



How to produce a Blu-ray?

1. Premaster incl. AACS

The Blu-ray Disc-Production and, respectively, the making of a Blu-ray Disc starts with the so-called Premastering. This process is immediately followed by the Authoring. Authoring means the assembly of all videos, sound tracks and subtitles etc. The Premastering of a BD is much more complex as that of a DVD. In total, the making of a disc comprises four working steps to be explained as follows.

First of all, for the making of a Blu-ray Disc the uncoded files are imported into a special processing software. The data images are generally available in formats like BDCMF (Blu-ray Disc Cutting Master Format) or sometimes also as a Sony-CMF. The imported file is copied and provided with a temporary AACS-Key.

The copy protection AACS is a general obligation for BD-Videos. No such disc can be played on a Blu-ray Disc Player without copy protection.

In the second step, the first data checks take place to see if the provided data are free of errors, for instance in relation to their readability or the provided format.

In the next step, another AACS-encoding is applied on basis of the already used AACS-Key. Generally speaking, the image is ready for the making of a stamper which is actually the pressing model. In addition, another copy protection (ROM-Mark) is applied. This ROM-Mark can be read by every Blu-ray Disc Player, without it the media cannot be played.

2. The Pressing

After the finishing of the Blu-ray Disc Premaster the pressing model (Stamper) is made. Technically this is not realized anymore via a glass master but via a silicium wafer. With a laser-beam recorder its surface is provided with the same pit and format structure that the final Blu-ray Disc will have. The resulting pits possess the smallest size of 70 nm depth and 132 nm length.

The prepared silicium wafer is then provided with an approx. 300 µm thin nickel layer in order to get a negative stamp. The resulting stamper may now be used for the pressing of the Blu-ray Disc – and the duplication begins.

The sampler is introduced into the injection molding machine. Just like for CDs or DVDs polycarbonate is injected into a closed mold. This synthetic material has to be dried sufficiently before use in order to prevent small warpings on the disc. During the consequent



cooling the material shrinks to an extent that allows to take it off the stamper. The saved information is located on the lower side of the layer of the 1,1 mm thin substrate.

Afterwards, the media is sputtered via a silver alloy. The alloy later serves as a reflection layer for the laser beam. The so-called sputtering during the Blu-ray Pressing describes a process in which a massive silver disc (target) is bombarded by electrons.

Due to the fact that a Blu-ray Disc is intended to possess a very low reflexion ability, this layer results very thin ($< 0,2 \mu\text{m}$). In direct contrast to a CD or DVD, Blu-ray Discs appear to be thinner or more transparent.

3. Post-Processing and Printing

The finished and tested discs pass on to printing. But before the discs gain their intended printing surface they pass through the so-called Barrier Coating during which a silicium nitride layer is applied to the surface. It provides an optimum protection against humidity attracted by hygroscopic varnish.

The still unprinted BD is printed in the following working steps and confectioned in the intended packagings.