

EDUCATION

The Advantage



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HOW DISCS ARE MADE

HOW A CD IS MADE

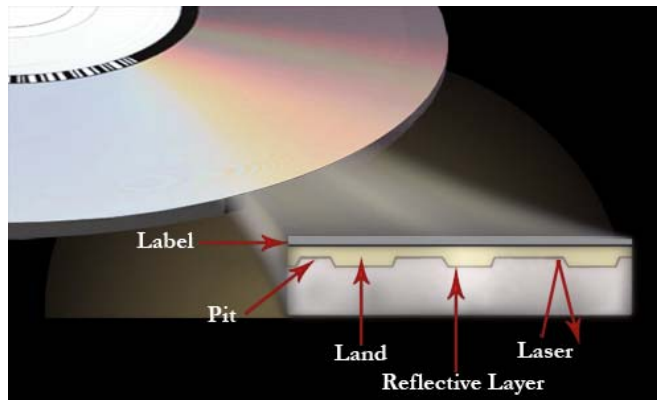
CDs consist of 99% clear polycarbonate plastic. The reflective layer, protective layer and screen print comprise the remaining 1% of the disc.



1. A disc is created from molten polycarbonate and digital information is stamped on the top of the disc, while it is still near melting point, using a die with microscopic bumps. These bumps are known as “pits and lands”.
2. After the information is molded into the polycarbonate, a reflective foil layer is applied using a process called sputtering or wet silvering. This layer reflects the laser back to the player, so its integrity is extremely important. The layer is usually silver, but can be made of gold or platinum.
3. A clear lacquer coating is applied to seal the reflective layer and prevent oxidation. This layer is very thin and offers little protection from top side scratches.
4. Finally the artwork is screen-printed on the top of the disc.

Pits and Lands are imprinted into the disc to indicate a one or a zero. A laser beam is sent from the player to the disc and the reflective layer reflects it back to the reader and the ones and zeros are translated by the player.

Recordable discs have a photosensitive dye type layer instead of the stamped information layer. This layer, when exposed to a certain light, will make an impression of a pit into the layer.



Re-recordable discs use a layer that allows the laser to polarize the photosensitive layer back and forth between a visible pit to an invisible pit.

HOW A DVD IS MADE

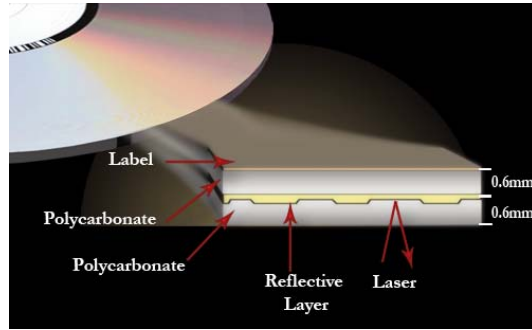
DVDs are made in different ways depending on the amount of information that is recorded on the disc. DVDs may be single or double layered and single or double layered double sided.

NOTE:

Due to the amount of information stored on DVD's, the amount of polycarbonate is less than a normal CD; therefore a DVD can not be repaired as many times as a CD.

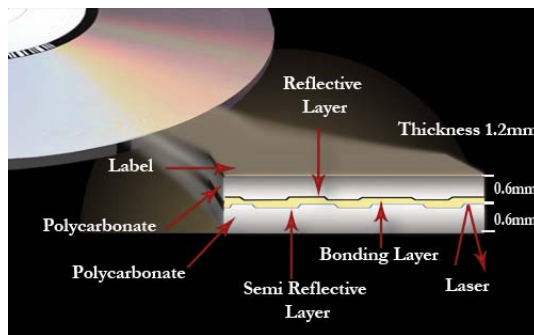
Single Layer DVDs (DVD-5 - 4.7GB)

These DVDs are made the same way as a CD with one additional polycarbonate layer added between the label and the pits and lands.



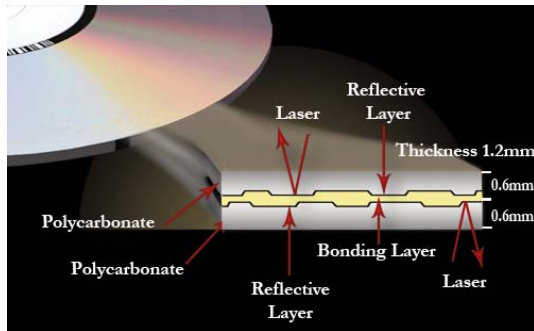
Double Layered DVDs (DVD-9 - 8.5GB)

Double layered DVDs have a semi reflective layer and a reflective layer giving two layers to store information.



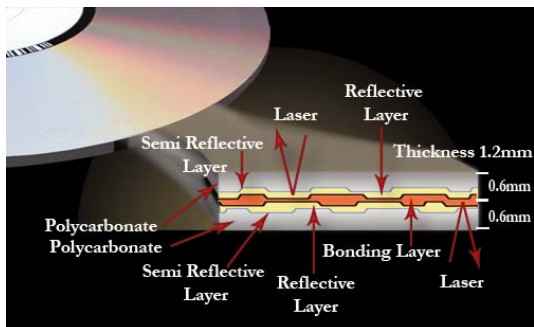
Double Sided DVDs (DVD-10 - 9.4GB)

Double sided DVDs consist of two discs bonded back to back with the reflective layers in the middle and both sides are repairable. Double sided DVDs use a different size of micro-abrasive polishing papers to prevent the manufacturer's label area from being removed during the repair process.



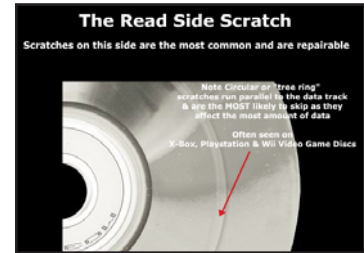
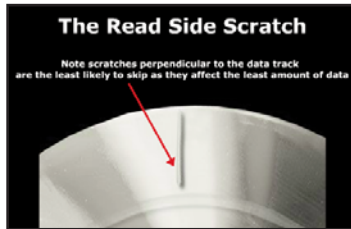
Double Sided/Double Layered DVDs (DVD-18 - 17.1GB)

Double sided/double layered DVDs are simply two double layered discs bonded back to back.

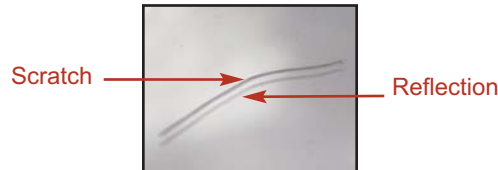


IDENTIFYING SCRATCHES

The three basic types of scratches are topside, reading side, and the top side foil dent. When repairing DVDs the top side scratch and the foil dent do not apply due to the construction of the disc.



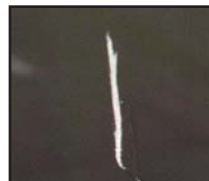
CDs, CD-ROMs & DVDs Reading Side Scratches



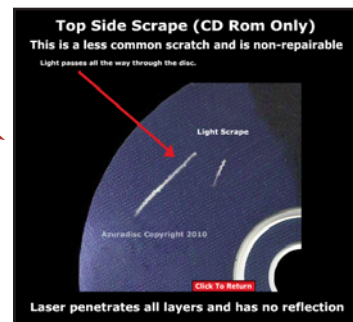
Reading side scratches are the most common type, the easiest to identify, and the only type of scratch that can be repaired.

If the scratch has a double image, as shown in the figure to the right, it is a reading side scratch and can be repaired by using an Azuradisc scratch repair machine. The double image is the result of the actual scratch and a reflection made by the reflective foil layer.

CDs & CD-ROMs ONLY The scratches shown are not found on DVDs Top Side Scratches



Light passes through the disc.



Top side scratches are caused by a sharp object damaging the printed label of a disc. In this case, the information just below the printed label is damaged and causes a skip. Top side scratches cannot be repaired, however they can be prevented by using an Azuradisc Scratch Guard.

The easiest way to identify the top side scratch is to hold the suspected scratch up to a light source and the light will pass through the disc.

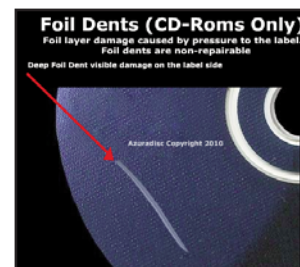
NOTE:

If light does not pass through, check the reading side of the disc and if there is a scratch without a “double image”, it is a top side scratch that did not remove any of the label.

Top Side Foil Dents



No double image



Top side foil dents are not scratches but look like a scratch on the reading side of the disc. The dent is made by a large amount of pressure put on the label side of the disc, causing the foil layer to dent. This dent will cause skips and cannot be repaired, however they can be prevented using an Azuradisc Scratch Guard.

The easiest way to identify the top side foil dent is to see if there is a “double image” produced. There should not be a second image because the damage is to the inner foil layer. There will not be any evidence on the label side of the disc because the pressure did not cause any of the label to be removed.