Disc Artwork Spec

All Disc artwork provided MUST follow this specification. Printing on a compact disc requires proper and precise preparation of artwork that is specific for the screen-printing process. To insure that the finished disc meets your quality expectations, please consult with CDRCITY customer service if our specification cannot be maintained or if you have any questions regarding these specifications.

Step I. Disc Artwork Requirements

Supported Platforms
- Macintosh Files
- PC Files

Supported Applications

In order to print high quality and high resolution CD, we require all CD artwork to be created in the following *Vector programs. Please note any CD artwork created in Photoshop (*Bitmap program) is not suitable for Silkscreen printing.

- Quark Express
- Adobe Illustrator
- Adobe Photoshop
- Corel DRAW

Additional desktop charges may be incurred if alternative programs are used.

Please note: Postscript files can be used; however, alterations can't be made if the file is out of our specification.

If you don't have access to the above applications, please contact Your Company customer service for assistance. We can also help you create the CD Artwork.

Color
- Preferably *spot color for your CD artwork (*PMS Color)
- *CMYK is also accepted; however, printing CMYK is more costly and longer turn-around. If spot color (PMS Color) can satisfy your requirement, please submit your CD artwork in PMS Color rather than CMYK. Refer to Step III for details on this issue. (Please see Four Color Process in Glossary).

Resolution
- All photo images or bitmap images should be saved at 300dpi. Refer to Step III for details on how to save your file at 300 dpi.

* Please refer to glossary for definition.

Line Width, Font, & Trap Specifications

Spot Color Line and Font Chart - Positive		Caps	Plain	Bold	Caps Bold
Font	.55 = 4pt = 1.4mm	ABCEEFGHIJ	abcdefghij	abcdefghij	ABCEEFGHIJ
Line Width	.007 = .5pt = .18mm				
Trap	.007 = .5pt = .18mm				
Spot Color Line and Font Chart - Negative		Caps	Plain	Bold	Caps Bold
Font	5pt	ABCEEFGHIJ	abcdefghij	abcdefghij	ABCEEFGHIJ
Line Width	.75pt				

Process Color Line and Font Chart - Positive		Caps	Plain	Bold	Caps Bold
Font	.83 = 6pt = 2.11mm	ABCEEFGHIJ	abcdefghij	abcdefghij	ABCEEFGHIJ
Line Width	.011 = .75pt = .26mm				
Trap	.007 = .5pt = .18mm				
Process Color Line and Font Chart - Negative		Caps	Plain	Bold	Caps Bold
Font	7pt	ABCEEFGHIJ	abcdefghij	abcdefghij	ABCEEFGHIJ
Line Width	1pt				

| Halftone Line and Font Chart - Positive		Caps	Plain	Bold	Caps Bold
Font	.97 = 7pt = 2.46mm	ABCEEFGHIJ	abcdefghij	abcdefghij	ABCEEFGHIJ
Line Width	.011 = .75pt = .26mm				
Trap	.007 = .5pt = .18mm				
Halftone Line and Font Chart - Negative		Caps	Plain	Bold	Caps Bold
Font	7pt	ABCEEFGHI	abcdefghi	abcdefghi	ABCEEFGHI
Line Width	1pt				

Step II. Disc Dimensions

There are 2 types of Disc coverage patterns. You may design the artwork according to either of the 2 dimensions. **Artwork exceeding the dimension limits will be altered to meet Your Company specifications at the customer's expense, as well as a possible delay in printing.**
34mm to 36" constitutes the stacking ring, which creates an uneven print surface on the printable area. The finished product may have a variation in the print quality at this dimension. One alternative is to knock out the stacking ring from the print area.
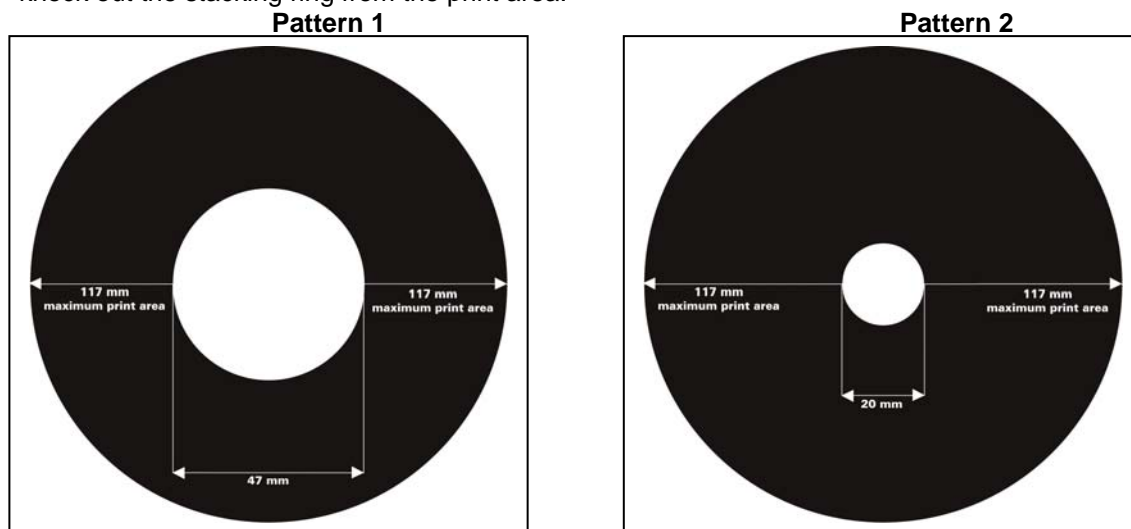
Pattern 1   **Pattern 2**

Printed Area

For pattern 2, please note: The lack of metalization in the inner area as well as the different reflectivity of the mirror band area may cause the color and or the overall appearance to vary if there is printing in these areas. A white flood coat will help to eliminate this effect.
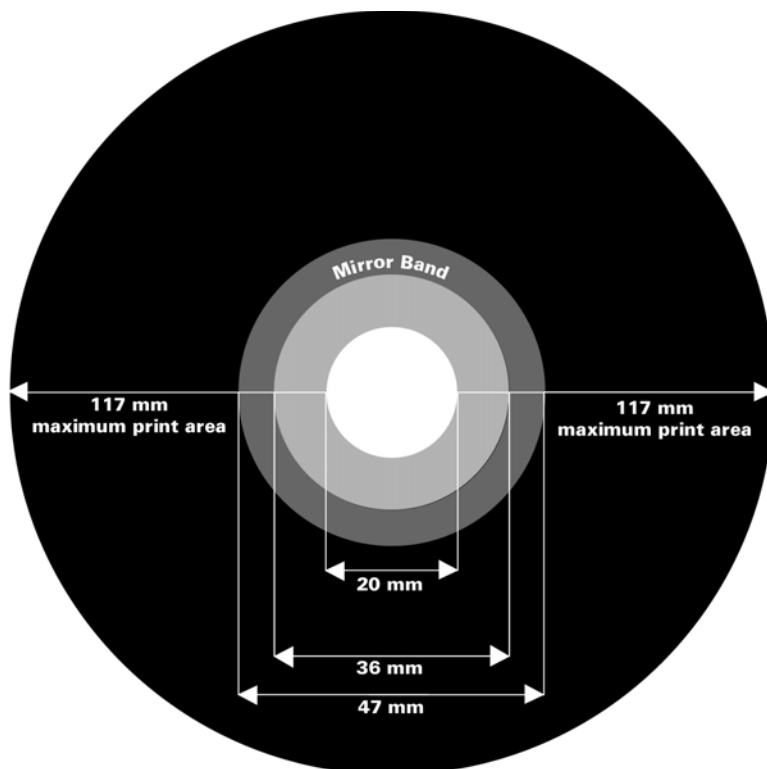
Step III. Creating the Disc Artwork

If you are familiar with print design, please skip to the following section. Otherwise, please read the following guide. If you wish to have a professional design studio create the artwork for you, please contact Your Company customer service for more information.

Step 1. Prepare image(s) or photograph(s) ready for print.

To start the design of your Disc Artwork, you will need to use a *bitmap design program to prepare your image or photograph. In this case, we recommend using Adobe Photoshop.
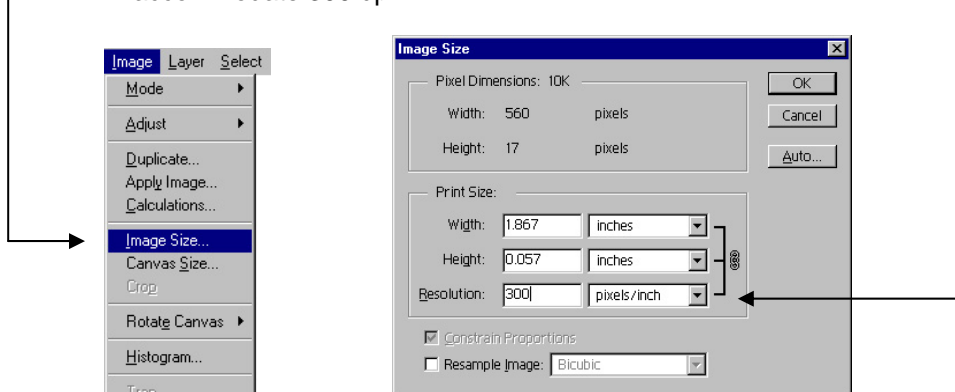
- Most of the image(s) or photograph(s) you have now should be in RGB. In order to send it to print, you need to convert the image(s) to CMYK. Click on "Mode - CMYK Color" under "Image" to convert image(s).
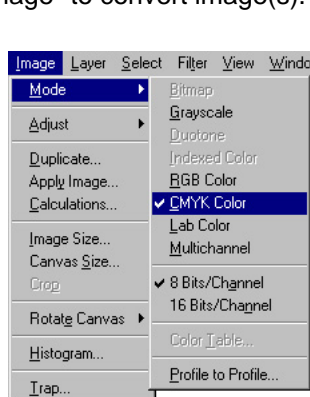
- Or convert the image(s) to Spot Color. In some cases, the image requires only 2 colors; you can convert the image to a duotone image.
  - Convert the image to Grayscale first by clicking on "Grayscale" under "Mode"
  - Then Click on "Duotone"; this will bring up a floating window
  - Select "Monotone", "Duotone", or "Tritone" under "Type" based on the number of colors your image consists of
  - In this example, Duotone is the selection. Click on the large color swatches to specify the *Spot Color you would like to use.
  - Click ok, now your image is converted to Spot Colors
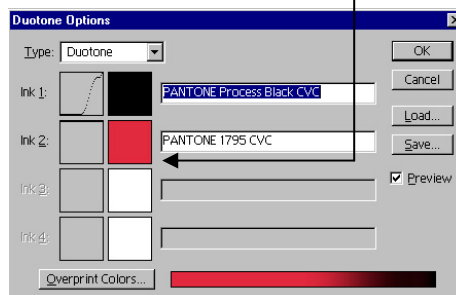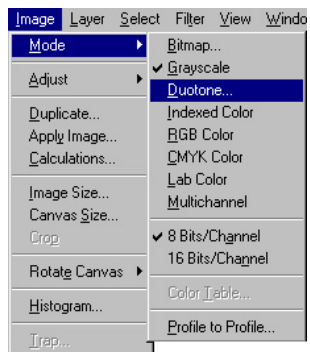
- Make sure you are not typesetting in PhotoShop. The text wouldn't be sharp and crisp. You'll need to typeset in a Vector layout program in Step 2.

- Before you save the final file, please make sure the image(s) and photograph(s) is already at 300 dpi.
  - Click on "Image Size" under "Image", this will bring up a floating menu.
  - If the number in "Resolution" box is already at 300 "pixel/inch", that means the image is already at 300 dpi.
  - If the number in "Resolution" box is not at 300, uncheck "Resample Image" and input 300 in "Resolution" box. This will allow the program to convert the image to 300 dpi without altering the image file size. However, the image dimension has been changed to accommodate 300 dpi.
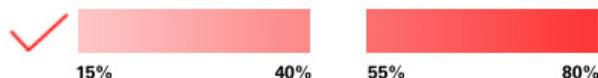
Image	Layer	Select
Mode		▶
Adjust		▶
Duplicate...		
Apply Image...		
Calculations...		
Image Size...		
Canvas Size...		
Crop		
Rotate Canvas		▶
Histogram...		

Image Size

Pixel Dimensions: 10K
Width: 560   pixels
Height: 17   pixels

OK   Cancel   Auto...

Print Size:
Width: 1.867   inches
Height: 0.057   inches
Resolution: 300   pixels/inch

☑ Constrain Proportions
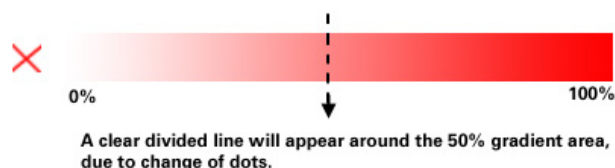☐ Resample Image: Bicubic

- Save the image in. TIFF or .EPS; these are two most suitable file formats for print. Now your image is print ready.

**Step 2. Layout the Disc Artwork in Vector Program**

Now you have the image ready, the next thing is to layout the Disc artwork based on the specific CD dimensions. The recommended vector programs are Adobe Illustrator, Corel Draw and Quark Express. In this case, we are demonstrating Adobe Illustrator 8.0.

- Choose the Disc pattern you would like to use; then create the CD rings based on the exact dimensions.
- Place the image you've just prepared into the CD ring.
- Make sure all the colors and swatches you are using are either CMYK or spot color. In most designs, CMYK process is not necessary to achieve the look and feel. Spot color is the best choice for any design that has less than 5 colors. CMYK not only is more expensive, it also requires longer turn-around time. Spot color presents a richer tone, consistent color for reprints, sharp and crisp text. You should also avoid gradient or "Vignettes". Gradient of halftone is not recommended because dot gain and tonal jump can cause a visible break line around the 50% range. If gradient is required in your design, make sure to run a gradient from 15% - 40% or 55% - 80% to avoid any possible problems.

0%   100%

A clear divided line will appear around the 50% gradient area, due to change of dots.

15%   40%   55%   80%

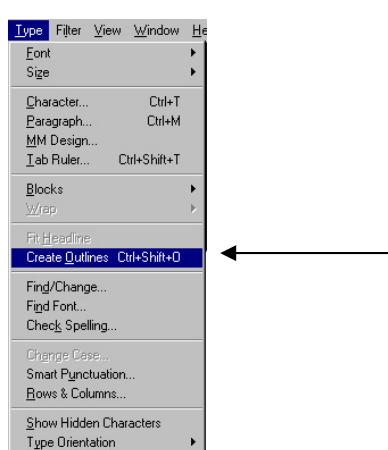- If your design consists of black background, please make sure to specify:

  Cyan (C)   0%
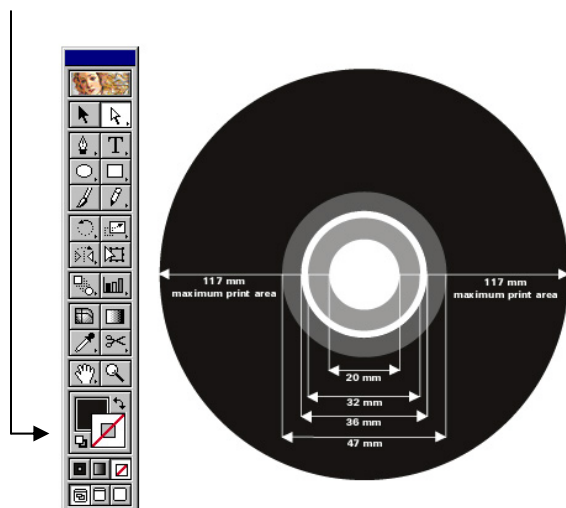 Magenta (M)   0%
  Yellow (Y)   0%
 Black (B)   100%
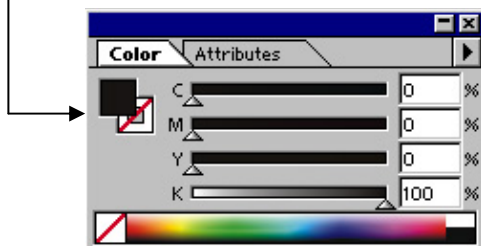
- Do all your typesetting in a Vector program. This will produce sharp, crisp text. Please refer to Line and Font section for minimum printable font size.
- After all the design and font setting is complete, make sure to convert all fonts to outlines (graphic) by clicking on "Create Outline" under "Type". After your design is finished, you'll need to submit the files to the film house. In some cases, they might not have the font you've used for the design. Therefore, you need to either convert the font to outline or save the fonts on the disc.

Type Filter View Window He	
Font	▶
Size	▶
Character...	Ctrl+T
Paragraph...	Ctrl+M
MM Design...	
Tab Ruler...	Ctrl+Shift+T
Blocks	▶
Wrap	▶
Fit Headline	
Create Outlines	Ctrl+Shift+O
Find/Change...	
Find Font...	
Check Spelling...	
Change Case...	
Smart Punctuation...	
Rows & Columns...	
Show Hidden Characters	
Type Orientation	▶

- Turn off all "Key Lines" which means turn off all Disc ring's outline.

- To create trim marks to define the position of your CD artwork. Select all items on the page, and then click on "Create - Trim Mark" under "Filter" to create trim mark around the CD artwork.
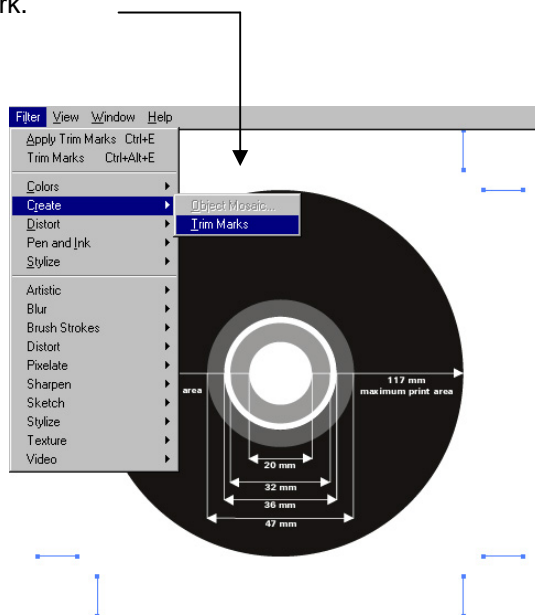

Save the Disc artwork in either .AI or .EPS format, before you send the file to film house. **Make sure to run a color separation and laser proof to ensure accuracy.**

Step 3. Color Separation and Laser Proof

- Running color separations is to show you exactly what color is used in the design.
- Click on "Separation Setup" under "File"; you will see a floating menu. On the center box, the color fields indicate what colors are used. If the design is created with CMYK, then you shall see a little "Printer icon" next to "Cyan, Magenta, Yellow, and Black". If only black was used, then you shall only see the "Printer icon" next to "Black".   If the design is done with spot colors, then you shall also see the specific spot colors indicated in the color fields.
- If you see any additional color that was not intended to be in it, make sure to go back to the design and fix the problem.
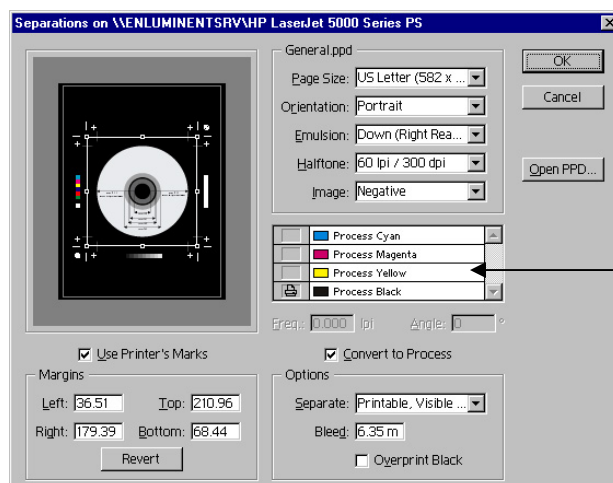
- Print the separation by clicking on "Print" under "File" and select "Separate" under "Output".
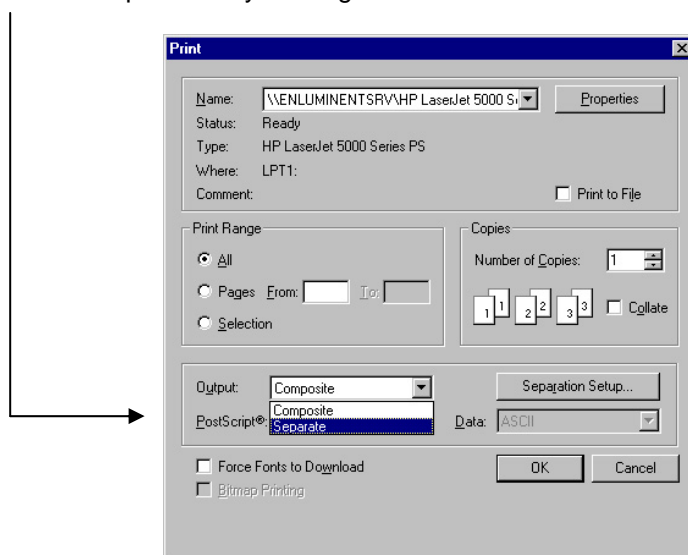
- Last but not least, print a laser proof to ensure accuracy.

IV. Disc Artwork Final Preparation Checklist

In order to ensure high quality Disc artwork output, maximize efficiency and quick turn-around time, and please make sure you've done the following.
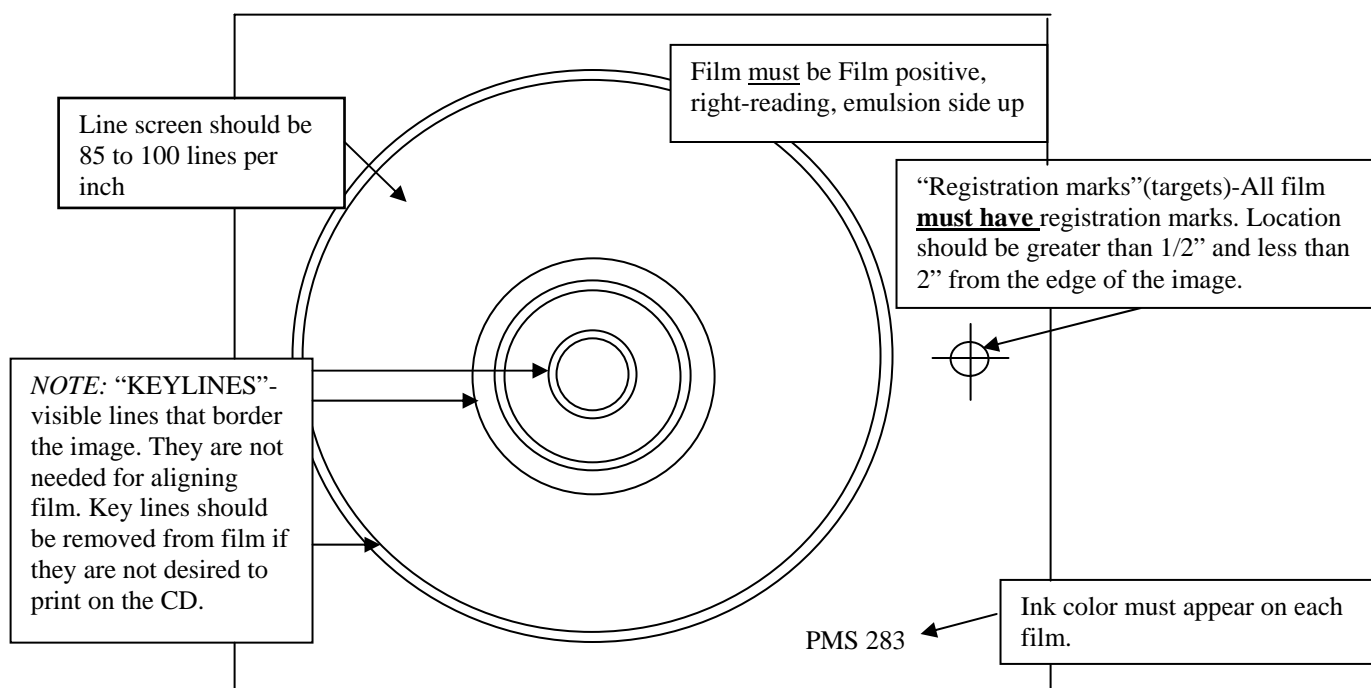
☐   Followed the exact Disc dimension specification

☐   All bitmap images are saved in either. Tiff or .EPS at 300dpi

☐   Artwork file is created either in spot color or CMYK

☐   Final Disc artwork is created in vector program

☐   All fonts are either converted to outline or included on the disc

☐   All linked files are included on the disc

☐   Must attach a color proof to ensure accuracy

☐   Provide laser separations

☐   Print file directories

☐   Provide only files needed for the job

☐   Provide contact information of the designer

Note: Laser proofs do not always output the same way as the image setter; monitor images do not always match hard proof images; all digital proofing devices do not output hues and values the same way.

Film Preparation

Film Requirements:

- DPI – output 2400 dpi (Dots per inch)
- Line Screen – 85 –100 lpi (Lines per inch)
- Dots – Elliptical Dots not Rounded Dots
- Line Screen Angle:
  - 60 degrees apart
    Yellow 0 degrees, Magenta 75 degrees, Cyan 15 degrees, and Black 135 degrees

Line screen should be 85 to 100 lines per inch

Film must be Film positive, right-reading, emulsion side up

"Registration marks"(targets)-All film **must have** registration marks. Location should be greater than 1/2" and less than 2" from the edge of the image.

NOTE: "KEYLINES"- visible lines that border the image. They are not needed for aligning film. Key lines should be removed from film if they are not desired to print on the CD.

Ink color must appear on each film.

PMS 283

- For best results, "Match Print" or an overlay proof (pulled from the film) must be supplied for all 4 Color Process orders. It is highly recommended that all orders, including those with spot colors, be supplied with a laser proofs.
- There are two areas on the CD that cannot be printed: The center hole, and 3 millimeters from the outer edge of the CD-ROM. These areas must be clear of any image/artwork. Artwork with images in these areas require revision and may be returned to customer for modification, or incur an extra engineering charge if Your Company is required to bring them into specification.
- A separate film is required for each color, (as well as the color sequence desired).
- Artwork, which joins two or more colors, is very demanding and we must have a trap/spread of 0.5pt or 0.18mm used when creating the film.

DEFINITIONS:

Bitmap Bitmap images are made up from pixels with different colors. When bitmap images are sized up, it usually increases the pixel size, which affects the overall clarity of the image. Any bitmap images, which are used for, print needs to be saved in 300 dpi. Bitmap is most suitable for photographs and images.   However, it is not suitable for type setting and illustrations.

Dot Pattern **Elliptical or oval shaped dot:** will provide the best results for screen-printing
Round shaped dot: Can influence the difficulties of screen-printing i.e. Gradients, vinnetts, and moiré.
Square shaped dot: Are not recommended for screen-printing.

DPI

Dots Per Inch. Specifies how many dots are contained in one inch of space. The higher the DPI, the more defined the document will be.

EPS

Encapsulated Postscript. A picture used when importing into a working document. Usually created in Photoshop or Illustrator.

FILM POSITIVE This type of film has the printable items in black, (emulsion side up).

FTP

File Transfer Protocol. Used to transfer data from one Internet address to another. If files are sent via FTP they should be compressed.

JPEG

Joint Photographic Experts Group. Similar to an EPS, but is used more for pictures or graphics. The quality of the image is lower than that of an EPS or TIFF.

Keyline

Visible lines that border the image (also known as a template). Keylines are used for positioning purposes only and should be removed if they are not meant to print.

LPI

Lines Per Inch. Specifies how many lines are contained in one inch of space. The higher the LPI, the more defined the document will be.

Match print

A color laminate proof made from the same film used for CD output.

Mirror Band Replicators manufactures information is located in this area (36mm – 47mm). Text could look different when no undercolor is used.

Moiré A checkered pattern either created by film separation or at the screen making process.

Registration Marks
Marks used to align film layers.

Stacking Ring The stacking ring will keep disc from touching other disc during the manufacturing Process.

TIFF Tagged - Image File Format. Similar to an EPS, but is used more for pictures or graphics.

Trapping   The manipulation of artwork or films to provide a slight overlap between adjoining images. Trapping can be accomplished electronically or manually.

Tonal Range   Percentage of the size of dot. Screen-printing can maintain between 15% to 85%.

Vector Graphic Graphics, which are made from calculations of x, y, z-axis. Therefore vector graphics can be resized indefinitely without becoming pixilated or losing clarity like bitmap images. It is most suited for typesetting and illustrations.

REGISTRATION MARKS / TARGETS
Typically cross hairs located at the top, bottom, right, and left (north, east, south, and west) of the artwork to insure each film will be properly aligned with the other films in the job, and centered properly on the screen.

LINE WIDTH AND TYPE SIZE
The screen-printing process does not reproduce of very small type or extremely small details well. This is particularly amplified when large / dense areas of print are combined with fine detail within the same color / screen combination.
See specified font and line widths under each print type.

SPOT COLORS
A spot color is used to print an area with a single PMS color, and Your Company can reproduce hundreds of colors using the Pantone Matching System (PMS). We can print a maximum of six (6) spot colors on a single disc. This includes a background color flood (donut) if requested. Minimum recommended line width is 0.18mm (.5 pt.) for lines Minimum recommended font size is 4pt. We request a trap / spread of 0.18mm (.5 pt) be used

FOUR (4) COLOR PROCESS (CMYK)
This process uses four (4) primary colors (CMYK) to produce photographic style images on a disc.
Separation requirements are as follows:
- Film angles for all elliptical dot shapes should be 60 degrees apart as follows = Yellow 0 degrees, Magenta 75 degrees, Cyan 15 degrees, and Black 135 degrees. If using other dot shapes (not recommended) use the standard 30 degrees apart = Yellow 0 degrees, Magenta 75 degrees, Cyan 15 degrees, Black 75 degrees.
- 85 to 100 line screens should be used.
- A tonal range (density) of 15% to 85% is recommended.
- A color match print or printed sample is required on all four (4) color process jobs and recommended for spot color jobs. If a color proof is not available, Your Company may have one made at the customer's expense.
- An elliptical dot shape is desired and most commonly used.
  Minimum recommended line width is 0.26mm (. 75pt.) for lines. Minimum recommended font size for four (4) color process is 6 pt bold.

BACKGROUND COLORS
For CD's using the Four (4) Color Process, the customer must specify if a white background (donut) is required. This is recommended to achieve a high quality image, as printing on the highly reflective surface of a compact disc will appear different to due the color proof being output on white paper; The white paper be representative of a white background donut. Print in the "Mirror Band" and/or in the transparent area between the stacking ring and the center hole may appear a different shade if a background donut is

not used. If a constant color shade is required in these areas, a background donut is highly recommended.

<u>HALFTONE PRINTING</u>

Continuous tone artwork such as photographs must be broken down into various size dots and colors before printing. All PMS (Pantone Matching System) colors are available for halftone printing, but as the dot size is reduced the color will appear lighter on the finished disc. Very fine dot sizes may not reproduce at all due to the mesh sizes used to prepare process screens.

- All art is required to be 85 to 100 lines per inch screen
- A tonal range (density) of 15% to 85%
- An elliptical dot shape is desired and most commonly used.
- With elliptical dot, film angles are 60 degrees apart.
  Minimum recommended line width is 0.26mm (.75 pt.). Minimum recommended font size for half tone is 7 pt.

Artwork and Silkscreen Issues

120mm Full CD Size: Outside Diameter 120mm / Inside Diameter 15mm

61mm CD Business Card Size: Outside Diameter (61mm X 80mm) / Inside Diameter 15mm

Printable Area:

CD: Outside Diameter 116mm to Inside Diameter 22mm
CD Business Card: Outside Diameter (59mm X 78mm) to Inside Diameter 22mm

Note: Stacking Ring area (34mm to 36mm) can not be printed

Registration/Center Marks
Make sure crop marks and registration marks are visible on all color separations for CD label art.

Accepted File Formats for CD Labels
We accept digital files saved at 300 dpi. in one of the following formats:

- Adobe Illustrator files (Ai)
- Adobe PhotoShop (PSD)
- QuarkXPress (QXD)
- Word (text only)
- Corel Draw 11
- EPS
- TIFF
- JPEG

These can be prepared on either PCs or Macintosh computers. PC formats is preferred. Please remember to provide all fonts or convert fonts to outlines. To further ensure accuracy, please provide a laser proof of the label.

A word about color
Photos and other artwork imported into any of these programs should be in CYMK color space. Pantone colors (we use coated PMS colors only) require special inks. Mixing and match these inks to the pantone color may increase your cost. Please be sure that all color work is provided in CMYK mode, and all black-and-white work is in grayscale mode. Files provided in RGB or indexed color mode will print incorrectly or not at all. Scanners scan in RGB mode, so remember to convert to CMYK before sending files for output.

White Flood Area
Ink will appear different when printed over the natural reflective CD surface in comparison to the white background of the computer screen or proof. For this reason, a white flood is used to ensure proper color matching. For 4 colors process work, this white flood measure 116mm, inner diameter 23mm. For 1 to 3 color work the flood area should be the same size as the artwork.

Resolution
it is important that scanned artwork has sufficient color information for proper reproduction. Your artwork should have a resolution of 300 dpi.

Customer Supplied Film
If you choose to provide film, the following specifications should be adhered to: Right reading emulsion up film positives. Please provide a proof with the film. Trapping is required when you supply your film for proper registration. Due to the nature of screen-printing, screen angles are somewhat different than the default angles most offset work use. Contact the Graphics Department for details.

The most common problems that occur with CD artwork:

1. Image (pixel-based) files are incorrect RGB files instead of correct CYMK files.

2. Linked graphics not supplied.

3. Layered image is flattened.

4. Fonts not supplied or not converted to outlines.

5. Registration/Center Marks not on every separation.