Norcote Technical Bulletin

M-24 Matte Clear

UV Curable Ink System

Suggested Uses:

The M-24 is a 100% solids UV curable screen printing ink that, when processed properly, exhibits a super matte finish. **It is the responsibility of the end user to pretest all substrates with Norcote® products prior to use in production.**

Product Features

- **Excellent Surface Durability**
- **Chemical Resistant**
- **Water Resistant**
- **Superior Flexibility for Die-Cutting and Embossing**

Printing Recommendations:

The M-24 is formulated to print from the container without the use of additives on a wide range of polycarbonate and polyester films commonly used in the Industrial Graphics Industry. The M-24 does not contain N-Vinyl-2-Pyrrolidone (common name NVP). All inks should be thoroughly mixed prior to use. Best results when printing flood areas are acquired by keeping ample amounts of ink in the screen, unlike gloss graphic inks. When using high speed presses, best results are obtained when printing no more than 800 impressions an hour.

Thinner:

The M-24 is supplied in a print ready condition. Due to the surface of the printed ink, thinners are not recommended to reduce the viscosity. If the viscosity of the product needs to be adjusted, the use of 049 Clear is recommended. Contact the Technical Service Department for additional information on the use of clears in the M-24.

Mesh:

200-305 plain weave meshes are recommended. Note that the mesh count selected will affect gloss values.

Squeegee:

Sharp 70-90 durometer polyurethane blade or multi-durometer blades can be used. For optimal ink lay down, a sharp 80 durometer blade is recommended.

Stencil:

Select direct emulsions or capillary films that are UV ink compatible.

Coverage:

The average coverage is 2,000 - 3,000 square feet per gallon, depending upon ink deposit.

Screen Cleaning:

Most conventional solvent cleaners work well. Alcohol based solutions must be avoided as they break down the emulsion. Norcote recommends Press Wash 110 (flash point 113° F), 140 (flash point 140° F) or NSW-824 (flash point 150° F). These products are used for cleaning ink off screens during on press color changes or before storing the screen. They work well when removing ink from squeegees, flood bars and other equipment. Contact us for packaging options.

Packaging:

M-24 is available in one (1) gallon, three (3) gallon and five (5) gallon containers. Contact Norcote for more information on large volume packaging.

Adhesive Resistance:

In the unlikely event that pressure sensitive adhesive is applied to the printed ink film, an addition of 5% 067 Adhesion Promoter must be added. When exposed to a minimum of 394.83 mJ/cm^2 and 800 mW/cm^2 (2 @ 200 80 FPM), the M-24 did not delaminate when using pressure sensitive adhesives after a period of seven (7) days. Only substrates that pass a cross hatch / tape adhesion test should have pressure sensitive adhesives applied. Testing was completed using a 305 /.34 plain weave screen with ProCap® 18 capillary film printed on GE 8010 Lexan® with 3M468 pressure sensitive adhesive.

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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Cure & Adhesion:

The M-24 Matte Clear is formulated to cure under 200 watt medium pressure mercury vapor lamps (focused) and requires a minimum of 189 mJ/cm^2 and 600 mW/cm^2 (2 @ 200 approximately 155 feet per minute) to ensure adhesion to most polycarbonate and polyester substrates.

Adhesion is determined by the use of a cross hatch / tape test (ASTM D-3359) on a printed part that is cooled to room temperature, applying 3M #600 tape. Adhesion was established on each of the tested materials under the curing conditions stated below:

	Autoflex® EBG 77	Autoflex® EBA 7	Melinex® 561	Autoflex® EBG 75	GE 8010 Lexan®	GE GS135	ProTek® Clear PC	Makrofol® DE1-4	Makrofol® DE1-1	Marnot® CLR PET	Marnot® Clear PC
Milijoule	233.13	189.8	189.8	189.8	189.8	189.8	189.8	189.8	189.8	189.8	189.8
Watt	1.489	1.469	1.469	1.469	1.469	1.469	1.469	1.469	1.469	1.469	1.469
Belt Speed	125 FPM	155 FPM	155 FPM	155 FPM	155 FPM	155 FPM	155 FPM	155 FPM	155 FPM	155 FPM	155 FPM

Water Resistance:

The M-24 Matte Clear is formulated to cure under 200 watt medium pressure mercury vapor lamps (focused) and requires a minimum of 394.83 mJ/cm^2 and 800 mW/cm^2 (2 @ 200 80 FPM) to achieve positive results when submerged in water for a period of 24 hours. Only substrates that pass a cross hatch / tape adhesion test should be exposed to water submersion. Testing was completed using a 305 /.34 plain weave screen with ProCap® 18 capillary film printed on GE 8010 Lexan®.

	Upon Removal (10 minute Delay)	3 hours after removal	12 hours after removal	24 hours after removal
Adhesion	Pass X-hatch / tape test	Pass X-hatch / tape test	Pass X-hatch / tape test	Pass X-hatch / tape test
Pencil Hardness	4H	2H—3H	3H—4H	4H
Scratch Resistance	5 = no visual change	5 = no visual change	5 = no visual change	5 = no visual change

Flexibility:

The M-24 is a flexible matte coating that can be die cut and embossed without cracking or crazing of the coating. Only substrates that pass a cross hatch / tape adhesion test should be embossed or die cut. When printed through a 305 / .30 plain weave screen and exposed to a minimum of 394.83 mJ/cm^2 and 800 mW/cm^2 (2 @ 200 80FPM), the M-24 displayed excellent flexibility when cold embossed, using a matched metal die. Pass indicates that cracking or crazing of the ink surface was not detected on any spot of the emboss area.

.013 – 015 Rim Emboss	.020 Pillow Emboss	.014 Rim .028 Dome Combination	.014 Rim .032 Dome Combination	.018 - .022 Dome Emboss	.020 Pillow Emboss	.014 Rim .032 Pillow Combination	.014 Rim .036 Pillow Combination
PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

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Melinex® is a registered trade mark of Dupont / Teijin Films, Inc.
Lexan® is a registered trade mark of GE Structured Products, Inc.
ProTek® and Marnot® is a registered trade mark of Tekra Corp.
Makrofol® is a registered trade mark of Bayer Corporation.

Chemical Resistance:

When exposed to a minimum of 394.83 mJ/cm^2 and 800 mW/cm^2 (2 @ 200 80 FPM), the M-24 shows excellent resistance to the following chemicals after a contact time of 1 hour (ASTM D-1308-02). Only substrates that pass a cross hatch / tape adhesion test should be exposed to chemicals. Testing was completed using a 305 /.34 plain weave screen with ProCap® 18 capillary film printed on GE 8010 Lexan®. Visual appearance completed using a visual grey scale evaluation. 1= Severe visual change, 2= Moderate to severe visual change, 3= Moderate visual change, 4= Moderate / no visual change, 5= No visual change.
visual change,

Chemical Tested	Visual Appearance	Surface Durability	Adhesion	Pencil Hardness	Gloss
Yellow Mustard	4	Excellent	Pass	4H	No impact
Bacon Grease	5	Excellent	Pass	4H	No impact
Vinegar (Strength 3%)	5	Excellent	Pass	4H	No impact
Vegetable Oil	5	Excellent	Pass	4H	No impact
Ragu® Pizza Sauce®	5	Excellent	Pass	4H	No impact
Ragu® Spaghetti Sauce	5	Excellent	Pass	4H	No impact
Tide® with Bleach	5	Excellent	Pass	4H	No impact
Downey® Liquid Fabric Softener	5	Excellent	Pass	4H	No impact
Ultra Joy® Dishwashing Liquid	5	Excellent	Pass	4H	No impact
Cascade® Liquid Detergent	5	Excellent	Pass	4H	No impact
Coffee (Caffeinated)	5	Excellent	Pass	4H	No impact
Soy Sauce	5	Excellent	Pass	4H	No impact
Clorox® Clean Ups®	5	Excellent	Pass	4H	No impact
409® All Purpose Cleaner	5	Excellent	Pass	4H	No impact
Ultra Clorox® 2	5	Excellent	Pass	4H	No impact
Ultra Mr. Clean® Top Job®	5	Excellent	Pass	4H	No impact
Mr. Clean® Wipe Ups™	5	Excellent	Pass	4H	No impact
Shout® Ultra Gel	5	Excellent	Pass	4H	No impact
Amway® Zoom® (Strength 3%)	5	Excellent	Pass	4H	No impact
Bar Keepers Friend® Cleaner	5	Excellent	Pass	4H	No impact

Ultra Mr. Clean®, Mr. Clean® Wipe Ups™, Cascade®, Tide® and Downey® are registered trade marks of Proctor & Gamble. Clorox®, Clean Ups®. 409® and Ultra Clorox® are registered trade marks of Clorox, Co. Shout® is a registered trade mark of SC Johnson Wax. Bar Keepers Friend® is a registered trade mark of SerVaas Laboratories, Inc. Amway® Zoom® is a registered trade mark of Amway Corporation.

Additives:

067 Adhesion Promoter:

An increase of gloss has been noted with additions of 5% 067 into the M-24. The increase in gloss values can be reduced by adding smaller percentages. When testing the M-24 with and without the addition of 067 Adhesion Promoter, there was not a significant difference in results obtained for most of the testing conducted. The only significant difference was the ability of the ink to withstand pressure sensitive adhesives.

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Storage & Available Warranties

All UV M-24 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 M-24 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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