



Scotchcal™

Special Effects Graphic Film Series 210

Description

3M™ Scotchcal™ Special Effects Graphic Film Series 210 has 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.

Advantages

Dusted and Frosted Crystal Films

- Dusted crystal film resembles acid-etched glass
- Frosted crystal film resembles sand-blasted glass
- Designed for electronic cutting
- Transparent synthetic liner prevents moisture absorption, lays flat, and resists static buildup
- Good cutting and weeding characteristics
- Three year exterior durability
- Fifteen year interior durability
- Low gloss eliminates glare
- Permanent adhesive

Fluorescent Films

- EDGE READY™ Material
- Designed for electronic cutting
- Screen printable
- High visibility; extremely conspicuous in all daylight conditions
- High gloss surface
- Good cutting and weeding properties
- Retains sharp appearance throughout life of product
- One year exterior durability
- Five year interior durability
- Permanent adhesive

Applications and End Uses

Film series 210 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.

Dusted and Frosted Crystal Films

- Prespaced, electronically-cut graphics
- Decorative translucent graphics on glass and acrylic substrates (non vehicular)

Fluorescent Films

- Prespaced, electronically-cut graphics
- Exterior and interior graphics and signs
- Safety markings
- Point-of-purchase and trade show displays
- Informational posters, signs and labels

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:

All Film Series 210

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

Dusted and Frosted Crystal Films

- Printing
- Application to vehicles

Fluorescent Films

These films are activated by exposure to near-ultraviolet visible light, but do not fluoresce under “black light” sources, and should not be used where black light fluorescence is required.

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

Compatible 3M Products

Fluorescent Films Only

- 3M™ Screen Printing Ink Series 1900 and clear coats from the same series
- 3M™ Screen Printing Ink Series 9700UV and clear coats from the same series
- 3M™ Prespacing Tape SCPS-2 and SCPS-53X
- 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	2 mil cast vinyl
Colors	210-314 Dusted Crystal 210-324 Frosted Crystal 210-404 Yellow Orange 210-405 Lemon Yellow 210-406 Lime Green 210-413 Pink 210-414 Red Orange
Thickness (film plus adhesive)	3 to 5 mil, nominal (0.08 to 0.13 mm)
Adhesive type and color	Pressure sensitive <i>Fluorescent:</i> white <i>Dusted and frosted:</i> clear
Liner	<i>Fluorescent:</i> white kraft paper <i>Dusted and frosted:</i> clear polyester
Application surfaces	<i>Fluorescent:</i> flat, flat with rivets, simple curves, first surface <i>Dusted and Frosted:</i> flat, simple curves, first and second surface
Application substrates	<i>Fluorescent:</i> metal, enamel paint <i>Dusted and Frosted:</i> glass, acrylic
Application temperature range	40° to 100°F (4° to 38°C) <i>air, film and substrate</i>
Removability	Permanent

Effective Performance Life

The effective performance life 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

Film Series 210SE	 Vertical Exposure <i>face of graphic is ± 10° from vertical</i>			
	Dusted or Frosted Crystal		Fluorescent	
	210-314 210-324		210-404 210-405 210-406 210-413 210-414	
	U.S. (years)	S.W. ² (years)	U.S. (years)	S.W. ² (years)
Unprinted				
Exterior exposure	3	2	1	9 mo.
Interior (no direct UV light)	15	15	5	5
Inside of outside window	7	4	n/a	n/a
Printed with Ink Series 1900 or 9700UV and a Clear Coat				
Outside exposure	0	0	1	9 mo.
Interior (no direct UV light)	0	0	5	5

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

² 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.

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

Screen Printing

To get the durability given in the **Effective Performance Life** section for film series 210, use the correct combination of ink and overprint clear. Check the appropriate Product Bulletins and Instruction Bulletins for the limitations of each particular ink.

The recommended screen printing inks are listed in the **Compatible Products** section on page 1.


Thermal Transfer Printing

The fluorescent 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 for film series 210. Refer to the 3M Related Literature on page 4 section for further information.

Minimum Cutting Heights

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

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 Tapes

The application tape to use depends on the type of graphic produced. 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.
- For graphics that have very little exposed liner, and/or large letters, and/or wide stroke width, use a premasking tape.

Film	Prespacing Tape	Premasking Tape
Dusted crystal	SCPS-2	SCPM-3
Frosted crystal	SCPS-2 SCPS-53X	SCPS-2 SCPS-53X
Fluorescent <ul style="list-style-type: none"> • Unprinted and printed with ink series 1900 • Printed with ink series 9700UV 	SCPS-2 SCPS-53X	SCPM-3 SCPS-53X

Application

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

Temperature

The application temperature range is: 40° to 100°F (4° to 38°C).

Rivets

Do not apply dusted and frosted crystal films (series 210-300) over rivets.

Application Method

Dusted and Frosted Crystal Films

The detergent and water application method is recommended. During application, all liquid must be removed by thorough squeegeeing. Any water trapped under the film will be obvious.

Fluorescent Films

Fluorescent film requires a dry application method.

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

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 210 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):
Dusted and Fluorescent	5 pounds/inch (0.9 kg/cm)
Frosted	3.5 pounds/inch (0.6 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

These adhesion values are 24 hours after application.

Substrate	Value
ABS	4 pounds/inch (0.7 kg/cm)
Acrylic	4 pounds/inch (0.7 kg/cm)
Acrylic enamel	4 pounds/inch (0.7 kg/cm)
Aluminum, alodine	8 pounds/inch (1.4 kg/cm)
Chrome	5 pounds/inch (0.9 kg/cm)
Fruehauf painted panels	4 pounds/inch (0.7 kg/cm)
Polycarbonate	4 pounds/inch (0.7 kg/cm)
Urethane paints	4 pounds/inch (0.7 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 series 210 is 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, 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.
Product Bulletins		
3M™ Screen Printing Ink Series 1900	1900	2501
3M™ Screen Printing Ink Series 9700 UV	9700	2507
Instruction Bulletins		
Design of markings	2.1	5501
Screen printing with ink series 1900	3.12	6012
Screen printing with ink 9700 UV	3.4	6004
Scoring and cutting	4.1	6501
Using 3M application tapes;premasking and prespacing for films and sheetings	4.3	6503
Application, substrate selection, preparation and substrate-specific application techniques	5.1	7001
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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Bulletin Change Summary

Provided specific information on approved Gerber systems; changed ink series 3900 to 1900; removed several colors from offering; improved interior warranty.



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