

## UV Curable Ink System



### Suggested Uses:

The MSK Series is recommended for second surface decoration of polycarbonate and many polyesters (print-treated and top-coated) for use as membrane switch overlays, nameplates and other select applications, especially when adhesives are to be applied. (\*Note pg. 4)

### Product Features

- \* Extremely Flexible
- \* Embossable
- \* Excellent Adhesion
- \* Very Opaque
- \* Outstanding Definition
- \* Good Intercoat Adhesion

### 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 MSK-70 Thinner or MSK-049 Over-print Clear can be used to thin the ink.

### Mesh:

A mesh count of 355-390 threads per linear inch (140-150 cm<sup>2</sup>) low elongation, monofilament polyester is suggested. Tension should range from 18-25 N/cm<sup>2</sup> 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:

The MSK Series performs best in non-nitrogen atmosphere curing units, inert atmosphere curing units limit the depth of cure. 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:

MSK Series inks are fast curing and work well with one 300 watts/in (120 watts/cm) or two 200 watt/in (80 watts/cm) medium pressure mercury vapor lamps. The minimum requirement is 200mJ/cm. The MSK Series inks will cure up to 60 feet per minute (20 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 2,200 square feet per gallon (200 square meters per gallon) depending on printing variables affecting ink film thickness and coverage.

### Mixing:

All Norcote® MSK Series colors are intermixable. Addition of any other ink series will impair MSK Series flexibility and may impair long term adhesion.

### 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.



**Adhesion:**

The MSK Series is a nonvisual post-curing system. Although further cross-linking occurs up to 24 hours later, the MSK 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. Pressure sensitive adhesives should be applied after a 24 hour post-cure for best results.

**Intercoat Adhesion:**

MSK Series inks intercoat adhesion is exceptional. Although loss of intercoat adhesion is difficult, it should be monitored throughout the production run especially when printing 8 or more passes.

**Weatherability:**

MSK Series inks are NOT weatherable.

**Die-Cutting/Embossing:**

The MSK Series inks are very flexible, providing excellent results under most embossing or die-cutting conditions. To obtain acceptable results, the MSK inks must pass a cross-hatch tape test before embossing. Inks with special effects pigments may not emboss easily. High stress embossing of metallic ink is not recommended.

**Metallic Colors:**

Most metallic pigments work well with the MSK-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 MSK Series ink mixtures. RECOMMENDATION: Mix only enough metallic ink for one day.

**Process Colors:**

MSK Series Halftone Process inks were designed for 4-color process printing. Color density can be adjusted with the addition of process toners or 060 Halftone Base. To achieve a minimum ink deposit, thus reducing pile height and dot gain, one should use a minimum stencil thickness.

**038 Silver Powder:**

The 038P is a type of coated powder that is meant to line up the silver particles at the bottom of a printed and cured ink film. It is recommended for second surface applications only. The 038 requires gentle mixing. It is best mixed by hand. Avoid dispersion using (toothed) mixing blades on mixers. It should be mixed with MSK-049 Clear not to exceed 15% by weight. Thoroughly mix the powder into the Clear. Ability to cure a suspension is related to pigment load and UV exposure. Use mesh counts of 305 tpi (120/cm) or lower when printing a metallic mixture. Adhesion and inter-coat adhesion to the substrate should be monitored throughout the production run. Higher percentages of metallic pastes can decrease adhesion and intercoat adhesion properties. Mix ink fresh daily. Keep the container away from direct and indirect light and heat. The lid should always be tightly secured.

**Color Range:**

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

**Standard Colors:**

Mixing White	002
Opaque White	1046
Non-Chalking White	1054
Non-Chalking Opaque White	1056
H.V. Opaque White	1593
Mixing Black	005
Opaque Black	1019
Midnight Black	1020
Deadfront Black	1022
Super Dense Black	2500
Super Dense Black	4000
Brown	007
Radiant Yellow	012 •
Medium Yellow	017
Permanent Orange	019 •
Radiant Orange	020 •
Opaque Yellow	2233
Lightfast Yellow	2313
Lightfast Orange	2872
Cha Cha Red	021
Red	022
Rhodamine Red	023
Rose	024
Magenta	026
Emerald Green	030
Spruce Green	031
Permanent Blue	034
High Density Permanent Blue	434
Opaque Process Blue	2021
Violet	035
Reflex Blue	037
Peacock Blue	038
Overprint Clear	049
Lens Clear	1085
Process Blue	050
HF Green	330*
HF Violet	335*

\* Halogen free per the International Electrotechnical Commission standard IEC 61249-2-21.

• 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	
Ultra Dot Halftone Yellow	410	
Ultra Dot Halftone Magents	420	
Ultra Dot Halftone Cyan	430	
Ultra Dot Halftone Black	440	
Ultra Dot Halftone Base	450	
Process Cyan Toner	880	Qts.
Process Magenta Toner	881	"
Process Yellow Toner	882	"
Process Black Toner	883	"
HD Process cyan	9001	
HD Process Magenta	9002	
HD Process Yellow	9003	
HD Process Black	9004	

**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

**Transparents:****Qts. Only**

Transparent Green	193
Transparent Blue	194
Transparent Yellow	195 •
Transparent Orange	196 •
Transparent Blue (Red Shade)	197 •
Deadfront Black	1122
Lt. LED Red	1186
Dk. LED Red	1187

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**Metallics:**

Silver Powder	038	
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.

**Textured Clears:**

Matting Clear	MSK-CL2
Low Texture Satin Finish	MSK-CL6

Textured Clears have a 2 day lead time.

Note: Textured Clears have a shelf life of 1 year from the date of manufacture when stored under the proper conditions. Refer to storage and shelf life on page 1.

**Storage & Available Warranties**

All UV MSK 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 MSK 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. 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.



## Key Additives

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

### 060 Halftone Base:

Halftone base is a thickened clear used primarily in the screenprinting of halftone or four color process reproductions. MSK-060 may be used to decrease the density of a color in order to match the color key. MSK-060 will also enhance fine line detail or fine copy negative artwork. Additions of 20% by weight or less will correct most variations in color density or print quality. Use of MSK-060 may affect lightfastness.

### 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.

### MSK-070 Thinner:

Enhances transfer of ink through the screen by reducing ink viscosity. Most useful for high-speed printing applications. Excessive amounts of 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 Cure Promoter will increase surface hardness and may increase gloss if curing conditions and production speeds remain unchanged. Mix inks fresh daily. Use of 073 may affect intercoat adhesion; monitor cure and adhesion throughout the production run. Do not exceed additions of 3% by weight.

### 074 Adhesion Promoter:

Enhances initial adhesion and adhesion of inks after multiple passes of some substrate through the curing unit (e.g. polyester). If intercoat adhesion is impaired by over curing previous prints, the use of 074 in subsequent prints may restore intercoat adhesion. Store in tightly sealed container and mix prior to use. Shelf life of the ink will be reduced by adding 074. Mix inks fresh daily. Stir the ink immediately and thoroughly. Do not exceed additions of 1% by weight.

### 078 Polycarbonate Adhesion Modifier:

Enhances adhesion and cure rates on many substrates. Most useful for accelerating production speeds, particularly when processing heat sensitive substrates that are susceptible to distortion. 078 enhances adhesion primarily due to promoting better cure. This additive contains NVP. Do not exceed additions of 5% by weight.

### 079 Adhesion Modifier:

Enhances the adhesion of MSK Series inks on specified materials; most useful for prints requiring die-cutting to a bleed edge. The 079 will increase the viscosity of the MSK Series inks. Use of 079 will reduce shelf life. 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 MSK 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.

### \*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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