Engineer Grade and Utility Grade Reflective Sheeting

Series 3200, 3260 and 5200
Meets ASTM Type I

Product Bulletin **September 2013**

Replaces Information Folder 1.7 dated November 2005

Description

Engineer Grade Series 3200

3M™ Engineer Grade Reflective Sheeting Series 3200 meets ASTM D4956 Type I and is an enclosed lens, pressure sensitive adhesive-coated sheeting with an easy release liner, intended for production of non-critical traffic signs and pressure sensitive stickers.

Sheeting Colors:

Color	Product Code
White	3290
Yellow	3271
Red	3272
Blue	3275
Green	3277
Brown	3279

Adhesive: Pressure-sensitive
Adhesive Color: Clear
Application Temperature: 65°F (18°C) minimum (sheeting and substrate)

Engineer Grade Series 3260

3M™ Engineer Grade Reflective Sheeting Series 3260 is punched for use in sprocket fed electronic cutting machines. Series 3260 sheeting is available in the following colors:

Color	Product Code
White	3260
Yellow	3271
Red	3272
Blue	3275
Green	3277

Series 3260 Roll Sizes

- 15 inch wide x 50 yard length (Useable sheeting width approximately 13-3/4")
- 30 inch wide x 50 yard length (Useable sheeting width approximately 28-3/4")

Description (continued)

Utility Grade Series 5200

3M™ Utility Grade Reflective Sheeting Series 5200 meets ASTM D4956 Type I, Class 4 sheeting with enhanced cold weather application properties. It can be applied at temperatures down to -10°F (-23°C) on moderately rough or porous metals and plastic surfaces. These sheetings are not intended for use as large emblems or signs.

Series 5200 has a high tack pressure sensitive adhesive and is available in the following colors:

Color	Product Code
White	5290
Yellow	5271

Series 5200 is designed for hand application. See Information Folder 1.5 for details.

Fabrication

For Series 3200 and Series 3260 sheeting temperature should be at least 65°F (18°C) or higher. If the sheeting temperature is less than 65°F (18°C), allow it to condition to 65°F – 75°F (18°C – 24°C) for at least 24 hours. For Series 5200 sheeting temperature should be at least 20ºF (-7ºC) or higher.

1. Series 3200 and Series 3260: Best application will be achieved by using a motorized or hand operated squeeze roll applicator.
2. Series 5200: Hand application. To obtain maximum initial adhesion use firm pressure with a two-inch (5 cm) rubber roller or plastic squeegee (PA1 or equivalent). Use multiple, heavy overlapping stokes. Resqueegee all edges. See Information Folder 1.5.

See Information Folder 1.7 for surface preparation and Information Folder 1.4, 1.5 and 1.6 for recommended application procedures.

A. Cutting:
The sheeting may be hand cut, band sawed, guillotined, cold or hot die cut, and electronically cut.

B. B. Screen Printing:
Use 3M™ Process Color 990.

See appropriate product bulletin for more information. Dry according to recommendations in product bulletin 990 and Information Folder 1.8.

C. Electronic Cutting Machines:
Users are encouraged to evaluate cutting procedures for their own equipment and shop conditions. However, these general recommendations should be followed to ensure easy handling. There should be enough down force on the knife blade to slightly score the liner. The knife blade should be sharp and clean. Letters and characters should be a minimum height of three inches with a minimum stroke width of three eighths (3/8) of an inch.

D. Premasking/Prespacing

1. Premasked Markings: Use Application Tape SCPM-3.
2. Prespaced Markings: Use Prespacing Tape SCPS-2 or Application Tape SCPM-3.

Fabrication (continued)

Table A – Minimum Coefficient of Retroreflection
Candelas/Foot Candle/Square Foot
Candelas/Lux/Square Meter

Obs.[1] Angle	Ent Angle[2]	White	Yellow	Red	Green	Blue	Brown
0.2	-4	70	50	14.0	9.0	4.0	1.0
0.2	+30	30	22	6.0	3.5	1.7	0.3
0.5	-4	30	25	7.5	4.5	2.0	0.3
0.5	+30	15	13	3.0	2.2	0.8	0.2

Reflectivity conforms to ASTM D 4956.

[1]Observation Angle – The angle between the illumination axis and the observation axis.

[2]Entrance Angle – The angle from the illumination axis to the retroreflector axis. The retroreflector axis is an axis perpendicular to the retroreflective surface.

Table B – CIE Chromaticity Coordinate Limits

									Reflectance Limit (Y)	
Color	**x**	**y**	**x**	**y**	**x**	**y**	**x**	**y**	**Min**	**Max**
White	.303	.300	.368	.366	.340	.393	.274	.329	27.0	
Yellow	.498	.412	.557	.442	.479	.520	.438	.472	15.0	45.0
Red	.648	.351	.735	.265	.629	.281	.565	.346	2.5	15.0
Blue	.140	.035	.244	.210	.190	.255	.065	.216	1.0	10.0
Green	.026	.399	.166	.364	.286	.446	.207	.771	3.0	12.0
Brown	.430	.340	.610	.390	.550	.450	.430	.390	1.0	9.0

Cleaning

Signs that require cleaning should be flushed with water, then washed with a detergent solution and soft bristle brush or sponge. Avoid pressure that may damage the sign face. Flush with water following washing. Do not use solvents to clean signs. See 3M Information Folder 1.10.

Storage and Shelf Life

Sheeting should be stored in a cool, dry area, preferably at 65-75ºF (18-24ºC) and 30-50% relative humidity and should be applied within one year of purchase. Rolls should be stored horizontally in the shipping carton. Partially used rolls should be returned to the shipping carton or suspended horizontally from a rod or pipe through the core. Unprocessed sheets should be stored flat. Refer to Information Folder 1.11 for more information. Unprinted sheeting may be stored by the fabricator for a period of up to one year and after printing, sign faces may be stored for an additional period of up to six months. Sheeting and sign faces must be stored in a clean area, free from excessive moisture and direct sunlight, with ambient temperatures of 85°F (29°C) or less.

Health and Safety Information

Read all health hazard, precautionary, and first aid statements found in the Material Safety Data Sheet (MSDS), and/or product label of chemicals prior to handling or use. Also refer to MSDS for information about the volatile organic compound (VOC) content of chemical products. Consult local regulations and authorities for possible restrictions on product VOC content and/or VOC emissions.

General Performance Considerations	The performance and durability of 3M reflective sheeting will depend upon a number of factors including (but not limited to) substrate selection and preparation, compliance with recommended application procedures, sign placement, geographic area, exposure conditions, atmospheric conditions (e.g. fog, snow, rain), surface deposits (e.g. dirt, dew, frost), maintenance and age. Engineer grade reflective sheeting can be expected to provide satisfactory performance for five to seven years when processed with 3M matched component inks and films, depending upon climatic conditions of the installation. Maximum durability of engineer grade reflective sheeting can be expected in applications subject to vertical exposure on stationary objects when processed and applied to properly prepared aluminum according to 3M recommendations provided in Information Folder 1.7 on Sign Base Preparation. The user must determine the suitability of any nonmetallic sign backing for its intended use. Applications to unprimed, excessively rough or non-weather-resistant surfaces, or exposure to severe or unusual conditions can shorten the performance of such applications. Signs or stickers that are covered by snow or ice for prolonged periods, such as those in mountainous areas, may also have reduced durability.
Limitation of Liability	3M shall not be liable for any direct, indirect, special, incidental, or consequential losses or damage, including, but not limited to, lost profits, revenue, business opportunities, or goodwill, in any way related to the information contained in this document.

Literature References

Product Bulletin 990	3M™ Process Color Series 990
Information Folder 1.4	Instructions for Operation of the Interstate Squeeze Roll Applicator
Information Folder 1.5	3M™ Reflective Sheeting Hand Application Instructions
Information Folder 1.6	Hand Squeeze Roll Applicators
Information Folder 1.7	Sign Base Surface Preparation for 3M™ Reflective Sheeting Application
Information Folder 1.8	3M™ Series 700, 880, and 990 Process Color instructions for use on 3M™ Reflective Sheetings
Information Folder 1.10	Cutting, Matching, Premasking and Prespacing of 3M™ Reflective Sheetings and Films
Information Folder 1.11	Sign Maintenance Management, for 3M™ Reflective Sheeting

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