and vary in how the information is recorded.

- [Compact disc digital audio](#) (CD-DA) are used in for mass-market music CDs.
- [Write-Once Read-Many](#) (WORM) can contain images, text, sound, video etc. and is a commercial format.
- [Compact disc - Recordable](#) (CD-R) are like WORMs, but are used non-commercially to record images, text, sound, video etc. CD-Rs cannot be erased or reused.
- [Compact disc Rewritable](#) (CD-RW) can be used, erased and reused.

The information recorded on CDs is encoded in digital form. The method of encoding the information varies depending on whether the CD is a read-only CD - CD-ROM (CD-DA and WORM) or a writable CD (CD-R and CD-RW).

Read-only CDs are made from molded polycarbonate with a spiral track of pits which hold the information. The laser reads the information from the pit. Read-only CDs are silver on both sides of the CD.

Writable CDs are made from a molded polycarbonate like read-only CDs but have dyes added to the laminate structure. As the information is being recorded by the laser onto the CD the dye becomes discoloured which results in the information being encoded. Writable CDs appear green, gold or blue on one side rather than silver on both sides.

### What type of CD-R to buy

Not all CD-Rs are created equal in terms of stability. Gold CD-Rs should be used if you are planning on undertaking an access/preservation project where you plan on using CD-Rs as the storage medium. Gold CD-Rs use the more stable phthalocyanine organic dye and appear to be a light green in colour. Many companies produce gold CD-Rs including Mitsumi and HHB. To find local suppliers of gold CD-Rs you can check the company websites for CD specifications and local suppliers.

### Storage and Handling

- Wear clean, lint-free gloves when handling CDs
- Handle CDs by their edges
- Store CDs in their polystyrene "jewel cases", polypropylene or polycarbonate cases or other archival plastic. Do not store in paper or card enclosures.
- Store CDs vertically
- Do not bend or place pressure on the CD as this may lead to delamination
- Store CDs in the dark as ultraviolet light can discolour the lacquer and polycarbonate layers causing laser reading problems.
- Avoid excess humidity levels (above 50%) as early CDs reflective layers have been know to oxidize. Reflective layer composition has changed over the years but excess humidity should still be avoided.
- Do not label discs with self-adhesive labels. Consult the disc manufacturer to find out which type of marker pen is appropriate for the disc.

### Environmental Recommendations

The life expectancy of a CD varies with the CD composition and storage environment. Currently, the life expectancy is thought to be anywhere from 20 – 200 years. Temperatures below -10°C and 5% are not recommended for optical media.

Maximum Temperature (+/- 2°C in 24 hrs allowable)	Maximum Relative Humidity (+/-10% in 24 hrs allowable)
Less than 23°C	20% - 50%

### References

ANSI/PIMA IT9.25-1988. Optical Disc Media – Storage. New York: American National Standards Institute.