



# Scotchcal™ Deluxe Graphic Film Series 210SG

## Description

3M™ Scotchcal™ Deluxe Silver Graphic Film 210-420 and Deluxe Gold Graphic Film 210-431 have been specially formulated by 3M for Gerber Scientific Products, Inc. and are available exclusively from an authorized Gerber distributor. To find a Gerber distributor near you, contact Gerber at 1-800-222-7446 or visit their website at [www.gspinc.com](http://www.gspinc.com).

## Advantages

- Mirrored silver or gold appearance on both sides
- High visibility
- GERBER EDGE READY® material
- Designed for electronic cutting
- Good cutting and weeding characteristics
- Long term exterior durability  
Gold: 3 years, Silver: 5 years
- For flat surfaces with and without rivets, and simple curves
- Permanent adhesive

## Applications and End Uses

Film series 210SG is intended for making permanent, durable graphics when used with the listed Compatible Products in the following applications. These types of applications are warranted by the 3M™ MCS™ Warranty.

- Prespaced, electronically-cut graphics
- Exterior and interior graphics and signs
- Point-of-purchase and trade show displays
- Commercial vehicle and industrial graphics, including emblems, striping, and general signage
- Two-way window graphics

## Limitations of End Uses

We do not normally warrant other applications, but please contact GSP to discuss your needs and other options.

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

- Graphics applied to:
  - Compound curved surfaces
  - Stainless steel substrates
  - Flexible substrates
  - Polycarbonate substrates

- Graphics regularly subjected to gasoline vapors or spills such as gas pumps, automobile fuel-tank ports, or top-feeding, petroleum tankers.
- Graphics made for automotive Original Equipment Manufacturers (OEM); contact 3M Automotive Division at 1-800-328-1684, Ext. 444, for alternatives.

## Compatible 3M Products

- 3M™ Screen Printing Ink Series 1900 and clear from the same series
- 3M™ Prespacing Tape SCPS-2.
- 3M™ Premasking Tape SCPM-3.

## Characteristics

This information is subject to change. Refer to the Fax-on-Demand Index to make sure this is the most current Product Bulletin. See 3M Related Literature for bulletin ordering information.

Characteristic	Description
Film and colors	<b>210-420</b> 3 mil (0.08 mm) cast vinyl film, silver <b>210-431</b> 4 mil (0.11 mm) cast vinyl film, gold
Thickness (film plus adhesive)	3 to 5 mil, nominal (0.08 to 0.13 mm)
Adhesive type and color	Pressure sensitive, clear
Liner	Transparent synthetic
Application surfaces	Flat with and without rivets, simple curves, first and second surface
Application substrates	Glass, painted metal and aluminum, acrylic (dried*)
Application temperature range	40° to 100°F (4° to 38°C) <i>film and substrate</i>
Removability	Permanent

\*This film can be dry-applied to acrylic that has been baked for 24 hours at 150°F (65°C) prior to application.

## Effective Performance Life

The effective performance life for film series 210SG is based on field experience and exposure tests conducted throughout the United States. When the graphics are processed and used according to the 3M recommendations, they should have the performance life shown in the table below. The actual performance depends on the:

- If screen printed: correct combination of film, ink and clear coat and the correct formulation and drying of the ink
- Selection and preparation of the substrate
- Application methods
- Cleaning and maintenance methods
- Exposure conditions

## Warranted Durability

Film	Overprint Clear	 <b>Vertical Exposure</b> <i>face of graphic is ± 10° from vertical</i>	
		U.S. <sup>1</sup> years	S.W. <sup>2</sup> years
<b>Unprinted</b>			
210-420	None	5	3
210-431		3	1
<b>Printed with 3M™ Screen Printing Ink Series 1900</b>			
210-420 <sup>3</sup>	1920DR	5	3
210-431 <sup>3</sup>		3	1

<sup>1</sup> For warranty periods outside the United States, contact the 3M sales organization for that country.

<sup>2</sup> The U.S. Desert Southwest includes Arizona, New Mexico, and the desert areas of California, Nevada, Utah, and Texas. A detailed map is available by request. The warranty for this area is reduced because there is more solar energy. This warranty applies to graphics exposed to solar energy in the U.S. Desert Southwest more than 50% of the time.

<sup>3</sup> Printed film 210-420 or 210-431 must be air dried.

## Screen Printing

To get the durability given in the **Effective Performance Life** section for film series 210SG, use screen printing ink series 1900 and clear coat 1920DR. Air dry after printing. Check the appropriate Product Bulletin and Instruction Bulletin for the limitations of the ink.

## Thermal Transfer Printing

These films are optimized for printing on the GERBER EDGE® and EDGE 2 thermal printing systems.

## Fabrication

This Bulletin does not contain detailed processing or application procedures. Refer to the 3M Related Literature on page 4 section for further information.

### Minimum Cutting Heights

 <b>Caution</b>
When using any equipment, always follow the manufacturers' instructions for safe operation.

Based on cutting and weeding evaluations that used Helvetica medium upper case, the recommended minimum cutting height for text is 0.375 inch (0.95 cm). Because of the differences in electronically-controlled cutting equipment and font characteristics, users should determine their own cutting and weeding capability.

These factors can affect cutting quality and ability:

- **Sharpness of the knife blade.** Dull blades create a serrated look to the cut edge of the film.
- **Weight on the knife blade.** The ideal weight slightly scores the liner. Too little weight does not cut completely through the film and the adhesive. Excessive weight cuts the liner. It also causes the blade to drag, accelerating wear and eventually creating a serrated cut edge on the film.
- Temperature and relative humidity are minor considerations, but avoid extreme or rapidly fluctuating conditions.
- Store the film in the same environment as the cutting equipment.
- Consider the stroke width of characters, style of serifs or extensions, and small details of scanned or digitized artwork.
- The minimum recommended stroke width is 0.040 inch (1.0 mm) when film is exposed to cleaning or other physical stress.

## Application Tape

The application tape to use depends on the type of graphic produced. These recommendations for both printed and unprinted film. See Instruction Bulletin 4.3 for details.

- For graphics that have a large amount of exposed liner, and/or small letters and/or narrow stroke width, use prespacing tape SCPS-2.
- For graphics that have very little exposed liner, and/or large letters, and/or wide stroke width, use premasking tape SCPM-3.

Note: For the full product names of the 3M products listed on this page, please see page 1.

## Application

Refer to the Instruction Bulletins listed in the 3M Related Literature section, located at the end of this Bulletin, for more complete information.

### Application Temperature

40° to 100°F (4° to 38°C)

### Application Method

The dry application method is recommended.

## Maintenance and Cleaning

Use a cleaner designed for high-quality painted surfaces. The cleaner must be wet, non-abrasive, without strong solvents, and have a pH value between 3 and 11 (neither strongly acidic nor strongly alkaline.)

## Shelf Life and Storage

- Unprocessed film has a shelf life of two years after receipt from 3M. Processed film has a shelf life of one year. However, the total shelf life of a graphic before and after processing cannot exceed two years.
- Leave rolls of film in the original shipping carton, or suspend the rolls horizontally.
- Store cut sheets lying flat.
- Store the film in a clean, dry area, away from direct sunlight, and at a temperature less than 100°F (38°C).
- Ship the finished graphics lying flat or in a roll. To roll the graphic, wrap it sheeting-side-out on a minimum 6 inch (15 cm) diameter core. These methods help prevent the film and premasking from wrinkling or popping off the liner.

## Health and Safety

### 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.

## Product Data

The values given are typical for film series 210SG and are not for use in specifications. The data given below is for unprinted film as purchased from 3M.

### Physical Properties

Property	Value
Tensile strength (minimum)	at 73°F (23°C)
Silver	7.7 pounds/inch (1.4 kg/cm)
Gold	14.4 pounds/inch (2.6 kg/cm)
Applied shrinkage	0.015 inch (0.4 mm)
Service temperature range	-20°F to +175°F (-29°C to +80°C)

### Adhesion Characteristics

Final adhesion value is 24 hours after application.

Substrate	Value
Acrylic	4 pounds/inch (0.7 kg/cm)
Aluminum, alodine	4.2 pounds/inch (0.75 kg/cm)
Fruehauf painted panels	3.3 pounds/inch (0.59 kg/cm)
Glass	3.5 pounds/inch (0.63 kg/cm)
Imron	3.7 pounds/inch (0.66 kg/cm)

### Chemical Resistance Characteristics

- Resists mild acids, mild alkalis, and salts
- Excellent water resistance

## Warranty and Limited Remedy

*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:* Film 210-420 and film 210-431 are warranted to be free of defects in materials and manufacture at the time of shipment and to meet the specifications 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.**

## 3M Related Literature

Listed below is related 3M technical literature that may be of interest. You may view and print these Bulletins from our Web site at [www.scotchprint.com](http://www.scotchprint.com), or order them via our Fax-on-Demand (FOD) system. Call one of these phone numbers to order the desired bulletins, and specify the FOD document number provided in the chart.

United States or Canada: 1-800-364-0768  
International: 1-651-732-6506

Subject	Bulletin No.	FOD No.
<b>Product Bulletins</b>		
3M™ Screen Printing Ink Series 1900	1900	2501
<b>Instruction Bulletins</b>		
Design of graphics	2.1	5501
Screen printing with ink series 1900	3.11	6011
Scoring and cutting	4.1	6501
Using 3M application tapes;premasking and prespacing for films	4.3	6503
Application, substrate selection, preparation and substrate-specific application techniques	5.1	7001
Application, special applications and vehicles	5.4	7004
Application, general procedures for interior and exterior dry applications	5.5	7005
Application, wet method for translucent screen printed, thermal mass transfer and cut graphics	5.7	7007
Storage, handling, maintenance, removal	6.5	8505

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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: 3031  
[www.scotchprint.com](http://www.scotchprint.com)

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