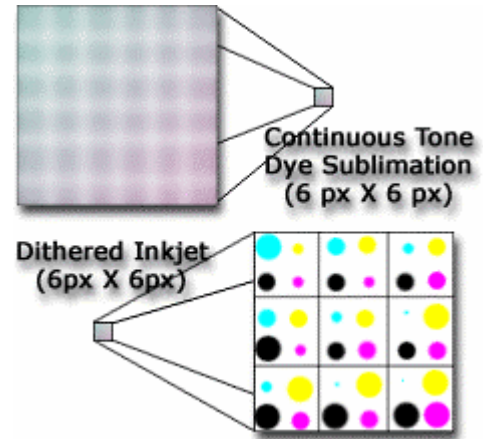


DYE SUBLIMATION PRINTING

There are two factors that contribute to the quality of dye sublimation printers. The first is continuous tone, and the other is un-dithered color. In dye sublimation printing, colors are not laid down as individual dots, as is done in inkjet printers.

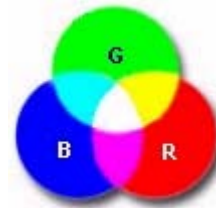
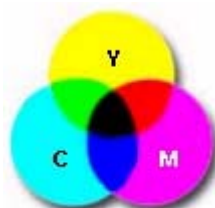
The color produced by a dye-sub is the result of the mixing of pigments to get the actual color. This is in contrast to most other printing methods which use a tight group of colored dots which, when seen by the human eye from a distance, appear to be a color (a process known as "dithering"). Under magnification, the dots are clearly different colors, and when seen close up with the naked eye the picture appears grainy. Because only one color needs to be printed (instead of up to four), a dye sub can place more dots on a card. It can take a 1200 dpi printer to get the same resolution a 300 dpi dye-sub printer is capable of.



Another difference that helps is that because the color sublimates on the card instead of being laid down as little dots, the edges of each pixel are blurred. This gives the impression of blending for a more natural appearance. Dots from an inkjet leave large white gaps in between pixels, giving the impression of a grain. Since longevity is something we all want from our prints, it's also comforting to know that because dyes sublimate instead of just being painted onto its surface, dye sublimation prints resist fading and are colorfast.

Subtractive Colour

This section contains some background material on the color process used in printing. The colors (Yellow, Magenta, Cyan) used in dye sublimation use a subtractive color process. Subtractive color starts with an object (often a substrate such as paper or plastic) that reflects light and uses colorants (such as pigments or dyes) to subtract portions of the white light illuminating an object to produce other colors. If an object



reflects all the white light back to the viewer, it appears white. If an object absorbs (subtracts) all the light illuminating it, no light is reflected back to the viewer, it appears black. It is the subtractive process that allows everyday objects around us to show color. Color paintings, color photography and all color printing processes use the subtractive process to reproduce color. In these cases, the reflective substrate is canvas (paintings) or paper/plastic (photographs, prints), which is usually white. Colour monitors, TV's, projectors etc. use the additive process.

Subtractive color process (YMC)

Additive color process (RGB)

In theory, overprinting all three colors produces black. In reality, a dark grey is produced, so black is used as a fourth printing ink. Hence the 'K' (for monochrome) in YMCK.

Printing

Due to the ceramic printhead being rigid the quality of the card surface is extremely important if high quality images are to be produced. Cards should be selected which are cut cleanly at the edges and have perfectly flat surfaces.

There are various card manufacturers and several different types of PVC card. Each of these will accept colour in differing amounts using the same printhead temperature. This is due to the PVC being used and the manufacturing process.

When printing a full colour card, the printhead will get progressively hotter as it works, this is compensated for in the printer firmware but it may affect how evenly some card designs print.

Dust and debris on the card surface will cause small white blemishes to appear in the image so keeping the cards and tacky rollers clean is imperative.

The printer creates the card by placing layers of dye onto the card in the following sequence:

Yellow:	(Y)
Magenta:	(M)
Cyan:	(C)
Black:	(K) or Resin black
Clear:	(O) or Overcoat

The coloured image is a combination of the Y, M, & C layers, which also produce a form of black.

The K Resin layer allows very sharp defined black text, barcodes etc. to be added. The Overcoat layer acts as a protective film against wear and fading and can also carry a secure image, which cannot be photocopied. (Ultra Secure)

Colours appearing on the monitor will not always be exactly the same as those printed by a printer; this can be due to various issues such as in transmitted light from the monitor colours can look different than viewing reflected light from the card. All monitors will show the same image slightly differently. Different plastic surfaces will give differing results and the dyefilm could vary slightly from batch to batch. For these reasons the **printer driver** has been designed to allow the user to adjust various aspects of the colour output.