

70G Series UV/LED Curable Ink System

The 70G Series is a one-part, dual cure ink system formulated to meet the extreme requirements needed for printing on high end glass and plastic bottles commonly used in the container market. As a dual cure system, the 70G Series can be cured with either UV or LED systems with a peak wavelength between 365-405 nm or with traditional UV mercury vapor or iron doped curing systems.

Primary Fields of Application

Printing on Glass

To achieve optimum adhesion, chemical and water resistance, Norcote® strongly recommends a flame pretreatment immediately prior to printing. Flame treatment is critical for adhesion to cold end coated glass. The use of Pyrosil® or Uvitro® is highly recommended.

Printing on HDPE

For optimal adhesion a dyne level above 42 is strongly recommended. This is best achieved through a flame treatment immediately prior to printing.

Soft touch bottles, HDPE containers with a high percentage of PCR, pearlescent or metallic pigments in the outer layer may require a higher dyne level for optimal adhesion.

Printing on Polypropylene

For optimal adhesion a dyne level above 42 is strongly recommended. This is best achieved through a flame treatment immediately prior to printing.

Differences in polypropylene and in the molding process can affect the surface characteristics of the container. It is important to fully test polypropylene prior to a production run.

Testing for Container Treatment

The use of the water dip method can be used press side to determine the adequate surface treatment. When dipped in water that is at ambient temperature, the water immediately sheet off the bottle evenly. Areas of reticulation or poor sheeting signifies surface contaminants and/or inadequate surface treatment.

Secondary Fields of Application

The 70G Series has been shown to adhere to a wide range of materials including but not limited to flat sheet HDPE, PET bottles, LDPE bottles, corrugated polyolefins, coated and uncoated metals. Due to the wide diversity of surface characteristics and ink receptiveness within like materials, Norcote® strongly recommends testing for end use suitability prior to printing.

Printing Recommendations

Ink Adjustments

Prior to printing, all inks should be mixed thoroughly until homogeneous. During print runs, ink should be mixed if they stand longer than 3 hours in a covered container. It is possible for ink components to separate in the container.

The 70G Series has been formulated to be used right from the container without the need for press side additives. If viscosity adjustments are necessary, 70G-070 Thinner can be used up to 10% by weight.

The 70G Series is a highly thixotropic ink series. Type of presses and speed of printing can thin out the ink system without adding thinners. Allow the press to "settle in" prior to making additions of thinners or other additives to the ink system.

Additions of thinners can have an adverse effect on cure and adhesion of the ink system. Adhesion testing should be conducted after additions of thinner is made.

Note that variations in ambient temperature can affect ink characteristics such as flow properties, print definition, opacity, static and color.

Do not microwave this product.

Mesh:

Plain weave low elongation polyester mesh of 305 (120 cm²) threads per linear inch and above is recommended. Screens should be brought to tension allow for low off contact and good snap off.

70G-1056KG6 Opaque Bright White and 70G-4000KG4 Jet Black have been formulated to maintain opacity and density when printed through mesh counts between 380.33PW and 460.27PW. Lower mesh counts should be avoided as it could result in poor cure, adhesion and durability of the printed ink film.



Stencil

All direct emulsion and capillary films (<25µm prior to application) that are compatible with UV/LED inks are acceptable.

Squeegee

Squeegees that are resistant to chemical attack by monomers commonly found in UV/LED inks are recommended.

Curing Parameters:**UV**

400 wpi mercury or iron doped lamp with an average minimum output of 300 mJ/cm² with 800 mw/cm² is typically sufficient to achieve full cure. Some substrate colors such as transparent blue, green or amber PET, and black may require a higher mJ and mW output to achieve full cure.

LED

8-20 w/cm LED systems with a peak output between 365-405 nm are recommended. Factors such as lamp distance to the substrate should be taken into account when testing for adhesion using LED systems.

Inks that cure under LED systems are highly sensitive to ambient light exposure. Extra care must be taken to avoid excessive exposure to light sources such as incandescent, fluorescent and LED lights (scatter).

Full cure depends on several factors such as ink film thickness, opacity, bulb type, energy output (wpi) and substrate color. Testing for full cure before and throughout the print run is strongly recommended.

Adhesion:

The 70G Series is a non-visual post curing system. Further cross-linking will continue up to 24 hours after printing, however the ink film should pass a basic cross hatch or tape adhesion test after exiting the cure unit and cooling to room temperature.

For difficult to adhere to substrates the following additives can be used:

70G-000KG4	up to 10% by weight
CUR-800*	.5% - 1% by weight
ADC-172* ¹	up to 7.5% by weight
ADH-067* ¹	up to 7.5% by weight
DK-072	up to 1.5% by weight

**Additives are highly reactive and will give inks a pot life between 4-8 hours. Additives should only be added to the amount of ink that can be used during that time frame and immediately prior to printing.*

¹Additives react chemically, independent of the curing process. Full adhesion characteristics will be realized 12-24 hours after full cure.

Intercoat Adhesion

70G Series has increased marking and scuff resistance properties. All though loss of intercoat adhesion is unlikely, adhesion between layers of ink should be monitored throughout the print run.

Mixing / Intermixing

All inks should be thoroughly mixed before and during the print run. Thorough mixing can be achieved by hand with an ink knife that reaches the full depth of the container or using an air mixer on medium speed.

70G Series can be intermixed with Norcote PPC Series inks at no more than 10% by weight. Re-test all adhesion and end use characteristics prior to the full print run when intermixing the 70G Series with the PPC Series. It is not recommended to mix the 70G Series with any other ink series.

Water Resistance

If water resistance is required, the cooled ink film must pass a cross hatch/tape test. Norcote recommends that thorough testing be conducted to ensure conformance to the specific water resistance requirements prior to the production run.

Metallic Pastes & Pigments

70G-000KG4 Mixing Base Metallic is recommended when using metallic pastes and /or pigments. Metallic pastes and/or pigments will reduce the pot life to 8-10 hours. Only mix enough product that can be consumed within that time.

Metallics:

Most metallic pigments work well with 70G-000 Metallic Mixing Clear. The increased viscosity helps to stabilize pigment suspension. Recommended mixing ratios are (by weight):

040 Gold Paste:	up to 20%*
042 Silver Paste:	up to 8%
044 Red Gold Paste:	up to 20%
046 Copper Paste:	up to 15%
038 Silver Powder:	up to 15%
240 Liquid Gold:	up to 30%
243 Silver Metallic:	up to 30%

Select mesh with openings large enough to transfer the metallic pigment of choice; generally a mesh count of 195-305 PW are recommended.

Using Metallics:

Metallic pigments will reduce the shelf life of ink mixtures. Actual shelf life will depend upon individual users conditions. As a general rule it is recommended to only mix enough metallic ink for one day.

**040 Gold Paste should be stored between 64°-95°F (18°-35°C) to avoid solidification. If this occurs, reliquify the paste by placing it in an area with a temperature of 77°-95°F (25°-35°C).*



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Whites, Blacks & Clears:

70G-311KG6 Opaque CMG White:

Non tinted white used for color matching. This white has been formulated with a higher photoinitiator load to help cure difficult color matches. Can also be used as an Opaque White.

70G-1054KG6 Opaque White:

Reduced opacity compared to the 70G-1056KG6 Bright Opaque White for use with a wider range of mesh counts (305.34PW – 460.27PW). Higher mesh counts will reduce the opacity of the printed ink film.

70G-1056KG6 Bright Opaque White:

Very opaque blue shade white that has been formulated to print through mesh counts of **380.33PW or higher**. Lower mesh counts are not recommended as full cure will become difficult.

70G-1046KG6 SR White:

For use in applications that require a high degree of surface durability, scuff and mar resistance. **This product will not inter-coat with other 70G colors.**

70G-1068HVKG6:

High Viscosity Opaque White: High viscosity white for long production runs where ink shear begins to thin out inks. Mesh counts of 380.33PW or higher is recommended due to the superior opacity of the product.

70G-1019KG4 Opaque Black:

Formulated for use on dark colored bottles and for color matching. When printed on natural or clear bottles, color could appear gray in color.

70G-4000KG4 Jet Black:

Deep, rich black formulated to print through mesh counts of 380.33PW or higher. Intended for use on natural and semi opaque bottles.

70G-000KG4 Mixing Base:

Metallic Clear base with increased photoinitiator loading, to assist in the curing of metallic, fluorescent and other pigments added, for special effects. Additions of metallics, fluorescent and other, special effect pigments or products should not exceed recommended loading.

70G-049KG4 Mixing Base:

Standard Clear that is designed to be used in color matches and inks where translucency is required. This product is not designed to use, as an overprint clear. Photoinitiator load does not include the LED wavelength. If using more than 50% by weight, full cure will be obtained under standard cure units only.

70G-049LEDKG4 LED Mixing Clear:

Clear that is designed to be used in color matches and inks where translucency is required. This product is not designed to use as an overprint clear. Photoinitiator load does include the LED wavelength.

70G-759KG High Viscosity Mixing Base:

Metallic Clear base with increased photo initiator loading, to assist in the curing of metallic, fluorescent and other pigments added, for special effects. Additions of metallics, fluorescent and other, special effect pigments or products should not exceed recommended loading.

70G-249KG4 Crystal Overprint Clear:

Clear that is designed to be used as an overprint clear directly onto containers or other colors of ink. Photo initiator load includes those that will cure under the LED Wavelength. This product is extremely sensitive to incandescent and ambient light. Keep all lids on containers when not in use.

70G-239RCKG4 Crystal Clear Overprint Clear – Roller Coat:

Clear is designed to be used as an overprint clear directly onto containers or other colors of ink by roller coating process. Photo initiator load includes those that will cure under the LED Wavelength. This product is extremely sensitive to incandescent and ambient light. **Keep all lids on containers when not in use.**

0D70G-2808-A4KG4 Matte Clear – Roller Coat:

Clear is designed to be used as a fine matte clear directly applied onto containers or other colors of ink by roller coating process. Photo initiator load includes those that will cure under the LED Wavelength. This product is extremely sensitive to incandescent and ambient light. Keep all lids on containers when not in use.

Standard Colors:

Standard colors have been formulated to cure under medium pressure mercury vapor lamps with a peak wavelength of 320-290 nm (UVA) and/or 8 watt or greater LED lamps. For best results, LED printing systems should be assisted with one medium pressure mercury vapor lamp (standard UV lamp) at the end of the print bank. For LED cure systems less than 6 watts, contact Technical Service at info@norcote.com for recommendations to achieve full cure.



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Standard Colors:

- 70G-012KG4 Radiant Yellow ¹
- 70G-016KG4 Brilliant Yellow ^{1 2}
- 70G-019KG4 Permanent Orange ¹
- 70G-021KG4 Cha Cha Red
- 70G-022KG4 Red
- 70G-023KG4 Rhodamine Red
- 70G-024KG4 Rose
- 70G-030KG4 Emerald Green
- 70G-031KG4 Spruce Green
- 70G-034KG4 Permanent Blue
- 70G-035KG4 Violet
- 70G-037KG4 Reflex Blue ²
- 70G-2313KG4 Lightfast Yellow
- 70G-2233KG4 Opaque Yellow ¹
- 70G-2872KG4 Lightfast Orange

The 70G Series is sold by weight, not by volume. The “KG” designation of the part code indicates how many kilograms of product are contained in a US gallon container. This product is also sold by the kilogram.

- ¹ May not be suitable for lightfast applications. Prolonged exposure to direct sunlight is not recommended.
- ² Avoid using in color matches as these colors contain multiple pigments.

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Fluorescent Colors:

Fluorescent colors are available upon request. Fluorescent pigments are not light-fast beyond 60-90 days even with an overprint clear. For maximum brightness and color stability 230-260 plain weave monofilament mesh counts are recommended. Please contact our Color Match Department for more information at 800-488-9180.

Precautions:

Avoid direct contact of ink with skin and clothing. If contact occurs, wash affected area with warm soapy water and dry thoroughly. If eye contact occurs, irrigate the area with water for 15 minutes and consult a physician. Remove contacts after flushing. For more specific information refer to the relevant safety data sheet.

PVC Plastics:

Decoration can aggravate embrittlement properties of PVC plastics which can lead to cracking and failure of the plastic. It is strongly recommended that the end user contact the polymer manufacturer to obtain information on the suitability for decorating with a UV ink as well as recommendations for molding/processing to reduce this potential. As every situation can not be tested for in a laboratory environment, it is the responsibility of the end user to determine the suitability of the products chosen for an end application.

Storage & Available Warranties:

All **70G** Series inks should be stored in tightly closed, black polyethylene containers in an area with the temperature not to exceed 90°F (32.2°C). Avoid direct sunlight and indirect white light. Excess ink from print runs should be stored in separate containers to avoid contamination and is not covered under any warranty. When stored under these conditions, Norcote® warrants the 70G Series standard inks shall be free from defects in material and manufacture until the expiration date shown on the product label. **Norcote® will not warrant any custom colors containing metallic pastes or any ink intermixed competitor products.** Any warranties provided will be limited to the price paid for the actual products used which give rise to the warranty claim.

This Technical Bulletin is intended to be used for informational purposes only, and is in no way intended to create any warranties or other obligations on behalf of Norcote®. All warranties, terms and/or conditions for a particular product will be specified on the applicable invoice and are only valid upon the creation of a legally binding contract.

Testing:

Due to the inability of Norcote® to anticipate or control the conditions under which the products and information relating thereto will be used and/or stored, Norcote® cannot guarantee the result obtained from using the products. Any suggested Uses are merely representative, and because the final product will depend on a number of specific factors, the end user should pretest all substrates with the product to use in production.

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