



Screen Printing Ink Series 1900 and Screen Print Clear VI0402

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Advantages

- High performance, fast drying ink system
- Weather resistant, with excellent color retention
- Superior exterior performance on difficult application surfaces, including corrugated and riveted surfaces
- Available in line and four color process inks
- Lead-free materials are available

Applications and Uses

Ink series 1900 is formulated for use on selected 3M graphic films. These inks are intended only for use with the listed Compatible Products and the following types of graphics, which are warranted by the 3M™ MCS™ Warranty.

- For multicolor graphics
- For graphics applied to flat or corrugated surfaces, with and without rivets

Limitations of End Uses

We do not normally warrant other applications, but please contact us to discuss your needs or let us suggest other 3M products.

Specifically, we do not warrant this ink for the following:

- We do not recommend applying graphics that have screen print clear 9720UV to transit-mix cement trucks or other vehicles frequently washed with concentrated, strong acids or aluminum brighteners.

Note: For these applications, graphics that have screen print clear 1920DR are recommended.

- Screen print clear 1920DR is not recommended on 3M™ Controltac™ Plus Removable Graphic Film with Comply™ Adhesive 3545C or RG3545C for graphics used in abrasive environments.
- We do not recommend using these inks on graphics that fade, crack, peel, lift or discolor due to abrasion or staining from cleaning solutions, engine fuels, exhaust, or organic solvents.
- For graphics made for automotive Original Equipment Manufacturers (OEM), please contact 3M Automotive Division at 1-800-328-1684, Ext. 444, for alternatives.

Description

3M™ Screen Printing Ink Series 1900 are high performance opaque inks, available in both line ink and four color ink. Metallic and pearlescent flakes may be added to the line color inks. These inks are formulated for use on selected 3M graphic films.

This bulletin covers both the line ink and the four color ink series 1900.

Note: **This bulletin does not cover 3M™ Scotchlite™ Transparent Screen Printing Ink Series 2900.**

Ink Characteristics

Pigments in 3M™ Four Color Screen Printing Ink Series 1900 may be slightly different from those in 3M™ Four Color Screen Printing Ink Series 9700UV. Adjustments may be needed during color separation.

Compatible Products

- Ink series 1900 is compatible with most 3M™ Controltac™ Plus Graphic Films, 3M™ Controltac™ Plus Graphic Films with Comply™ Adhesive, 3M™ Scotchcal™ Graphic Films and 3M™ Scotchlite™ Reflective Graphic Films. Always refer to the most current film product bulletin of the films you are planning to use for complete details, including ink compatibility, warranties and specific recommendations.
- In general, ink series 1900 can be used as an alternative to any application that recommends 3M™ Screen Printing Ink Series 3900, Series 6600I or Series 7000LS.

Product Line

This information, which is subject to change, is for ink series 1900. Refer to the Fax-on-Demand Index to make sure this is the most current Product Bulletin.

Four Color Opaque Concentrates	
Halftone Concentrates	Halftone Bases
1990 Yellow	1997 Standard
1991 Magenta	1998 Retarder
1995 Black	
1996 Cyan	
Line Color Opaque Ink	
1902 ¹ Red Shade Yellow	1932 ² Lemon Yellow
1903 White	1933 ¹ Orange
1905 Black	1937 Red Violet
1912 ¹ Green Shade Yellow	1952 Transparent Red Shade Yellow
1913 ² Red Shade Orange	1967 Magenta
1914 Dark Green	1970 Red Shade Blue
1916 Green Shade Blue	1971 Deep Red
1918 Yellow Shade Red	1972 Transparent Green Shade Yellow
1924 Light Green	
1927 Blue Violet	
Screen Print Clear	
1920DR Dirt Resistant Screen Print Clear	
1930 Matte Screen Print Clear	
VI0402 Petroleum Resistant Clear ³	
Toner/Reducer	
1910 Gloss Toner/Reducer	
3M™ Thinners	
For inks or concentrates	For clears
CGS-30	CGS-30
CGS-50	CGS-50
CGS-80 ⁴	

¹ These products have lead-containing pigments: 1902, 1912, 1933.

² Line colors 1913 and 1932 can be used to develop lead-free formulas.

³ For graphics used where frequent petroleum spills occur, we recommend using screen print clear VI0402.

⁴ The higher the CGS number, the slower the evaporation rate.

Note: For the full product names of the 3M products listed on this page, please see page 2.

Warranty Information

Graphic Performance Life

Refer to the appropriate film Product Bulletins for warranty information for the various combinations of inks, films, processing methods and screen print clear. Processing conditions can affect the durability of the ink. Carefully follow all instructions in the ink Instruction Bulletins.

The warranty given in the Product Bulletin that is current at the time you purchased the film is the one that 3M will honor.

Factors that affect the warranty or graphic performance:

- A screen print clear is required for graphics printed with ink series 1900.
- Formulations containing 3M screen printing ink series 1900 with Scotchlite ink series 2900 void the warranty.
- The use of more than one type of ink on a graphic affects the warranty. If you use ink series 1900 with either ink series 9700UV or 2900, the warranty is the same as for the least durable ink.
- If the color of a printed ink is matched to the color of a pigmented film, the finished ink and film may not maintain the same color or gloss after being exposed outdoors.

Warranty and Limited Warranty

The following is made in lieu of all other express or implied warranties, including any implied warranty of merchantability or fitness for a particular purpose: This ink is warranted to be free of defects in materials and manufacture at the time of shipment and to meet the characteristics stated in this Product Bulletin. 3M will replace or refund the price of any 3M materials that do not meet this warranty within the specified time periods. See the worldwide 3M™ MCS™ Warranty bulletin, which gives the terms and limitations of the warranty.

These remedies are exclusive. In no case shall 3M be liable for any direct, indirect, or consequential damages, including any labor or non-3M materials charges.

Sheet Preparation

Liner Printing

- Polyethylene-coated paper liner: this type of liner cannot be printed.
- Kraft paper liner: this type of liner 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.

Scotchlite Reflective Graphic Film

Ink series 1900 can be used with Scotchlite films; however, most of the inks are opaque and will appear black at night. Using 3M™ Scotchlite™ Transparent Screen Printing Ink Series 2900, which is a transparent ink, is an alternative.

Close color 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 nighttime appearance.

Follow the recommendations in Instruction Bulletin 2.1 to minimize within-lot and crossweb variation. Reflective graphic film 680CM-10 is available already color matched.

Ink and Screen Print Clear Preparation

Line Colors

- The line colors from ink series 1900 typically need 10 to 20% thinner added to reach the desired viscosity of 1500 to 2000 centipoise.
- Under typical conditions with line inks thinned to print viscosity and using a 230 tpi (threads per inch) mesh screen, the approximate coverage is one gallon (3.8 liters) covers 1600 square feet (39 m²/liter).

Four Color Inks

- Four color inks in ink series 1900 are supplied as concentrates. The concentrates must be mixed with a half-tone base and thinner to be made press ready. A typical press-ready formula for four color ink is 20% ink concentrate, 70% halftone base and 10% thinner formula by weight.
- Under typical conditions with press-ready ink and using a 280 tpi (threads per inch) mesh screen, the approximate coverage is:
 - Solid (100%) printing: one gallon (3.8 liters) covers 1800 square feet (44 m²/liter).
 - 50% dot coverage: one gallon (3.8 liters) covers 3600 square feet (88 m²/liter).

Screen Print Clear

- Screen print clear 1920DR and 1930 can be mixed to obtain a custom gloss. Adding screen print clear 1930 to 1920DR reduces the durability of screen print clear 1920DR.
- Screen print clear 1920DR and 1930 typically need 20 to 30% thinner added to reach the desired viscosity of 600 to 900 centipoise. Using a 200 tpi mesh screen, the approximate coverage is one gallon (3.8 liters) covers 2500 square feet (61 m²/liter)

Note: Using less than the recommended usage of screen print clear can reduce the durability.

Note: For the full product names of the 3M products listed on this page, please see page 2.

Petroleum Resistant Graphics

Use screen print clear VI0402 to improve the graphic's resistance to petroleum staining on products such as film 3650 white.

Screen print clear VI0402 typically needs approximately 30% thinner CGS-80 added to reach the desired viscosity of 800–1000 cps.

Using a 230 tpi mesh screen, the approximate coverage is one gallon (3.8 liters) for 1500 square feet (36 m²/liter).

Air dry the screen print clear and then follow by oven drying.

See Instruction Bulletin 3.12 for more detailed information.

Screen Printing

Frame

- Use a rigid, metal frame.
- Include a 6 to 10 inch (15 to 25 cm) well between the frame and the graphic design on all sides.

Fabric

- Line inks: use a 230 tpi screen fabric.
- Four color inks: use a 280 tpi screen fabric.
- Screen print clear: use a 200 tpi screen fabric.

Stencil

Use a photographic or hand-cut stencil that is water soluble and resistant to ketones and strong lacquer solvents.

Squeegee

Use a sharp squeegee with a medium to hard, rubber or plastic blade. The squeegee should be large enough to overlap the design by at least 2 inches (5 cm) on each side.

Printing Method

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

Special Applications

3M™ Screen Printing Ink Series 9700UV

Ink series 9700UV can be applied over ink series 1900; however, for this construction, the only warranted screen print clear is 9720UV.

3M™ Scotchlite™ Screen Printing Ink Series 2900

Ink series 2900 can be printed over or under ink series 1900. Screen print clear 2930R should be used on ink series 2900.

Metallic and Pearlescent Inks

Metallic and pearlescent flakes are for use only with line colors in ink series 1900.

Producing graphics with inks that contain metallic or 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

We recommend only Sparkle Silvex® Aluminum Flakes. Other flakes may not be outdoor durable.

- Small flakes 5000AR
- Medium flakes 3000 AR

Note: Sparkle Silvex is available from:
Silberline Manufacturing Company, Inc.
Lincoln Drive, P.O. Box B
Tamaqua, Pa 18252-0420
Telephone: 800-348-4824
Fax: 717-668-0197
www.silberline.com

Recommended Pearlescent Flakes

This type of flake may be used on a customer test and approve basis. We recommend:

- White, unpigmented pearlescent flakes
- A flake size of 10 to 60 micron.

Note: These pearlescent flakes are available from:
EM Industries, Inc., Division of E. Merck
5 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	8	5 to 8
Mixtures of metallic and pearlescent flakes	9	9

Screen Printing with Flakes

- Use the same screen printing and drying methods for metallic and pearlescent ink as for line colors in ink series 1900.
- Inks must be protected with a screen print clear.

Note: For the full product names of the 3M products listed on this page, please see page 2.

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 the most current Instruction Bulletin 3.12 for more information.

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

Ink and Screen Print Clear Drying

Drying Method	Minimum Temperature	Minimum Time
Air	Ambient	24 hours
Batch	150°F (64°C)	10 minutes
Conveyor ¹	150°F (64°C)	30 seconds

¹ Conveyor drying is recommended. Check the conveyor temperature at various locations across the belt.

Note: Drying tests are provided in the ink Instruction Bulletins.

Application Tapes

After the graphics are thoroughly dry, you should apply a prespace tape or premask tape using a roll applicator. Do not use heat. See the film's Product Bulletin and Instruction Bulletin 4.3 for details on selecting and using application tape.

Shelf Life, Storage and Shipping

Screen Printing Ink Series 1900

- Store the inks at 32° to 80°F (0° to 27°C).
- Use the ink within 1 year of purchase.
- Do not use ink that shows signs of gelling.
- Store the inks in the original container or in other similar containers.

Finished Graphic

- Be sure the ink and the screen print clear are dried before packaging the finished graphic.
- Ship the finished graphic lying flat or rolled. To roll, wrap the graphic, film-side out, onto a core that is 5 inches (13 cm) or larger in diameter. These methods help to prevent the liner and premask from wrinkling or popping off.
- Put a slip sheet, such as 3M™ Easy Release Liner #33, on the printed side of the following types of graphics:
 - a graphic that is pre-mounted on panels
 - panels that have graphics on both sides
 - a liner that is printed by the printer
- Store the graphics in a clean, dry area.
- Store the graphics out of the direct sunlight and at a temperature less than 100°F (38°C).
- The combined shelf life of processed and unprocessed film cannot exceed two years from the date you receive the film. However, the film must be used within one year of processing even if the combined shelf life is less than two years.

Health and Safety



Caution

Provide adequate ventilation and observe safe operating procedures when using ink series 1900. Refer to the Material Safety Data Sheets (MSDS) for details.



Caution

When handling any chemical products, read the manufacturers' container labels and the Material Safety Data Sheets (MSDS) for important health, safety and environmental information.

To obtain MSDS sheets for 3M products:

- By fax, call 1-800-364-0768 in the US and Canada or 1-650-556-8417 for all other locations.
- Electronically, visit us at <http://www.3M.com/msds>.
- By mail, or in case of an emergency, call 1-800-364-3577 or 1-651-737-6501.

When using any equipment, always follow the manufacturers' instructions for safe operation.

**Attention:
Authorized Graphics Manufacturers**

Visit our password-protected website for exclusive product information, profiles and services.

www.scotchprint.com, then *Login*

To register, login and click “Register” on the right side of the screen. Certain restrictions apply.

3M Related Literature

Before starting any job, be sure you have the most current product and instruction bulletins.

The information in 3M bulletins is subject to change. Current bulletins, as well as a list of all bulletins updated within the last three months, are available at www.scotchprint.com or through our Fax-on-Demand system. Any warranty, if offered, is based on information in the bulletin that was current at the time you purchased the 3M products. The following bulletins provide the information and processes you need to properly make the graphics described in this bulletin.

Fax-on-Demand phone numbers:
United States or Canada: 1-800-364-0768
International: 1-651-732-6506

Subject	Bulletin No.	FOD No.
Product Bulletins		
Films Order an index from the Fax-on-Demand system to identify the FOD No. for the film bulletins you need.		
3M™ Screen Printing Ink Series 9700UV	9700	2507
3M™ Scotchlite™ Screen Printing Ink Series 2900	2900	2512
Instruction Bulletins		
Screen printing with ink series 1900 - line color - 4-color	3.12 3.11	6012 6011
Screen printing with ink 9700UV - line color - 4-color	3.4 3.13	6004 6013
Screen printing with ink series 2900 - line color - 4-color	3.18 3.19	6018 6019
Using 3M application tapes; premasking and prespacing for films	4.3	6503
Storage, handling, maintenance, removal	6.5	8505
Warranties		
Worldwide 3M™ MCS™ Warranty		9503
Other		
Color Card		75-5100-2274-4

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Bulletin Change Summary

Added limitation about using clear 1920DR on film 3545C and RG3545C. Moved limitations about using more than one ink type and mixing inks to the warranty section. Moved recommendation for petroleum spill environments to the Product Line table. Updated screen print clear preparation for petroleum resistant graphics. Removed references to 3M™ Scotchlite™ Screen Printing Ink Series 1900. The Comply brand name is now known as Comply™ Adhesive. Other changes and additions are indicated by black bars in the margins.



Commercial Graphics Division
3M Center, Building 220-12E-04
PO Box 33220
St. Paul, MN 55144-3220 USA
General Info. 1-800-374-6772
Technical Info. 1-800-328-3908
Fax 1-651-736-4233

Fax-on-Demand 1-800-364-0768 US/Canada or 1-651-732-6506 International
Fax-on-Demand document: 2501
www.scotchprint.com

3M Canada
P.O. Box 5757
London, Ontario
Canada N6A 4T1
1-800-265-1840
Fax 519-452-6245

3M México, S.A. de C.V.
Av. Santa Fe No. 55
Col. Santa Fe, Del. Alvaro Obregón
México, D.F. 01210
52-55-52-70-04-00
Fax 52-55-52-70-22-77

3M Puerto Rico, Inc.
Puerto Rico Industrial Park
P.O. Box 100
Carolina, PR 00986-0100
787-620-3000
Fax 787-750-3035