



## Choosing The Correct Union White Plastisol



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- *Overview*

With so many white inks to choose from on the market today, it can become very confusing and frustrating when trying to choose the correct white plastisol to use as an underbase for flash curing applications. Is there one "miracle white" that does it all or is it necessary for printers to inventory more than one white ink? This paper will honestly answer those questions as well as deal and rate the best choices of Union Ink products to use as underbase whites. Squeegee, mesh, printing, flash curing and curing parameters will also be discussed.

- *What is Underbasing?*

Underbasing is a process where a white ink is printed on a dark colored shirt, placed underneath a drying unit called a flash cure dryer which brings the ink film to a minimum gel temperature and allows colors to be printed on top of the white underbase ink. Because this process basically turns the substrate you are printing on from a dark color to a white, it allows you to produce vibrant prints while utilizing medium opacity such as Union Unimatch and General Purpose inks such as Union Autoline and Ultrasoft.

- *What Union White Inks Are The Best Choices For 100% Cotton Dark Shirts?*

The best choice for underbasing 100% cotton dark shirts is either **PADM-1027 Bright Cotton White**. Bright Cotton White offers a creamy, easy-printing consistency that allows underbases to be printed through fine mesh counts and provides a smooth surface for overprint colors. Optical brighteners formulated in the ink give it a purer white color in appearance. Bright Cotton White has no after flash tack which is important if you cannot afford to sacrifice a print head as a cool down station (see section titled "Printing Parameters" for more information about cool down stations). If a printer wants to have one ink for an underbase, highlight white or standard white ink for 100% cotton, this is the ultimate choice. Bright Cotton White has no bleed resistance and should not be used on any dark garments that are constructed with polyester.

### **PADM-1020C Maxopake White**

Provides many of the same characteristics as Bright Cotton White and EZ Print White except it is not as pure a white in appearance and does not print as well through finer meshes (above 255).

**MIXO-1000 Mixopake White** works well for printers wanting one ink for 100% cotton also. The only disadvantage to MIXO-1000 is a print head on automatic presses may be sacrificed as a cool down station because of a slight after flash tack.

Up to this point, we have only discussed printing on 100% cotton fabric. Union Ink does not recommend the use of Low-Bleed white inks on 100% cotton. There are several reasons. The most important reason is that low-bleed inks can cause a condition known as "ghosting" on some colors of cotton. Ghosting occurs most often when a sensitive color of garment is printed and then stacked or folded when still warm. The anti-bleed ingredients in the low-bleed white then continue to outgas and can cause the dye of the garment above to fade and create a ghost image. This phenomenon can occur with all brands of low-bleed ink. It is rare but it can really ruin your day when it happens. Union Ink places a warning about this phenomena on the label of all of our low-bleed inks.

- *What Inks Are The Best Choices For Polyester or Polyester Blend Garments?*

Because shirts containing any amounts of polyester are prone to dye migration (bleeding) specially formulated ink must be used on this substrate. This ink is manufactured with special ingredients to prevent the dyes of the shirt from migrating through the ink film. Consult the Union Ink Catalog section "General Information About Plastisol Inks" for more information on the causes and prevention of dye migration.

Even though **PLHT-1055 Lightning Low-Bleed White**, **PLHT-1070 Diamond White** and **POLY-1050 Low-Bleed White** provide excellent results when used as underbase whites some caution should be followed in the print

technique. Low-bleed whites are typically formulated with special resins, fillers, and plasticizers designed to stop dye migration. Some even contain a small amount of blowing agent (commonly used to manufacture puff inks) in order to increase opacity and maximize their bleed resistance. These ingredients can cause an uneven printing surface for your subsequent colors if the ink deposit is too thick and requires a longer flash time. Printers should be careful to use screens tensioned to manufacturer's specifications and adjust their off contact and squeegee pressure in order to print the ink on top of the garment instead of pushing it through the garment onto the platen. This thin ink film provides a smoother surface for overprint colors as well as a faster flash time. Many printers successfully use the PLHT-1055 Lightning White as an underbase white through 160 and higher mesh count screens. The superior bleed resistant of Lightning White also helps blocks dye migration as long as the entire ink film reaches 300 degrees Fahrenheit during the curing process.

- *Mesh Specifications For Underbase Whites\**

**MIXO-1000, PADM-1020C, PADM-1027, PLHT-1055, PLHT-1070 and PATH-1050**  
(listed in threads/inch, for metric sizes, divide by 2.54)

Simple block areas: 160-180 (Manual Press) 200-230 (Automatic Press).

Detailed images: 160-230 (Manual Press) 230 (Automatic Press).

Fine line halftones: 200-230 (Manual Press) 230-305 (Automatic Press).

- *Mesh Specification For Overprint Colors\**

Simple block areas: 200 (Manual Press) 260 (Automatic Press).

Detailed images: 230 (Manual Press) 305 (Automatic Press).

Fine line halftones: 260 (Manual Press) 350 (Automatic Press).

Highlight whites: 180-305 (Manual or Automatic Press)

\*These are guidelines only and may need to be varied depending upon the amount of detail and the number of colors in the design

- *Printing Specifications*

Underbase screens on your automatic or manual press should be set off-contact in order for the ink to clear the screen cleanly. A screen set at the proper off-contact (0.040" to 0.100") and with good screen tension (25 newtons or greater) works best. With improperly tensions screens or too much off-contact, it may be necessary to double stroke the underbase to clear the ink from the screen cleanly and provide the smoothest surface for the overprint colors.

Squeegees should be set at a slight angle and with just enough pressure applied to clear the ink from the screen. It is recommended printers using automatic presses back off the squeegee pressure until the ink does not print and then slowly increase the pressure until the desired underbase print is achieved. Remember, you are trying to print the ink on top of the garment, not drive the ink through the garment. If the print starts appearing on your platen you are probably using too much pressure.

If possible, overprint colors should be printed from the smallest to largest area of coverage in order to minimize pick-up on the backs of the screens. Squeegee pressure is important in this stage because you are now printing on a piece of non-absorbent vinyl that is not as forgiving as an absorbent garment. Too much pressure will cause the colors to smear. To alleviate this problem either use a lighter pressure during the print stroke or utilize finer mesh counts for overprint colors.

- *Flash Curing the Underbase*

Your flash cure unit must be large enough to not only cover the design but should be at least 4" larger than the design you are flash curing. Some of the smaller 16 inch square units can barely cure a 14 inch design much less the oversized prints in demand by customers today.

The flash cure unit should be positioned above the design so you can get a partially cured print in a matter of 3-5 seconds while not burning the garment. Plastisols will reach what is called the gel temperature at approximately 240 degrees Fahrenheit. The temperature can be measured with either a temperature strip or temperature probe available from Union Ink Company. **Caution: Be careful not to fully cure the underbase ink.** An overprint color may not adhere to a fully cured underbase and flake off after the shirt is washed. Another indication of

overcuring the underbase is if little pinholes of white can be seen through the overprint color. If so, lower your flash cure temperature or raise the height of the flash cure unit.

After flash curing the underbase white, the ink may seemr sticky even though it is fully gelled. This is called “after-flash tack” and usually occurs in inks not specifically formulated for flash curing. It occurs more frequently on automatic presses because of the production speeds. This tack goes away in a few seconds but slows down production in the meantime.

To eliminate this problem a cool down station may be necessary or fans may be needed between print heads to cool down the underbase print. For example, on a six color press the underbase would be printed on head #1, flash cured on head #2, head #3 would be empty and used as the cool down station. The overprint colors would be printed on heads #4, #5, and 6. Because of the cool down station you will be limited to three colors. This is why the best choice is to use ink specifically designed for underbasing where after flash tack is not a factor.

On manual presses with rotary table platens “after flash tack” is usually not a factor because the underbase has had sufficient time to cool and lose the tack before the print comes back around for the overprint colors.

- *Disclaimer*

Customer testing is required and should be mandatory with this product or any new product or process before running production. Our technical advice and recommendations given verbally, in writing, or by trials are believed to be correct. They are not binding also with regard to the possible rights of third parties and do not exempt you from your task of examining the suitability of our products for the intended use. We cannot accept any responsibility for application and processing methods that are beyond our control, nor can we accept responsibility for misuse by you of the products or use by you of the products outside the specified written instructions given with the products. User must protect sensitive skin, exposed wounds and eyes from contact with products.

- *For More Information*

This paper was written and produced for your information by the staff of Union Ink Company. For more information about this product, process or any other Union Ink product please call McBee Supply at 1-800-622-3304 or Union Ink at 1-800-526-0455.