



Scotchcal™ ElectroCut™

Graphic Film

Series 220

For Electronic Cutting and Thermal Transfer Printing

Description

Film series 220 has been specially formulated by 3M for Gerber Scientific Products, Inc., (GPS), and is EDGE READY™. It is 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.

Film series 220 are 2 mil, pressure-sensitive films designed for permanent graphics that may be prespaced and electronically cut or used in narrow width thermal transfer printing systems. This film series is available in 94 colors.

Recommended Types of Graphics and End Uses

These end uses are recommended for this film and may be covered by the 3M™ MCS™ Warranty. Certain restrictions may apply; please read the entire bulletin for details.

- Prespaced and electronically-cut graphics
- Commercial and industrial graphic applications, including emblems, vehicle graphics, labels, striping, general signage, two-way window markings
- Thermal transfer printed graphics

Limitations of End Uses

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

Unsuitable End Uses for This Film

- Application to stainless steel for fleet applications
- Application to corrugated surfaces or surfaces with compound curves
- Graphics subjected to gasoline vapors or spills
- Thermoforming
- Backlit signage (Use 3M™ Scotchcal™ Translucent Graphic Film Series 230 instead)
- Graphics made for automotive Original Equipment Manufacturers (OEM); contact 3M Automotive Division at 1-800-328-1684 for alternatives.

Compatible Products

Refer to the durability tables for 3M™ MCS™ Warranty for the proper combination of materials and imaging options.

3M Substrates

- 3M™ Panaflex™ Awning and Sign Facing Series 945GPS

Other Products

- 3M™ Prespacing Tape SCPS-2
- 3M™ Premasking Tape SCPM-3

Characteristics

Physical Characteristics

Characteristic	Description
Film	Cast vinyl
Thickness	Without adhesive: 2 mil (0.05 mm) With adhesive: 2.5 to 3.5 mils (0.063 to 0.09 mm)
Colors	See Color Chart on page 2
Adhesive type	Pressure sensitive
Adhesive color	Clear
Liner	Kraft paper, white
Tensile strength <i>minimum</i>	5 pound/inch at 73°F (0.9 kg/cm at 23°C)
Adhesion <i>24 hours after application</i>	ABS, Acrylic, Acrylic enamel, Fruehauf painted panels, Polycarbonate, Urethane paints: 4 pounds/inch (0.7 kg/cm) Aluminum, alodine: 8 pounds/inch (1.4 kg/cm) Chrome: 5 pounds/inch (0.9 kg/cm) Polypropylene: 3 pounds/inch (0.5 kg/cm)

Characteristic	Description
Chemical resistance	Resists mild alkalis, mild acids, and salt Excellent resistance to water <i>(this does not include immersion)</i>
Flammability	Film 220-10 has been tested for flame spread per ASTM E84, "Surface Burning Characteristics of Building Materials," and meets the requirements of National Fire Protection Association Class A (1) (most fire-resistant class) as defined in NFPA 101, "Life Safety Code." Contact 3M at 1-800-328-3098 for more information.

Application Characteristics

Characteristic	Description
Finished graphic application recommendation	Graphic orientation: Vertical, non-vertical and horizontal Surface type: Flat with and without rivets; Simple curves
Finished graphic application recommendation <i>continued</i>	Substrate type: Panaflex substrate 945GPS, metal, glass, acrylic, polycarbonate, fiberglass, painted surfaces Application temperature: 40° to 100°F (4° to 38°C) <i>air and substrate</i>
Applied film shrinkage	0.010 inch (0.3 mm) <i>maximum</i>
Finished graphic exposure temperature	-40° to +225°F (-40° to +107°C)
Graphic removal	None, permanent

Color Chart

No.	Color	No.	Color
220-10	White	220-96	Teal
220-11	Pearl grey	220-98	Dark violet
220-12	Black	220-99	Fawn
220-13	Tomato red	220-100	Oyster
220-14	Bright orange	220-101	Nimbus gray
220-15	Bright yellow	220-103	Magenta
220-17	Vivid blue	220-104	Dark coral
220-19	Deep mahogany brown	220-105	Harvest gold
220-20	Matte white	220-130	Eggshell
220-21	Palm oyster	220-133	Raspberry
220-22	Matte black	220-134	Intense orange
220-23	Deep red	220-135	Primrose yellow
220-24	Terra cotta	220-138	Pale lavender
220-25	Sunflower	220-139	Saddle brown
220-27	Indigo	220-145	Chrome yellow
220-29	Russet brown	220-151	Traffic gray
220-31	Medium grey	220-173	Salmon pink
220-37	Sapphire blue	220-176	Aqua
220-38	Royal purple	220-177	Shadow blue
220-39	Tan	220-186	Bright green
220-41	Dark grey	220-187	Wedgewood blue
220-46	Kelly green	220-193	Mauve
220-47	Intense blue	220-196	Apple green
220-48	Purple	220-197	Light navy
220-49	Beige	220-223	Matte red
220-53	Cardinal red	220-253	Warm red
220-54	Light orange	220-263	Perfect match red
220-56	Dark green	220-273	Process magenta
220-57	Olympic blue	220-276	Bottle green
220-58	Burgundy	220-283	Cranberry
220-63	Geranium	220-286	Jade green
220-64	Apricot	220-307	Dark aqua
220-66	Forest green	220-357	Bermuda blue
220-77	Peacock blue	220-367	Celestial blue
220-86	Robin egg blue	220-377	Blue bird
220-88	Violet	220-387	Periwinkle
220-89	Sandstone	220-397	Dark blue
220-90	Antique white	220-407	Matte blue
220-94	Coral	220-417	Sky blue

Transparent

220-114 Clear Enamel Receptive

Metallic Colors

220-120	Silver	220-216	Sage green
220-131	Gold	220-217	Dark blue
220-201	Slate	220-218	Light rose
220-206	Pine green	220-227	Bright blue
220-208	Burgundy	220-229	Copper
220-209	Dark brown	220-231	Light gold
220-211	Charcoal	220-237	Silver blue

Warranty Information

See the 3M Graphics Center Warranty Brochure for the complete warranty and remedy details. The warranty given in the Product Bulletin that is current at the time you purchased the film is the one that 3M will honor.

3M™ MCS™ Warranty for Finished Graphics

Warranted Durability for Unprinted Graphic Constructions

Warranties shown in years

U.S. Exposure				U.S. Desert Southwest (D.S.W.) Exposure			
Vertical		Non-Vertical		Vertical		Non-Vertical	
Vehicle	Signs	Vehicle	Signs	Vehicle	Signs	Vehicle	Signs
Film Colors: 220-10, 12, 20, 22							
8	7	4	3.5	5.6	4.9	2.8	2.5
Film Colors: 220-114, 120, 131							
5	5	2.5	2.5	3.5	3.5	1.75	1.75
Film Colors: All others in film series 220							
6	6	3.0	3.0	4.2	4.2	2.1	2.1

Legibility Warranty for Horizontal Exposure of Vehicle Graphics Requiring Legibility Only, in years

Refer to the definition of Horizontal Exposure. This orientation exposes graphics to the maximum sunlight and environmental conditions and is intended for use only on rooftops of commercially owned vehicles where identification from the air is needed.

This warranty covers legibility only. Color change, lose of gloss, and chalking will occur and are not covered by warranty.

Film Colors 10, 11, 12, 13, 14, 15, 20, 22, 53

U.S. 5 years
U.S. Desert Southwest: 3 years

Desert southwest exposure. Graphics exposed to solar energy more than half of the time in Arizona, New Mexico and the desert areas of California, Nevada, Utah and Texas. A detailed map is available upon request.

Signs. Graphics applied outdoors and exposed to the elements.

Fleet vehicle. Straight trucks and trailers used in commercial fleets.

Standard vehicle. Buses, vans, automobiles, recreational vehicles.

Graphic Performance Life

The actual performance depends on the:

- Correct combination of 3M-recommended graphics products
- Imaging (thermal mass transfer)
- Selection and preparation of the substrate
- Surface texture
- Application methods
- Angle and direction of sun exposure
- Environmental conditions
- Cleaning or maintenance methods

Application Outside the U.S.

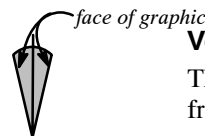
Contact Gerber Scientific Products.

Opacity

This film can be used on opaque surfaces but has less hiding power than a film with a colored adhesive. Consider this characteristic when selecting and preparing the substrate.

Warranty Notes

Terms



Vertical Exposure

The face of the graphic is $\pm 10^\circ$ from vertical.



Non-Vertical Exposure

The face of the graphic is greater than 10° from vertical and greater than 5° from horizontal.



Horizontal Exposure

The face of the graphic is $\pm 5^\circ$ from horizontal.

Chalking

Chalking for unprinted film colors 20 , 173, 263, 273 and 286 as they age is considered normal and acceptable wear. Chalking can be removed by normal graphic cleaning methods.

Application to Glass

3M accepts no liability for glass breakage when using this film for window graphics. See Instruction Bulletin 5.1 for details.

Harsh Cleaning

Graphics exposed to abrasive washing conditions, harsh cleaners or chemicals are not warranted.

Graphics Made with Components Not Sold or Recommended by 3M

The 3M MCS warranty does not cover finished graphics made with other manufacturers' inks, film, graphic protection and/or application tapes, except as noted in this Bulletin. The user is solely responsible for the graphic appearance, performance and durability of graphic constructions that include non-3M graphic products.

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 or implied warranty arising out of a course of dealing, custom or usage of trade: all 3M products 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. 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.**

See the Graphics Market Center Warranty Brochure, which gives the terms, additional limitations of the warranty, if any, and limitations of liability.

Thermal Transfer Printing

This film is designed for use with the Gerber Digital Imaging systems and is compatible with GerberColor™ : GCP (Process); GCS (Spot); GCT (Transparent); GCM (Medal); GCX (Special Effects); and GCF (Finishing) Series Foils.

Fabrication

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

Cutting

Minimum Cutting Heights

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.

Weeding

The excess film should be weeded (removed) as soon after cutting as practical. This is to minimize the effect of possible adhesive flow 24 or more hours after cutting.

Application Tapes

The application tape to use depends on the type of graphic produced. See Instruction Bulletin 4.3 for more 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.

Shelf Life, Storage and Shipping

Activity	Recommendation
Shelf life	Total shelf life: 2 years Up to 2 years unprocessed, <i>OR</i> process within 1 year <i>and</i> apply within 1 year of processing
Storage conditions	100°F (38°C) maximum - Out of sunlight - Clean dry area - Original container - Bring the film to print room temperature before using
Shipping finished graphics	Flat, or rolled printed side out on 5 inch (13 cm) or larger core. These methods help to prevent the liner 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 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 and services. Certain restrictions apply.

- Go to www.scotchprint.com.
- Select a country.
- Click *Login* on upper left side of screen.
- Click Register.
- Enter authorization code: **CGD_SGN**.
- Complete the information and submit.
An e-mail will be sent when your authorization is completed.

3M Related Literature

Before starting any job, be sure you have the most current Product and Instruction Bulletins.

The information in 3M Product and Instruction 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 appropriate Bulletin(s) that was current at the time you purchased the 3M products. The following Product and/or Instruction 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		
3M™ Panaflex™ Awning and Sign Facing Series 945GPS	945	4006
3M™ Scotchcal™ Translucent Graphic Film Series 230	230	3002
Instruction Bulletins		
Design of markings	2.1	5501
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, general procedures for interior and exterior dry applications	5.5	7005
Storage, handling, maintenance, removal	6.5	8505
Warranties		
3M Graphics Market Center Warranty Brochure		9503

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Bulletin Change Summary

This bulletin was updated to better organize the warranty information. Additional text changes are indicated by a black bar in the margin.

Release K now includes the Shelflife, Shipping and Storage section.



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Fax-on-Demand document: 3019
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