



R I M A G E™

## Perfect Print™ Specification

## System Description

This specification describes a system that will allow the CD printer in the Rimage Producer transporters to print in alignment with an art-screened image resident on the CD-R prior to printing. The key attributes of the system are:

- Index Marking
- Index Color
- Ink Types
- Surface Receptivity
- Artwork Placement

### Index Marking

A single black, or cyan colored index mark is to be silk-screened on the disc with a specified relation to the pre-printed image. See Figure 1. The index ring begins at a radius of 21.8mm (0.858") and extends to 25.2mm (0.992"). The index ring must have high reflectivity, either from silk-screening a white layer or leaving the disk un-screened in the index ring area. No contrasting features other than a single black index mark measuring at least 1.5mm by 3.4mm (0.059" by 0.134") may be present within the index ring. The leading edge of the index mark defines the angle. Notice in figure 1 that the index mark is to the left of the center, setting the index mark angle to a true zero degrees.

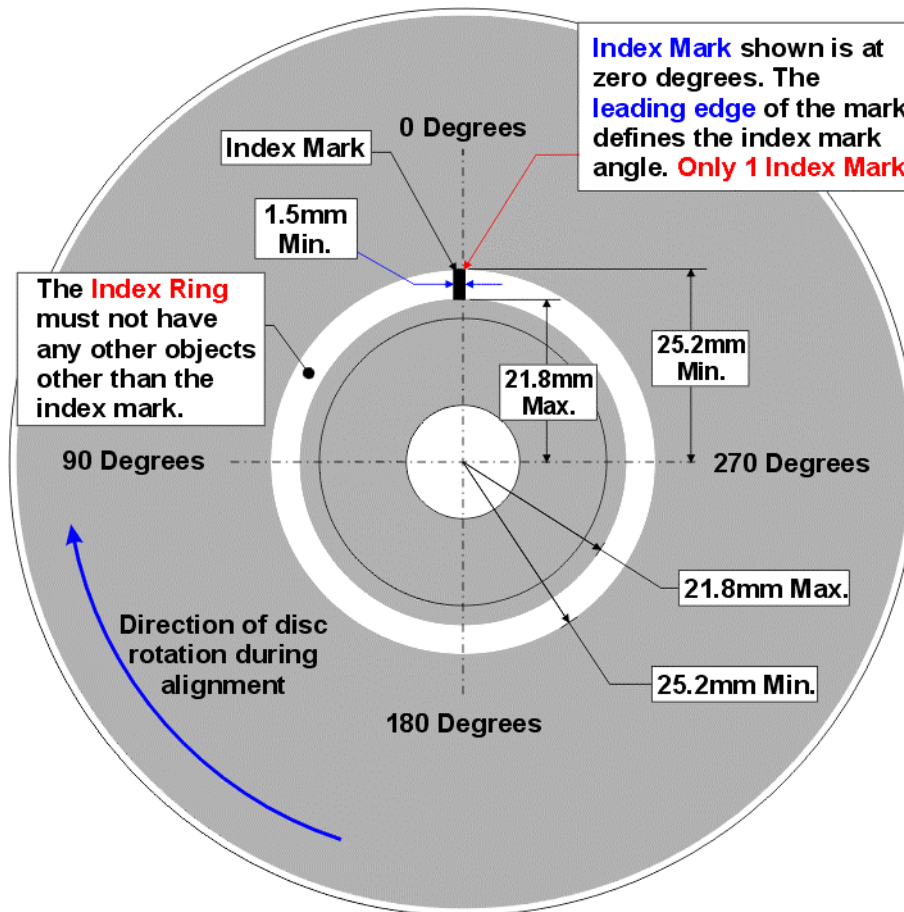


Figure 1: Index Marking Requirements

Figure 2 shows the index mark at 30°. The index mark can be placed anywhere from 0 to 359.75 degrees in 0.25 degree increments. Once again, there must not be any other objects within the index ring!

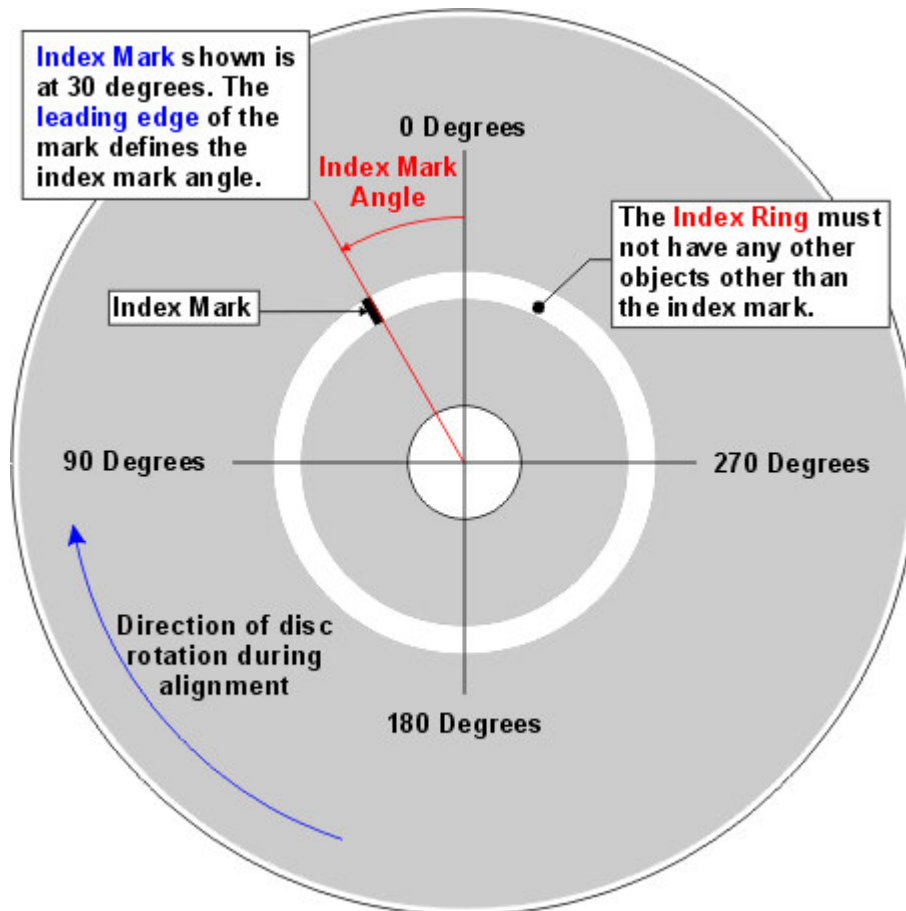


Figure 2: A Single Index Mark at 30 Degrees

Instead of a rectangular index mark, use the artwork as the index mark. As shown here, the black area covers the index ring for 180 degrees. When using this design, there **MUST** not be any other objects within the index ring area. This includes the white area on the right side, as well as the black index mark, shown with the dashed line. (The dashed line is not printed, but is there only for illustration.) Do not allow any objects to cross over the black index mark because it may cause a failure to occur. The index mark can be as large as 340 degrees.

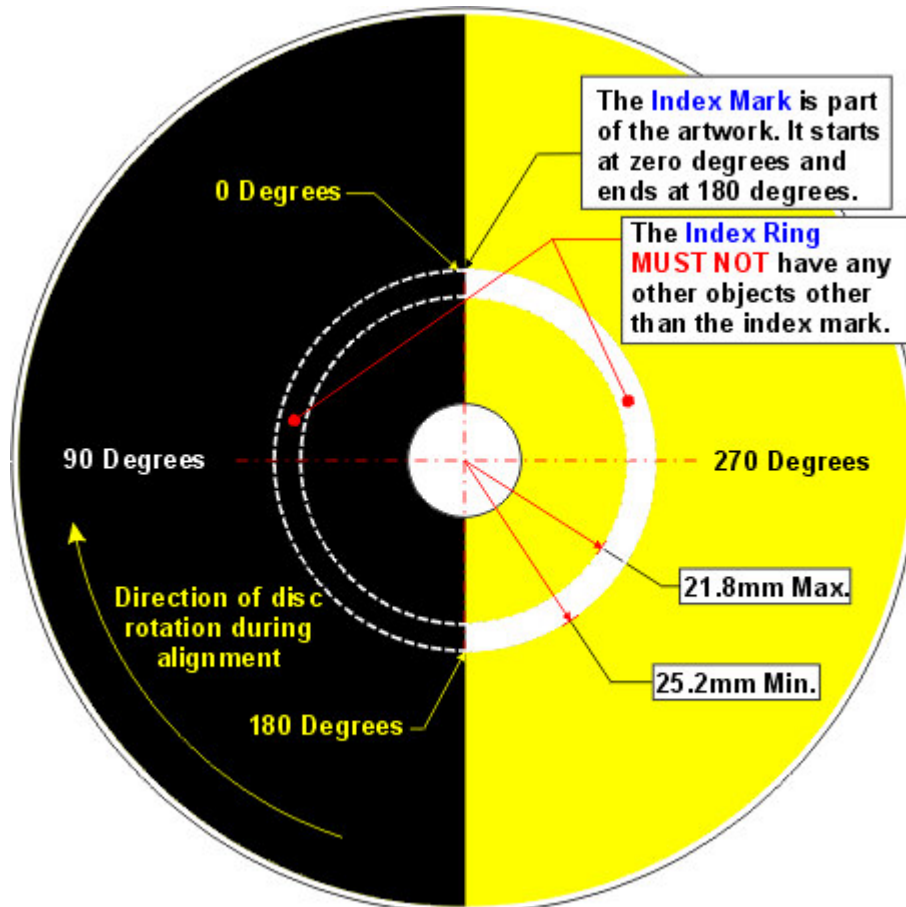


Figure 3: The Artwork is the Index Mark

### **Index Color**

The best index mark color is black, however the index mark could be cyan in color. Colors containing cyan can be detected with the index sensor. Some colors that contain cyan are blue, purple and green. Before ordering many silk-screen discs, run a test with the color of the index mark. Even though the index mark contains cyan, it may not be enough to detect the mark with high reliability. Also, some inks may not work because the way they reflect light. Rimage has a list of companies that have experience with the proper inks.

### **Background Color**

Acceptable backgrounds should not be silk-screened so the Rimage thermal printer can print on the disc. If a background color is desired, certain inks may receive the thermal ink. The acceptable colors could be white, yellow, magenta, or red. Any color containing cyan may cause problems if it is in the index ring. The disc shown in Figure 3 could have a yellow index ring matching the yellow background. Before coloring the background, as shown in Figure 3, the ink must be able to receive the ink from the thermal printer. Call Rimage for a list of companies that can silk-screen discs with the proper ink that allows the printer ink to adhere to the disc.

## **Positioning Accuracy**

Angular  $\pm 1^\circ$

Horizontal (X)  $\pm 0.75\text{mm}$  (0.03")

Vertical (Y)  $\pm 0.25\text{mm}$  (0.01")

Silk-screen printing systems typically can hold an image to disk registration accuracy of  $\pm 0.1\text{mm}$  (0.004").

## **Operations of Perfect Print**

When Perfect Print is enabled in the Production Server software, the system will use the Index Mark Angle parameter to align the disc with the printer prior to printing. The screened and printed images will be aligned to within system tolerances. Perfect Print adds roughly 40 seconds to print times.

The electronics uses a retro-reflective optical sensor to find high to low reflectivity (light to dark) changes as the disc rotates. The leading edge of the index mark may be placed at any angle (in steps of  $0.25^\circ$ ) in the artwork. A user parameter (*Index Mark Angle*) in the Production Server software tells the system the angle of the index mark.

## **Considerations for Successful use of Perfect Print**

In general, the disc surface must simultaneously meet the requirements for resin receptivity, media surface, and artwork placement in relation to the printed objects as described in the next paragraphs.

### **Surface Receptivity to Resin**

The surface of the disc to be printed must be receptive to the wax resin in the area to be printed. Most silk-screening processes leave the disc surface with a thin film that inhibits proper transfer of the resin from the ribbon to the disc. In light of the requirements for successful deployment of Perfect Print, prospective users of the system should obtain a couple of screened discs that will meet their quality requirements prior to purchasing many discs.

### **Media Surface**

The Rimage CD printer is a thermal transfer printer that must apply sufficient pressure to the print surface for proper imaging. The printhead in CD printer presses the ribbon against the disc surface developing a line of contact between the disc surface and the thermal ribbon. The disc and the ribbon move together past the stationary print head. The ribbon must be in direct contact with the disc surface over every pixel to be printed.

Media surfaces such as ink-jet printable and dithered silk-screen are too rough for successful thermal printing. Disc surfaces that are inherently smooth enough for successful thermal printing are spin-coated lacquer (blank discs); silk-screened with a single ink (major manufacturer's white, or silver thermally printable discs); and offset printed discs.

## Artwork Placement and Type

Placement of the artwork (silk-screen ink) is important so the thermal ink from the printer can be adhered to the disc. Dithered screen patterns, or some types of silk-screen ink do not allow the thermal from the printer to adhere to the disc.

Area #1 - provides the easiest way to ensure sufficient print pressure by having an open horizontal band spanning the entire width of the disc without any silk-screened objects, as in Area #1. The print can directly adhere to the surface of the disc.

Area #2 - is far enough away from the silk-screened ink so the printhead and ribbon contact the surface of the media. Adequate horizontal margin between screened objects and over-print is required. A distance of 3 mm works in most cases.

Area #3 - may have problems since the blue ink may lift the printhead away from direct contact of the disc. See the side illustration for a cross-sectional diagram.

Area #4 - prints well if the blue ink allows the thermal based ink to adhere to it. Most silk-screened inks do not allow the thermal ink to adhere to it. The blue ink must also be a solid ink, not a dithered pattern where two colors are spot processed on the disc. You can call Rimage Sales for companies that have experience with Rimage silk-screen requirements that adheres thermally based ink from the Rimage printer.

Area #5 - The blue ink adds some thickness and the black ink adds another layer of thickness. See the diagram to the left of Area #5. These steps of ink thickness can prevent the printhead from providing sufficient pressure over the print areas on the underlying surface.

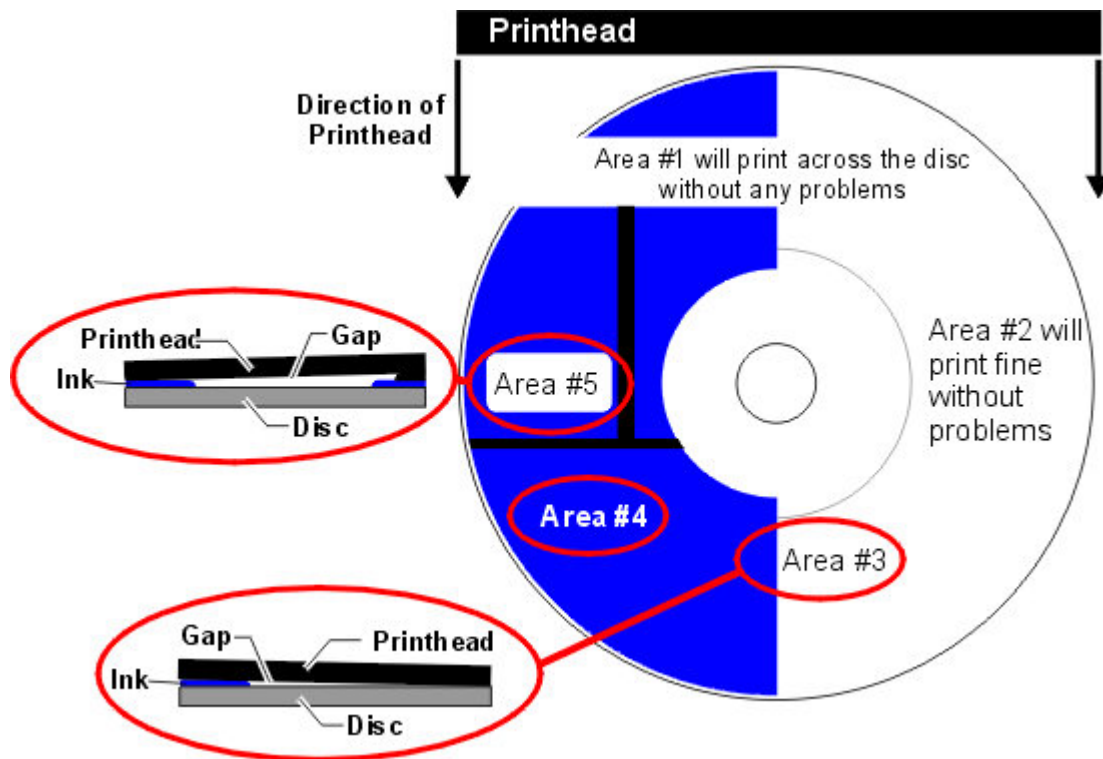


Figure 4: Examples of Good and Bad Placement