

Blu-ray Technology



www.verbatim-europe.com

 **Verbatim**®

Why Verbatim?

Verbatim offers the complete solution for all your needs. From optical media and memory cards to printable photo paper and batteries, Verbatim is the right choice for future technology, today.

Verbatim aims to ensure that all of our products carrying the Verbatim brand meet the exact high quality standards that our customers have come to expect.

Our research and development teams are continually creating new products and enhancements on current products. This results in early launches of new products like Blu-ray plus latest speed generations in DVD, whilst improving printable surfaces and establishing features like Hard Coat.

Our business model and dedicated employees have earned us our sought after leadership position and the top market share in Europe for recordable CD and DVD media. It is a position we have worked hard to achieve, and we will work even harder to maintain it.

About Verbatim

Verbatim is a subsidiary of Mitsubishi Kagaku Media, based in Japan. Mitsubishi Kagaku Media's wide-range of operations makes it one of the leading chemical companies in the world.



Mizushima Research Centre

Mitsubishi Kagaku Media's pioneering strength is visible in its products, for which the research and development is carried out in the Mizushima Research Centre. The company also has strong relationships with the major hardware manufacturers in the market. These two strengths benefit Verbatim by ensuring not only the latest technologies and products first to market, but also that optical discs bearing our brand are the standard that many hardware companies test their recorders on, making our discs superbly compatible.



High Definition Media

With less than 10 years since the debut of the DVD format, the 'Next Generation' of optical media is already here and the demand for High Definition (HD) home entertainment is on the rise.



High Definition Television provides an unsurpassed picture quality and a remarkable high-end surround sound. With the superb resolution, dynamic contrast, vivid colours and remarkably clear sound effects, high definition brings an additional dimension to your visual entertainment.

With the expected growth of HDTV, there is a consequent growth in the recording of the HD television programming. Recording 2 hours of standard definition television in standard DVD quality requires a full 4.7GB DVD disc. High Definition content - with its increased resolution and digital sound tracks requires an ever greater amount of storage capacity. Verbatim's Blu-ray discs range from 25GB to a massive 50GB which is more than enough HD storage space.

What is Blu-ray?



Blu-ray discs (BD) get their name from a combination of the words blue and optical ray. The format was developed by the Blu-ray Discs Association (BDA), which is made up of a group of leading consumer electronics, major film studios and PC companies, including our parent company, Mitsubishi Kagaku Media. Verbatim, as a subsidiary of MKM, has therefore, first hand access to the latest in Blu-ray technology.

Our Research and Development team enables us to be at the forefront of Blue Laser Technology and we are currently looking into producing 6x speed discs and quad-layer 100GB capacity discs.

The Blu-ray disc's higher storage capacity is enabled by a blue laser that has a shorter wavelength than the standard red laser used in CD (780nm) and DVD (650nm) technology. Blu-ray disc utilises a blue laser with a wavelength of only 405nm combined with a strong lens system with a numerical aperture of 0.85. This results in a ultra-small laser spot which allows writing smaller data pits which increases the amount of data on the disc. Due to the small data entry spot on the disc surface hard coating is needed on Blu-ray discs.

Features and Benefits

- Mitsubishi Kagaku Media, Verbatims parent company, have perfected the Blu-ray technology with on-going research and development to assure offering the best products on the market.
- Verbatim's BD-R discs have a newly developed inorganic recording layer called MABL, this patented technology ensures superb quality recording, long archival lifetime and excellent "playback" performance. 
- Verbatim's proven production technology and experience ensures perfect recording on every Blu-ray disc supplied to our customers. Therefore Verbatim offers the same lifetime warranty for Blu-ray that it offers to each of its CD and DVD discs.
- Blu-ray disc usage:
 - Data Storage & Backup: 5 movies DVD quality, 4800 Photos of 5MB, 7200 MP3 files (3.3MB)
 - Video / HDTV Recording
 - Development of video games and software
 - Remastering for Film and TV Studios
 - Data / Software distribution

Hard Coat surface

Some discs are handled extensively, for example, 8cm discs that are constantly placed in and out of the Camcorder in external environments. To protect from potential damage, all Verbatim Blu-ray discs benefit from the Hard Coat protective layer, which was developed originally by Verbatim. This layer protects

from fingerprints, dust, scratches, static and water. See below 2 examples. The left hand image shows a disc comparison for typical scratch resistance. The right hand image shows how Verbatim's Hard Coat prevents from fingerprint smudging, an essential feature for Blu-ray recording.

After Steel-wool Test

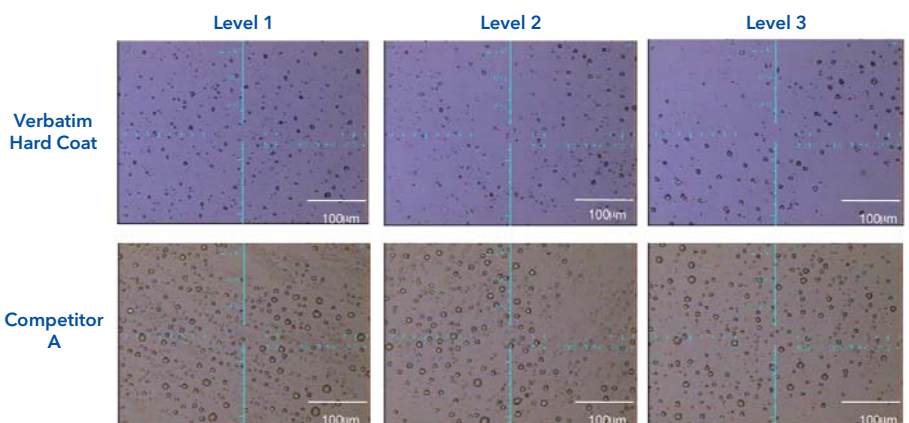


Without Hard Coat



With Hard Coat

Artificial Fingerprint Test - No fingerprint smudging



HARD COAT



Finger print proof



Static proof



Scratch proof

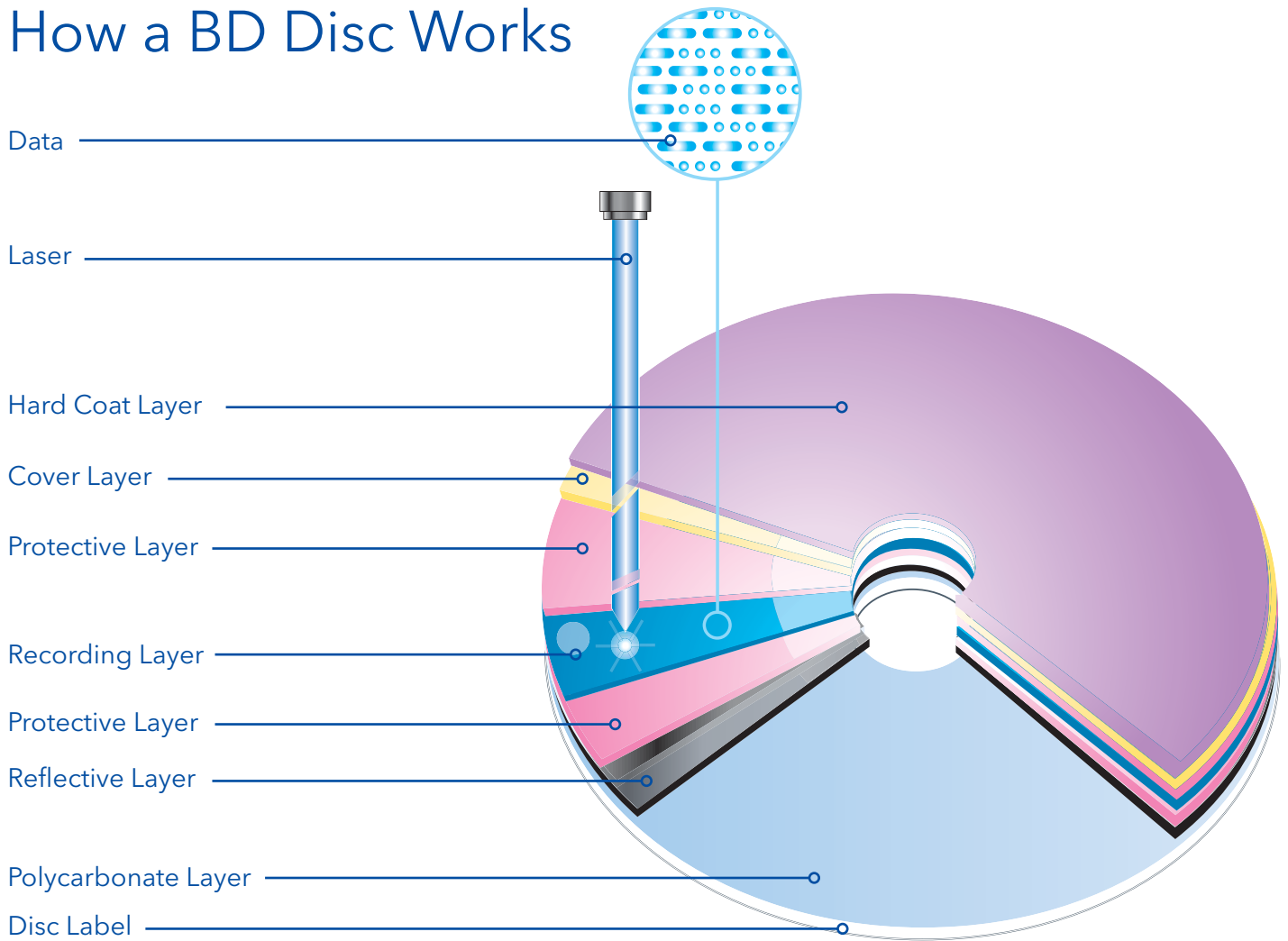


Dust proof



Water proof

How a BD Disc Works



Minimum pit length = 0.15µm Track pitch = 0.32µm Capacity = 25GB

Blu-ray Specifications

Disc Type	BD-R (Write-once)		BD-RE (Re-writable)	
	Single layer	Dual layer	Single layer	Dual layer
Recording Layer	Single layer	Dual layer	Single layer	Dual layer
Recording capacity	25GB	50GB	25GB	50GB
Recording layer	Inorganic material		Phase-change material	
Laser wavelength	405 nm		405 nm	
Lens numerical aperture (NA)	0.85		0.85	
Standard data transfer rate	36 Mbps		36 Mbps	
Disc diameter	120 mm		120 mm	
Disc thickness	1.2 mm		1.2 mm	
Cover Layer	0.1mm		0.1mm	
Tracking	Groove recording		Groove recording	
Track pitch	0.32 µm		0.32 µm	
Shortest mark length	0.149 µm		0.149 µm	

The Range

BD-R / RE	Capacity	Speed	Pack Style	Part No
BD-R	25GB/ 135min	2x	5 Pack Jewel Case	43613
BD-R	25GB/ 135min	4x	10 Pack Spindle	43689
BD-R	50GB/ 270min	2x	10 Pack Spindle	43691
BD-RE	25GB/ 135min	2x	5 Pack Jewel Case	43615

BD-R Printable	Capacity	Speed	Pack Style	Part No
BD-R Printable	25GB/ 135min	4x	5 Pack Jewel Case	43669
BD-R Printable	25GB/ 135min	4x	25 Pack Spindle	43690

BD-R / RE Dual Layer	Capacity	Speed	Pack Style	Part No
BD-R DL	50GB/ 270min	2x	5 Pack Jewel Case	43673
BD-RE DL	50GB/ 270min	2x	5 Pack Jewel Case	43619

8cm BD-R / RE	Capacity	Speed	Pack Style	Part No
8cm BD-R	7.5GB	2x	5 Pack Jewel Case	43661
8cm BD-RE	7.5GB	2x	5 Pack Jewel Case	43663

MABL = Metal Ablative Recording Layer.
A specially created inorganic recording layer present on Verbatim's BD-R media ensures excellent recording compatibility and prolonged stability for archival life.

