

Media Q & A**History of Taiyo Yuden / CD-R**

Taiyo Yuden invented the CD-R, along with Philips and Sony, on June 13th, 1988. At the time, Taiyo Yuden was the only manufacturer of CD-R media in the world, supplying media to many well-known CD-R distributors. The CD-R was not given the boost it needed until 1992. In that year, CD-ROM drives were introduced into the computer market. At that point, the CD-R market changed from mainly audio applications, to the data market, which because of its quick market expansion gave the CD-R notoriety and market success. As time passed, many Taiwanese manufacturers started to release their own CD-R media, thus resulting in a decrease in prices that continues today. With the market changing rapidly every day, Taiyo Yuden has managed to keep quality their number one issue. Because of this, they continue to be one of the best quality CD-R products in the market today.

What is a CD-R / CD-RW?

CD-R stands for CD-Recordable. CD-Rs are write-once media, meaning that once you write information to the disc, you cannot erase it and write new information to the disc. They can be used with a standard CD player.

CD-RW stands for CD-Rewritable. This allows you to erase discs and reuse them. CD-RW media does not work in all players.

Are they identical to normal CDs?

CDs are made by being pressed from a mold, while CD-Rs and CD-RW's are made by burning the information to the disc with a laser. Though they are not physically identical, they work just the same. However, you cannot record to pressed CDs, only to CD-R/RW discs.

What kinds of media are there?

CD-R media is classified by its organic dye composition and the reflective layer. There are 4 kinds of dyes in use today:

1. Cyanine dye, which has a cyan blue color;
2. Phthalocyanine dye, which has a light aqua color;
3. Metalized azo dye, which has a dark blue color;
4. Formazan dye, which has a light green color.

The reflective layer is a layer made up of either a silver alloy or 24K gold.

There are different types of media mainly because each manufacturer configured their own materials and processes which all had to be patented. Each new CD-R manufacturer has to develop their own combination of materials.

What is recording speed?

Recording Speed is the time it takes for a CD-R writer to "write" or "burn" the information to a CD-R disc. Currently, 16X is the preferred choice of speed in the industry. 16X means it takes 16 times as fast to write the information to the disc. For example, a 74-minute recording would take 74 minutes at 1X, 37 minutes at 2X, 18.5 minutes at 4X, 9.25 minutes at 8X, and 4.625 minutes at 16X. These times are general and do no account for lead in and lead out times, but they are a good rule of thumb.

Pressing vs. Burning

Pressing is the act of stamping out CDs at a replication house. These discs are created with a glass master, and then the CD is stamped or "pressed" out with the information already on the disc. Burning is the act of burning the information to the disc in a CD-R writer or burner. The visual difference between pressed and burned CDs is that pressed have the silver bottom that is all one shade. An example would be any CD you have purchased at a store, they were pressed. A burned CD-R has a change in shade on the bottom between the burned and unburned sections. Usually, the bottoms are blue or gold.

How is a CD-R “burned?”

Within a CD writer, a laser focuses on the blank CD-R and begins the process by actually burning “pits” into the reflective layer. In this process, what is created is a series of “lands” and “pits” within the reflective dye. The information is stored on the lands in a series of number combinations. These numbers are always 0’s and 1’s. The different combination of 0’s and 1’s on the lands make up the information on the disc that CD reader or player will read when the disc is played back.

“Good” vs. “Bad” media

There are many factors that differentiate good quality CD-R media from poor quality media. One factor is the flatness of the disc. You want to know that your media is the flattest in the industry. Another factor is equal weight distribution around the disc. A disc that is uneven in weight will wobble while it spins in the burner and the reader. That will make for a poorly burned disc. Another factor is amount and consistency of the dye on the bottom of the disc. If the CD-R has too much or too little dye, the burning process will be affected and consequently, so will the reading process. These guidelines are key in determining the quality of a CD-R disc.

Are pressed CDs better than burned CD-Rs?

The answer to this question depends on 2 factors: what is the quality of the CD-R writer and what is the quality of the CD-R disc. Assuming you have a professional CD-R writer and the media you are using is professional quality, there is no difference between pressed CDs and burned CD-Rs. This will vary depending on the burn speed.

What is the difference between Audio and Data CD-Rs?

The CD-Rs that say “For Music Use Only” are meant to be used with the “consumer” stand-alone audio CD recorders from your local superstore. They cost a little more than data CD-Rs because a portion of that cost goes to the record industry. These disc also have copy protection pre-written to them to discourage duplication. Data discs are written with a computer burner, not a consumer audio CD recorder. They are duplicatable and you can record audio or data to these discs. In the professional world, data CD-Rs are preferred over “music only” discs.

Does faster writing speed reduce CD-R quality?

If you are using professional quality CD-R media in a professional writer, there will be less of a chance of degradation and failure. In truth, the faster you burn a disc; the quality of the copy is lessened from the original. However, this will be noticed more with poor media than professional media. In regards to audio recording, the main question is, “will I hear an audible difference?” The answer to that is probably not, assuming your media and writer are professional quality.

Who are the manufacturers of CD-R media?

Taiyo Yuden is the inventor of CD-R technology and is credited with making the first “green” CD-Rs. Other manufacturers that have gotten into the CD-R game include TDK, Ricoh, and Kodak, and Mitsui. Mitsui made the first “gold” CD-Rs, while Verbatim made the first “silver/blue” CD-Rs. Most brands that you see in the marketplace are just name brands that are manufactured by someone else, probably one of the 5 on this list.

What is the best kind of media to use?

Ultimately, you want to use the media that gives you the best end result. One factor to look at is what the max recording speed is of the disc. If you try to burn it faster than it can handle, you will be left with a shiny coaster. If you are recording audio, you want to stay away from CD-RW discs. Besides the fact they are more expensive than regular CD-Rs, they don’t play audio in many CD players. Also, the CD-RW standard has its drawbacks. In actuality, CD-RW media can only be written to around 5 times before the disc is useless. Plus, you don’t want to be erasing and recording new material to the same disc over and over. It is cheaper just to buy once-write CD-R media and always have a backup copy.

How long do CD-Rs last?

The age of an unwritten disc can be anywhere from 6 weeks to 100 years. Different manufacturers have different life spans. Taiyo Yuden media has a life span of 100 years. This is a good factor in determining which media is best for you. However, you probably won’t using CDs in 100 years, but the fact that they will last that long adds to credibility and

quality. This life span is also assuming the CD-R is kept in a safe and cool environment. Exposure to excessive heat, humidity, or direct sunlight will reduce their life span.

How much data and audio can they hold?

CD-R discs come in two storage sizes. The first is 650 MB or 74 minutes. The second is 700 MB or 80 minutes. Depending on the project, you can measure it in file size or length of time.

Is writing on the disc or a stick on label bad for the disc?

It is not bad for the disc if you are careful. The wrong kind of ink or label can damage the disc. The adhesives from the label or the ink from a pen can dissolve the protective layer of the disc. The safest way to use labels with a CD-R is to purchase printable discs, which come pre-made with labels. As for pens, you never want to use a ballpoint pen on the surface of a CD. There are many "CD Safe" pens and markers on the market. One safe way to write on the disc is to use a felt-tipped pen or marker. Never use a solvent-based pen on a CD-R.

What is unbranded, branded, printable?

Unbranded CD-R media does not have a discernable brand name or logo on the disc. An example of this would be a plain, silver lacquer surface disc. Branded media does have a logo or brand name visible on the disc. Most media purchased at a superstore fits into this category. Printable media is a CD-R with a surface designed for ink jet printing directly onto the disc. In this case, you'll need to get a CD printer, like the Signature 4 by Primera. These are ink jet printers with a CD tray that allows for printing directly onto the disc.

Is there a difference between pressed CDs and silver CD-Rs?

Besides the fact that a pressed CD is made differently than a CD-R, the difference would be in the change of color on the bottom of the disc. A pressed CD has the same shade of silver all the way across. A CD-R will have a change in shade between the burned and unburned sections. If the CD-R was burned to capacity, there is no real way to visibly tell the difference between the two discs.