



# Screen Printing UV Ink Series 9800

**For line colour and four colour screen printing**

## Product Replacement Note

3M™ Screen Printing UV Ink Series 9800 replaces the coloured inks in 3M™ Screen Printing Ink Series 9700UV.

Note: Clears 9720UV and 9730UV are still available.

## Description

3M™ Screen Printing UV Ink Series 9800 is a high performance, ultraviolet-curable ink system used to print multicolour graphics on a wide variety of 3M graphic films. The ink series includes transparent, opaque and four colour process inks for use on indoor or outdoor graphics.

When protected with selected 3M clears, this ink produces a tough, flexible, graphic coating that is weather, chemical and abrasion-resistant. It also has superior performance on difficult application surfaces, including corrugated and riveted surfaces.

## Recommended Types of Graphics and End Uses

Ink series 9800 is formulated for use on selected 3M graphic films. When constructed and used as described in this bulletin, these types of graphics and end uses may be warranted by the 3M™ MCS™ Warranty. Please read the entire bulletin for details.

- For indoor and outdoor graphics
- For graphics used in a petroleum environment where staining is not a concern

## Limitations of End Uses

The inks are not recommended for markings used on articulated trucks carrying concrete or for other vehicles frequently washed with concentrated strong acids.

Graphics made of multiple layers of ink and clear that must be stretched during installation are not recommended.

## Compatible Products for 3M™ MCS™ Warranted Graphics

### Graphic Films

Ink series 9800 is compatible with most of 3M's Scotchcal, Controltac and Scotchlite branded graphic films that are designed for screen printing. Refer to the Product Bulletin for the base film being used for ink compatibility, intended applications, construction options and warranties.

### Clears

- 3M™ Screen Printing Gloss Clear 9800CL
- 3M™ Screen Printing Gloss Clear 9720UV
- 3M™ Screen Printing Low Gloss Clear 9730UV

### Application Tapes

- 3M™ Premasking Tape SCPM-44X
- 3M™ Prespacing Tape SCPS-2
- 3M™ Prespacing Tape SCPS-55  
(use on graphic films with 3M's Comply™ Adhesive)

## Product Line

This information is subject to change. Be sure this is the most current Product Bulletin

Opaque Colours	
9802 Opaque Black	9830 Orange
9803 Mixing Black	9837 Red Shade Yellow
9806 Mixing White	9843 Medium Yellow
9808 Opaque White	9849 Lemon Yellow
9812 Magenta	9861 Light Green
9813 Red Violet	9879 Green Shade Blue
9826 Brick Red	9891 Blue Violet
9827 Red	
Transparent Colours	Process Colours
9825 Blue Shade Red	9805P Black
9828 Yellow Shade Red	9815P Magenta
9831 Orange	9845P Yellow
9840 Medium Yellow	9875P Cyan
9848 Yellow	
9864 Blue Shade Green	
9882 Red Shade Blue	
Clears	Other Products
9800CL Gloss	9801 Thinner
	9810 Toner
	9800B Halftone Base
	9800HBB Heavy Body* Halftone Base

\* Available only by special order

## Warranty Information

### Warranted Durability

For detailed warranty information, refer to the Product Bulletin for each base film used in your graphic.

Depending upon the graphic construction and end use:

- Ink series 9800 with gloss clear 9800CL may be warranted for up to 6 years.
- Ink series 9800 with gloss clear 9720UV may be warranted for up to 8 years.
- Ink series 9800 with low gloss clear 9730UV may be warranted for up to 3 years.

Processing conditions can affect the durability of the ink. Carefully follow all instructions in Instruction Bulletins 3.20 and 3.21.

## Graphics Exposed to Abrasion or Staining

Graphics are not warranted against fading, cracking, peeling, lifting or discolouration due to severe abrasion or staining from cleaning solutions, engine fuels, exhaust, or organic solvents.

### Colour Matching Ink to Film

If the colour of a printed ink is matched to the colour of a pigmented film, the finished ink and film may not maintain the same colour or gloss after being exposed outdoors.

## Sheet Preparation

### Liner Printing

Most film liners are polyethylene-coated paper, which cannot be printed. Kraft paper liners can be printed. Print the liner before screen printing the graphic. Use a fast drying lacquer or a fast drying halftone black screen printing ink for paper.

### 3M™ Scotchlite™ Reflective Graphic Film

Close colour matching of multi-sheet graphics is difficult on retroreflective materials because production lots may vary. Adjoining panels of Scotchlite reflective graphic films must be checked for both daytime and night-time appearance.

## Ink and Clear Preparation

### Coverage for Line Colour Inks and Clear 9800CL

Typically, one U.S. gallon (3.8 litres) of the line colour inks or clear 9800CL covers 59 to 83 square metre/litre.

### Coverage for Four Colour Inks

Typically, with a PE 145 plain weave mesh, one U.S. gallon (3.8 litres) of press-ready ink covers 193.6 square m/l at 50% dot. Adjust the quantities based on your requirements.

### Press Ready Formulations

Line colour inks and clear 9800CL are supplied press ready and do not need to be combined with other components.

## Screen Printing

### Frame

Use a rigid, metal frame. Include a 15 to 25 cm well between the frame and the graphic design on all sides.

### Fabric

A 140 to 150 threads per cm [tpc], 31 to 34 micron, monofilament, polyester mesh is recommended for most applications.

### Stencil

Use direct emulsions and thin capillary films that yield a thin ink deposit and are water soluble, resistant to ketones and strong lacquer solvents and UV ink compatible.

### Squeegee

Use a sharp squeegee with an 80 durometer (or equivalent) or harder plastic blade. Multiple durometer squeegees (70/90, 65/95/65, 70/90/70, or 75/95/75) also work.

### Method

Use the off-contact screen printing method to produce a uniform impression. Make a fill pass and then make the impression pass.

## Curing Methods

Refer to the Instruction Bulletins 3.20 and 3.21 for more complete information.

### Focused-lamp Cure Unit Specifications

Ink series 9800 is formulated to cure when exposed to a focused, medium-pressure, mercury-vapor lamp at a belt speed to achieve:

	EIT (mj/cm <sup>2</sup> )	Kühnast (mj cm <sup>2</sup> )
Line / 4 colour inks	200-275	190-230
Clear 9800CL	250-325	220-300
Clear 9720UV	300-350	320-370

The UV energy output of the cure unit must be accurately measured. We recommend the following radiometers:

- (1) Kühnast UV Integrator (250-410nm) which is available from Kühnast Strahlungstechnik, GmbH, Poststr. 56, 633607 Wächtersbach, Germany.

Web Site: [www.uv-technology.de](http://www.uv-technology.de)

Or

- (2) Uvicure™ Plus UVA/High Power (315-400 nm) radiometer, which is available from: EIT Corporation, 108 Carpenter Drive, Sterling, VA 20164, USA.

Web Site [www.eit.com](http://www.eit.com)

## Testing

Complete testing information is found in the Instruction Bulletins 3.20 and 3.21 printing with the UV 9800 Ink Series.

Every print pass must pass these three tests.

- Appearance Test
- Abrasion Resistance Test
- Tape Snap Adhesion Test

## Special Applications

### Metallic and Pearlescent Inks

Producing graphics with inks that contain metallic and pearlescent flakes requires careful attention to produce consistent, high quality graphics. Even small changes in components and processing conditions affect the print quality.

#### Warranted Metallic Flakes

Use only the recommended flakes. Other flakes may not be outdoor durable.

Flake Size	Sparkle Silvex™ Aluminium Flakes
Small	SSP-950-20-C
Medium	SSP-910-20-C or SSP-404AR

Note: Sparkle Silvex flakes are available from: Silberline Manufacturing Company, Inc., 130 Lincoln Drive, P.O. Box B, Tamaqua, PA 18252-0420  
Telephone: 800-348-4824 FAX: 570-668-0197

#### Warranted Pearlescent Flakes

Flake Size	EMD Chemicals Part No.	Effect
Small	9111WR Rutile fine satin	Lustre
	9121WR Rutile lustre satin	Lustre
Medium	9103WR Sterling silver	Similar to small to medium aluminium flake, except they have no opacity or hiding power

Note: Pearlescent flakes are available from:  
EMD Chemicals, Inc., Division of E. Merck,  
7 Skyline Dr., Hawthorne, NY 10532  
Telephone: 914-592-4660 FAX: 914-592-9469

#### Flake Concentrations

Type	Maximum Concentration by % weight	Typical Concentration by % weight
Metallic flakes	12	5 to 10
Pearlescent flakes	12	10 to 15
Mixtures of metallic and pearlescent flakes	12	5 to 10

### Printing With Metallic and Pearlescent Flakes

- Use the same screen printing and curing methods for metallic and pearlescent ink as for regular ink series 9800.
- Inks must be protected with screen print clear 9720UV or 9800CL.
- Use the following mesh size recommendations.

#### Mesh Size Recommendations

Type	Flake Size	Median Flake Size microns	Mesh Size
Metallic flake	Small	19	34 micron or larger 140 to 150 tpc plain weave
	Medium	22	34 micron or larger 120 tpc plain weave
Pearlescent flake	Small	< 20	34 micron or larger 140 to 150 tpc plain weave
	Medium	10 to 40	34 micron or larger 120 tpc plain weave

#### Shelf Life of Flakes

##### Important Note

Metallic flakes require special handling. Exposure to air causes them to deteriorate and agglomerate. This will cause printing problems. We recommend buying only what can be used in a short period of time. See Instruction Bulletin 3.20 for details.

- After adding the metallic flakes, the pot life of mixed, metallic ink is 1 to 2 days.
- Pearlescent flakes do not cause the ink to gel, however, they will settle.

## Shelf Life, Storage, and Shipping

### Ink Series 9800

Activity	Recommendation
Shelf life	<ul style="list-style-type: none"><li>• Use by the expiration date shown on the product packaging. A Use By date is on the ink container, as well as on the outer shipping carton.</li><li>• Do not use ink that shows signs of gelling.</li></ul>
Storage conditions	<ul style="list-style-type: none"><li>• 15° to 32°C</li><li>• Away from direct sunlight, mercury vapour lamps, quartz-halogen lamps, or arc lamps.</li><li>• Original container or in other sealed, black polyethylene containers. <i>Do not store the inks in glass or metal containers.</i></li></ul>

### Finished Graphics

Activity	Recommendation
Shelf life	<b>Total shelf life: 2 years</b> Up to 2 years unprocessed, <b>OR</b> process within 1 year of film receipt <b>and</b> apply within 1 year of processing.
Storage conditions	<ul style="list-style-type: none"><li>• 38°C maximum</li><li>• Out of sunlight</li><li>• Clean dry area</li></ul>
Shipping finished graphics	<ul style="list-style-type: none"><li>• Cure ink and clear coat before packaging.</li><li>• Ship flat, or rolled printed side out on 6 inch (15 cm) or larger core to help prevent the liner and premasking tape from wrinkling or popping off.</li><li>• Put a slip sheet, such as 3M™ Easy Release Liner #33, on the printed side(s) of graphics that are:<ul style="list-style-type: none"><li>– pre-mounted to panels</li><li>– printed on the liner</li></ul></li></ul>

## Health & Safety

Refer to the package label and the Material Safety Data Sheet for health, safety, and handling information on the products referenced in this bulletin. For 3M products, if necessary, you may contact our Toxicology/Product Responsibility Department on 01344 858000.

### Important Notice to Purchaser

The 3M products described in this publication are covered by a 3M warranty and limitation of liability.

3M's warranty provides that if 3M finds that goods are defective in material or workmanship they will be replaced or the price refunded at 3M's option but note that 3M does not accept liability for other direct losses (except for personal injury or death) or consequential losses relating to defective products or from information supplied by 3M.

Purchasers and users of 3M products, and not 3M supplying companies, are always solely responsible for deciding on the suitability of the 3M product for their required or intended use.

### Technical Assistance

For help on specific questions relating to 3M Commercial Graphics Division Products, contact your local Technical Service Representative.

Commercial Graphics Department  
3M United Kingdom PLC  
3M Centre, Cain Road, Bracknell  
Berkshire, RG12 8HT  
Tel: 01344 857850  
Fax: 01344 857939

e-mail: [commgraphics.uk@mmm.com](mailto:commgraphics.uk@mmm.com)

[www.3m.com/uk/graphicsolutions](http://www.3m.com/uk/graphicsolutions)

[www.scotchprint.com/uk](http://www.scotchprint.com/uk)

### Sales Assistance

Commercial Graphics Group  
3M United Kingdom PLC  
3M House, 28 Great Jackson Street  
Manchester, M15 4PA  
Tel: (0161) 237 6394

Free Fax: (0800) 378127

e-mail: [commgraphics.uk@mmm.com](mailto:commgraphics.uk@mmm.com)

[www.3m.com/uk/graphicsolutions](http://www.3m.com/uk/graphicsolutions)

[www.scotchprint.com/uk](http://www.scotchprint.com/uk)

Commercial Graphics Department  
3M United Kingdom PLC  
3M Centre, Cain Road  
Bracknell, Berkshire  
RG12 8HT  
Tel: 01344 857850  
Fax: 01344 857939  
e-mail: [commgraphics.uk@mmm.com](mailto:commgraphics.uk@mmm.com)  
[www.3m.com/uk/graphicsolutions](http://www.3m.com/uk/graphicsolutions)

Commercial Graphics Department  
3M United Kingdom PLC  
3M House, 28 Great Jackson Street  
Manchester M15 4PA  
Tel: 0161 237 6394  
Free Fax: 0800 378127  
e-mail: [commgraphics.uk@mmm.com](mailto:commgraphics.uk@mmm.com)  
[www.3m.com/uk/graphicsolutions](http://www.3m.com/uk/graphicsolutions)

Commercial Graphics Department  
3M Ireland (Dublin)  
Adelphi Centre, Dun Laoghaire  
County Dublin, Ireland  
Tel: +353 1 280 3278  
Fax: +353 1 280 3509  
e-mail: [commgraphics.uk@mmm.com](mailto:commgraphics.uk@mmm.com)  
[www.3m.com/uk/graphicsolutions](http://www.3m.com/uk/graphicsolutions)