

## **THE LIFE-SPAN OF CD/DVD STORAGE**

Would you be surprised to learn that standard CD and DVD discs have an expected lifespan of just 3 to 5 years? If your precious memories are backed up on optical discs, you might want to go looking for a medium that will protect your documents and photos a bit longer.

Standard CD/DVD technology uses a laser beam to heat a layer of organic dye that is sandwiched between polycarbonate sheets. The heated point, which can be very tiny, first swells like a bubble and finally collapses into a pit in the dye layer. A pattern of pit/no-pit areas on the disc's surface constitute binary code that can be read by the same laser that wrote it. That is, the pattern can be read as long as the laser-burnt pits last.

It takes 3-5 years for the organic dye to degrade naturally; that is the maximum life expectancy of CD, DVD, or Blu-Ray discs that use dye technology.

A PRODUCT CALLED Milleniata claims to vastly exceed this life expectancy by replacing DEGRADABLE ORGANIC DYE WITH A mineral compound that is melted by the writing laser beam.

It takes more power to melt "stone" than it does to boil dye, apparently. Not every optical drive contains a laser powerful enough to write M-DISC discs. There are optical drives touted as M-ready and they don't seem to be any more expensive than regular drives.

### **WHAT ABOUT YOUR HARD DRIVE?**

CDs last only three to five years? Surprise... you really shouldn't expect your hard drive to last much longer than that, either.

A recent study on hard drive longevity was conducted by Backblaze, an online backup provider that has more than 25,000 consumer-grade hard drives in service. They found that 78% of the drives they use are lasting longer than four years. That might sound good, but it also implies that 22% of hard drives fail in the first four years.

The Backblaze study identifies the three most common causes of drive failure: factory defects, random failures, and parts that wear out. The failures due to factory defects tend to happen in the first 18 months of service. Failures due to wear out start to increase much faster after the three-year point. Backblaze has some stats that give them confidence to predict that more than half of all drives will last six years.

M-DISC's added value (the discs sell for about \$3 each versus pennies for a regular optical disc) lies in its stability under archival conditions: a safe deposit box, or perhaps an attic or basement. Attics may get hot enough to degrade organic dye prematurely while minerals remain intact. But a disc made with either is still vulnerable to physical destruction if it's carried from place to place routinely.

Still, for important personal or commercial digital artifacts such as family photos, tax returns, unpublished novels, etc., at least one M-DISC may be worth having. The largest Blu-ray M-DISC capacity is about 25 GB, so more than a handful shouldn't be necessary for most consumers, unless you have extensive collections of photos, music or videos that you want to preserve for centuries. Businesses and other institutional users may need more M-DISCs.

### **Flash Drives and Cloud Storage**

There isn't a lot of manufacturer enthusiasm for M-DISC; actually, there's none of which to speak. Thus, there isn't a lot of consumer demand for optical media that lasts more than 3-5 years. After all, we live in an age of flash drives (with an expected life-span of 10 years) and cloud storage. Here's the irony: for most digital data generated by consumers, destruction is a more pressing problem than preservation is.

But if you're looking for a backup solution that avoids the problem of the relatively short lifespan of consumer-grade hard drives and CD/DVD discs, as well as the privacy concerns of cloud storage, a couple of M-DISCs and a fireproof safe bolted to a concrete floor might be the best you can do right now.