



Engineer Grade and Utility Grade Reflective Sheeting

Series 3200, 3260 and 5200

Meets ASTM Type I

Product Bulletin 3200-International

January 2011

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:

| <u>Color</u> | <u>Product Code</u> |
|--------------|---------------------|
| 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 perforated for use in electronic cutting machines.

Series 3260 sheeting is available in the following colors:

| <u>Color</u> | <u>Product Code</u> |
|--------------|---------------------|
| White | 3260 |
| Yellow | 3261 |
| Red | 3262 |
| Blue | 3265 |
| Green | 3267 |

Roll Sizes

15-inch width x 50 yards (useable sheeting width approximately 13-3/4 inches)

30-inch width x 50 yards (useable sheeting width approximately 28-3/4 inches)

Utility Grade Series 5200

3M™ Utility Grade Reflective Sheeting Series 5200 is an ASTM Type 1, Class 4 sheeting with enhanced cold weather application properties and is primarily intended for application at temperatures down to -10°F (-23°C) to include moderately rough or porous metals and plastic surfaces. These sheetings are not intended for use as large emblems or signs. These sheetings are not designed for extended durability.

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

| <u>Color</u> | <u>Product Code</u> |
|--------------|---------------------|
| White | 5290 |
| Yellow | 5271 |

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

Sign Fabrication Methods

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 at 65°F – 75°F (18°C – 24°C) for at least 24 hours. For Series 5200 sheeting temperature should be at least 20°F (-7°C) or higher.

1. Best application will be achieved by using a motorized or hand operated squeeze roll applicator.

2. Hand application. To obtain maximum initial adhesion use firm pressure with 2" (5cm) rubber roller or plastic squeegee PA1 or equivalent. Use multiple, heavy overlapping strokes. 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. Screen Printing: Use 3M™ Process Colors Series 990. See appropriate Product Bulletin for more information. Dry according to recommendations in the appropriate product bulletin: PB 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 3 inches with a minimum stroke width of 3/8 inch.
- D. Premasking/Prespacing
 1. Premasked Markings: application tape SCPM-3.
 2. Prespacing Markings: prespacing tape SCPS-2 or Application Tape SCPM-3.

Cleaning

Signs that require cleaning should be flushed with water, then washed with a detergent solution and 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 1.11.

Storage and Shelf Life

Sheeting should be stored in a cool, dry area, preferably at 65-75°F (18-24°C) 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 IF 1.11 for more information.

Unprinted sheeting may be stored by the fabricator for a period of up to one year and after printing, markings may be stored for an additional period of up to six months. Sheeting and markings 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 5-7 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 for prolonged periods, such as those in mountainous areas, may also have reduced durability.

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

| <u>Obs.¹ Angle</u> | <u>Ent. Angle²</u> | <u>White</u> | <u>Yellow</u> | <u>Red</u> | <u>Green</u> | <u>Blue</u> | <u>Brown</u> |
|-----------------------------------|-----------------------------------|--------------|---------------|------------|--------------|-------------|--------------|
| 0.2 | -4 | 70 | 50 | 14.5 | 9.0 | 4.0 | 2.0 |
| 0.2 | +30 | 30 | 22 | 6.0 | 3.5 | 1.7 | 1.0 |
| 0.5 | -4 | 30 | 25 | 7.5 | 4.5 | 2.0 | 1.0 |
| 0.5 | +30 | 15 | 13 | 3.0 | 2.2 | 0.8 | 0.5 |

Reflectivity conforms to ASTM D 4956.
¹Observation Angle – The angle between the illumination axis and the observation axis.
²Entrance 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

| <u>Color</u> | <u>x</u> | <u>y</u> | <u>x</u> | <u>y</u> | <u>x</u> | <u>y</u> | <u>x</u> | <u>y</u> | <u>Reflectance Limit (Y)</u> | |
|--------------|----------|----------|----------|----------|----------|----------|----------|----------|----------------------------------|------------|
| | | | | | | | | | <u>Min</u> | <u>Max</u> |
| 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 | 12.0 |
| Blue | .140 | .035 | .244 | .210 | .190 | .255 | .065 | .216 | 1.0 | 10.0 |
| Green | .026 | .399 | .166 | .364 | .286 | .446 | .207 | .771 | 3.5 | 9.0 |
| Brown | .430 | .340 | .610 | .390 | .550 | .450 | .430 | .390 | 4.0 | 9.0 |

Warranty

3M warrants for a period up to 7 years from date of application (concrete definition of the period is subject to the terms of sale) that 3M™ Engineer Grade Reflective Sheeting Series 3200 sold by 3M to be used for traffic control signs and delineators is free of defects in material and workmanship, subject to the following provisions: Sheeting Series 3200 must be processed and applied to a vertical ±10° surface in accordance with all 3M application and fabrication procedures provided in 3M’s product and information folders, technical memos (which will be furnished to the agency upon request), including the exclusive use of 3M matched component systems, process colors, overlay films and recommended application equipment.

Conditions

Such failure must be solely the result of design or manufacturing defects in the 3M engineer grade prismatic reflective sheeting and not of outside causes such as: improper fabrication, handling,

maintenance or installation; use of process colors, thinners, coatings, or overlay films and sheetings not made by 3M; use of application equipment not recommended by 3M, failure of sign substrate; exposure to chemicals, abrasion and other mechanical damage from fasteners used to mount the sign; sign burial; collisions, vandalism or malicious mischief. 3M reserves the right to determine the method of replacement. Replacement sheeting will carry the unexpired warranty of the sheeting it replaces. Claims made under this warranty will be honored only if the signs have been dated at the time of sheeting application, which constitutes the start of the warranty period. Claims made under this warranty will be honored only if 3M is notified of a failure within a reasonable time, reasonable information requested by 3M is provided, and 3M is permitted to verify the cause of the failure.

Limitation of Liability

3M's liability under this warranty is limited to replacement or allowance as stated herein, and 3M assumes no liability for incidental or consequential damages such as lost profits, business or revenue in any way related to the product regardless of the legal theory on which the claim is based. THIS WARRANTY IS MADE IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY, OF FITNESS FOR A PARTICULAR PURPOSE, ANY IMPLIED WARRANTY ARISING OUT OF A COURSE OF DEALING OR OF PERFORMANCE, CUSTOM OR USAGE OF TRADE.

Literature Reference

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

3M assumes no responsibility for any injury, loss or damage arising out of the use of a product that is not of our manufacture. Where reference is made in literature to a commercially available product, made by another manufacturer, it shall be the user's responsibility to ascertain the precautionary measures for its use outlined by the manufacturer.

Important Notice

All statements, technical information and recommendations contained herein are based on tests we believe to be reliable, but the accuracy or completeness thereof is not guaranteed, and the following is made in lieu of all warranties, or conditions express or implied. Seller's and manufacturer's only obligation shall be to replace such quantity of the product proved to be defective. Neither seller nor manufacturer shall be liable for any injury, loss or damage, direct, special or consequential, arising out of the use of or the inability to use the product. Before using, user shall determine the suitability of the product for his/her intended use, and user assumes all risk and liability whatsoever in connection therewith. Statements or recommendations not contained herein shall have no force or effect unless in an agreement signed by officers of seller and manufacturer.

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