Norcote Technical Bulletin

88 Series
UV Curable Ink System

Suggested Uses:
The 88 Matte Series inks are recommended for use on polyethylene (container & flat sheet), some polypropylene-flat sheet, soft vinyl's (French calf, suedene, patent, etc.), most decal material, PETE, PETG, many polyesters (print- treated and top-coated), PVC, polycarbonate, paper and card stocks, styrene, some coated metals and most acrylics and book cloths. **It is the responsibility of the end user to pretest all substrates with Norcote® products prior to use in production.**

Product Features
- Matte Finish
- Chemical Resistant
- Excellent Intercoat Adhesion
- Multi-purpose Product
- Opaque
- Quick Curing
- Resistant to Blocking

Printing Recommendations:
All inks should be thoroughly mixed prior to use. Inks are supplied at print ready viscosity for most applications. If adjustment is needed the 88-070 Thinner or 88-049 Overprint Clear can be used to thin the ink.

Mesh:
A mesh count of 305-355 threads per linear inch (120-140 cm^2) low elongation, monofilament polyester is suggested. Tension should range from 18-25 N/cm^2 on a rigid frame.

Stencil:
All direct emulsions and thin capillary films (15-25µ before application) compatible with UV inks are acceptable.

Squeegee:
A sharp 80 shore durometer polyurethane squeegee is preferred. Inks can be printed with durometers ranging from 60-90 as well as dual durometer squeegees.

Curing Parameters:
Norcote® 88 Series inks cure only when exposed to UV light of the proper wavelength. Curing speeds depend on several factors including ink film thickness and the energy level of the lamps. Ink should be cured immediately after printing.

Curing Equipment:
88 Series inks work well with one 300 watts/in (120 watts/cm) or two 200 watt/in (80 watts/cm) medium pressure mercury vapor lamps. The 88 Series inks will cure up to 100 feet per minute (30 meters per minute) with most focused UV curing units.

Screen Cleaning:
Most conventional solvent cleaners work well. Norcote's® NSW-824 Screen Wash is an environmentally friendly cleaner proven effective with UV and other inks. It is available in 1 and 5 gallon containers or 55 gallon drums. Refer to the NSW-824 technical data sheet for additional information. Alcohol based solutions must be avoided as they break down the emulsion.

Coverage:
Approximately 2,500 square feet per gallon (230 square meters per gallon) depending on printing variables affecting ink film thickness and coverage.

Mixing:
All Norcote® 88 Series colors are intermixable. The 88 Series matte inks may be combined with the 80 Series gloss inks to achieve a wide range of gloss levels.

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. For more specific information, refer to the relevant Material Safety Data Sheet.

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Adhesion:
The 88 Series is a nonvisual post-curing system. Although further cross-linking occurs up to 24 hours later, the 88 Series inks should pass a crosshatch tape test, (ASTM #D3359-97), using 3-M 600 tape after exiting the curing unit and cooling to room temperature. Maximum chemical and abrasion resistance and adhesion will be attained after 24 hours. 800 Initiator may improve adhesion and surface durability.

Intercoat Adhesion:
88 Series inks intercoat adhesion is excellent. Although loss of intercoat adhesion is difficult, it should be monitored throughout the production run especially when printing 6 or more passes.

Weatherability:
The 88 Series inks are not weatherable.

Scoring and Folding:
The 88 Series inks provide fair results under controlled scoring and folding conditions. To obtain acceptable results, the 88 Series inks must pass a cross-hatch tape test. Highly pigmented inks and inks with special effects pigments may not score and fold well. For further details contact the Technical Service Department.

Chemical Resistance:
The 88 Series inks have been exposed to a variety of chemicals to determine chemical resistance. The 88 Series inks proved to be resistant to most common chemicals when properly cured.

Metallic Colors:
Most metallic pigments work well with the 88-049 Overprint Clear. Ability to cure a suspension is related to pigment load and UV exposure. Select mesh with openings large enough to transfer the metallic pigments of choice; generally a mesh count of 305 threads per inch (120/cm) or lower is required. Metallic pigments will reduce the shelf life of 88 Series ink mixtures. RECOMMENDATION: Mix only enough metallic ink for one day.

Color Range:
Specific colors can be matched at Norcote® against prints, wet ink or PANTONE® numbers.

Standard Colors:

Matte Mixing White	002
Matte Mixing Black	005
Matte Brown	007
Matte Radiant Yellow	**012 •**
Matte Brilliant Yellow	016
Matte Medium Yellow	017
Matte Permanent Orange	**019 •**
Matte Red	022
Matte Rhodamine Red	023
Matte Rose	024
Matte Magenta	026
Matte Emerald Green	030
Matte Spruce Green	031
Matte Permanent Blue	034
Matte Violet	035
Matte Reflex Blue	037
Matte Peacock Blue	038
Matte Clear	049
Matte Lightfast Yellow	2313
Matte Lightfast Orange	2872

• May not be suitable for lightfast applications and is not recommended for prolonged exposure to direct sunlight.

Process Colors:

Halftone Base	060
Halftone Process Cyan	080
Halftone Process Magenta	081
Halftone Process Yellow	082
Halftone Process Black	083

Fluorescent Colors/JZB's:

Aurora Pink (Blue shade)	11 B
Aurora Pink (Yellow shade)	11 Y
Rocket Red	13
Fire Orange	14
Blaze Orange	15
Arc Yellow	16
Saturn Yellow	17
Signal Green	18
Horizon Blue	19
Corona Magenta	21

Metallics:

Gold Paste	040	• (See Note)
Silver Paste	042	
Red Gold Paste	044	
Copper Paste	046	
Rich Gold Ink	240	
Silver Ink	242	

• 040 paste should be stored between 18C-35C to avoid solidification. If this occurs, reliquify the paste by placing it in an area with temperatures of 25C-35C.

Key Additives

Thoroughly mix all additives both prior to and after addition into base inks. Store additives in a tightly sealed container.

065-Flow and Bubble Control:
Used to control bubbles which may occur in the wet ink film upon screening. This effect is primarily observed during screenprinting on high gloss surfaces, during high-speed printing, or on certain types of vinyl (where plasticizer conditions may exist). Use of 065 will adversely affect intercoat adhesion; monitor intercoat adhesion throughout the production run. Do not exceed additions of 1.5% by weight.

88-070 Thinner:
Enhances transfer of ink through the screen by reducing ink viscosity. Most useful for high-speed printing applications. Excessive amounts of 88-070 will reduce cure rates and impair surface durability. Do not exceed additions of 10% by weight.

073 Cure Promoter:
Improves depth and speed of cure. Most useful for promoting rapid curing of thick ink deposits, particularly when applied to heat sensitive substrates. 073 will increase surface hardness and may increase gloss if curing conditions and production speeds remain unchanged. Mix inks with 073 fresh daily. Use of 073 may affect intercoat adhesion; monitor adhesion throughout the production run. Do not exceed additions of 3% by weight.

075 Vinyl Adhesion Modifier:
Improves the wetting characteristics of the inks on vinyl substrates; 075 may eliminate the need to wipe the plasticized vinyl prior to printing. Vinyl Adhesion Modifier will also increase the cure rate. Use of 075 will reduce the shelf life of the 88 Series inks. Mix only enough ink for one day. Do not exceed additions of 5% by weight.

076 Flexibilizing Agent:
Designed to increase flexibility for embossing, folding or any application where severe ink elongation on a flexible or rigid substrate is required. Excessive use of 076 will affect cure rate, surface hardness and weatherability. Do not exceed additions of 15% by weight.

077 Rate Enhancer:
Accelerates the cure rate of the 88 Series inks. Most useful for promoting rapid cure of heavy ink deposits. Add only if necessary as 077 will increase the gloss of the ink. Mix inks containing 077 fresh daily. Monitor intercoat adhesion throughout the production run. Do not exceed additions of 5% by weight.

078 Polycarbonate Adhesion Modifier:
The 078 was formulated to enhance adhesion and cure rates. 078 is most useful for accelerating production speeds, particularly when processing heat sensitive substrates that are susceptible to distortion. Do not exceed additions of 5% by weight.

079 Adhesion Modifier:
Enhances the adhesion of 88 Series inks on coated card stock, some metals and other specified materials; most useful for prints requiring die-cutting to a bleed edge. The 079 will increase viscosity and reduce shelf life of the ink. Monitor intercoat adhesion throughout the production run. Mix fresh daily. Do not exceed additions of 2% by weight.

100 Thickening Agent:
This powder will thicken the ink, yet will not dramatically affect the gloss. Monitor cure and adhesion of the 88 Series inks when using thickening agent. Increased ink film thickness may result when printing more viscous inks. Use of 100 powder will affect weatherability. Do not exceed additions of 2% by weight.

170 Anti-Stat Gel:
Prevents static and fuzzy prints. Anti-stat gel should be added to the ink fresh daily. Intercoat adhesion should be monitored throughout the production run. Do not exceed additions of 12% by weight.

800 Initiator:
Developed to provide adhesion to selected materials. Improves water resistance and surface durability. Addition of 800 to any ink containing 070 thinner may reduce cure rates and shelf life. Mix daily; stir immediately. Do not exceed additions of 1% by weight.

Storage & Available Warranties

All UV 88 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 Products shall be free from defects in material and manufacture for a period of one (1) year from the date of sale for the 88 Series standard inks, with no additives, and for a period of one (1) month from the date of sale for any custom color containing Day Glo® JZB or T-Powder. Norcote will not warrant any custom colors containing metallic pastes or any inks intermixed with 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 results 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 Products prior to use in production.

***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.

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