

Commercial Branding and Transportation Division

# 3M™ Engineer Grade Reflective Sheeting Series 3200

Product Bulletin Series 3200  
June 2023

Replaces Product Bulletin Series 3200, 3260, and 5200 Dated March 2021

## 1 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 for production of non-critical traffic signs and pressure sensitive stickers. Series 3200 sheeting is available in the colors indicated in Table 1.

**Table 1.** Series 3200 Product Codes By Color

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

**Adhesive:** Pressure-sensitive

**Application Temperature:** 65°F (18°C) minimum

## 2 Specifications

### 2.1 Coefficient of Retroreflection and Chromaticity

Minimum coefficient of retroreflection ( $R_A$ ) values are presented in Table 2.

**Table 2.** Minimum Coefficient of Retroreflection,  $R_A$ , cd/ft<sup>2</sup> (cd/lx/m<sup>2</sup>) per ASTM D4956 for Type I Signing. Measurements taken according to ASTM E810.

| Observation Angle <sup>a</sup> (°) | Entrance Angle <sup>b</sup> (°) | White | Yellow | Red | Green | Blue | Brown |
|------------------------------------|---------------------------------|-------|--------|-----|-------|------|-------|
| 0.2                                | -4                              | 70    | 50     | 14  | 9     | 4    | 1     |
| 0.2                                | +30                             | 30    | 22     | 6   | 3.5   | 1.7  | 0.3   |
| 0.5                                | -4                              | 30    | 25     | 7.5 | 4.5   | 2    | 0.3   |
| 0.5                                | +30                             | 15    | 13     | 3   | 2.2   | 0.8  | 0.2   |

a. Observation Angle - The angle between the illumination axis and the observation axis.

b. Entrance Angle - The angle from the illumination axis to the retroreflector axis. The retroreflector axis is an axis perpendicular to the retroreflective surface.

Color specification limits and daytime luminance factor (Y%) data for series 3200 sheetings are presented in Table 3.

**Table 3.** Color specification limits (daytime).

| Color  | x    | y    | x    | y    | x    | y    | x    | y    | Daytime Luminance Factor (Y%) |     |
|--------|------|------|------|------|------|------|------|------|-------------------------------|-----|
|        |      |      |      |      |      |      |      |      | Min.                          | Max |
| White  | .303 | .300 | .368 | .366 | .340 | .393 | .274 | .329 | 27                            | -   |
| Yellow | .498 | .412 | .557 | .442 | .479 | .520 | .438 | .472 | 15                            | 45  |
| Red    | .648 | .351 | .735 | .265 | .629 | .281 | .565 | .346 | 2.5                           | 15  |
| Blue   | .140 | .035 | .244 | .210 | .190 | .255 | .065 | .216 | 1                             | 10  |
| Green  | .026 | .399 | .166 | .364 | .286 | .446 | .207 | .771 | 3                             | 12  |
| Brown  | .430 | .340 | .610 | .390 | .550 | .450 | .430 | .390 | 1                             | 9   |

## 3 Substrates

For traffic sign use, the substrates found to be most reliable and durable are properly prepared aluminum sheets and extrusions. **Users are urged to carefully evaluate adhesion and sign durability properties of all other substrates.** Other substrates suitable for secure and durable applications of Series 3200 sheetings have the following characteristics:

- Clean
- Smooth
- Flat
- Rigid
- Dimensionally stable
- Weather resistant
- Non-porous
- High surface energy (pass water break test)

Refer to [3M Information Folder 1.7](#) for surface preparation recommendations. Substrates with low surface energies may require additional preparation steps, such as flame treatment, mechanical abrasion, or use of adhesion promoters prior to sheeting application.

Series 3200 sheetings have been designed primarily for application to flat substrates. Any application to a substrate with a radius of curvature of less than 5 in. should also be supported by rivets or bolts. Plastic substrates are not recommended where cold shock performance is required. **Sign failures caused by substrate failures or improper surface preparations are NOT the responsibility of 3M.**

## 4 Application

Series 3200 sheetings utilize a pressure sensitive adhesive that has been specially designed to retain adhesion over a wide temperature range and for application to a broad range of surfaces, and (although not optimal) may even include moderately rough or porous wood, plastic, and a variety of metal surfaces.

### 4.1 Temperature

#### Series 3200

Series 3200 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 to 75°F (18°C to 24°C) for at least 24 hours.

### 4.2 Equipment

**Series 3200:** The best applications are achieved using the following equipment

- Motorized squeeze roll applicator (see [3M Information Folder 1.4](#) for details regarding the 48" Interstate Squeeze Roll Applicator)
- Hand Squeeze Roll Applicator (HSRA) (see [3M Information Folder 1.6](#))

**Note:** When using an HSRA with an air cylinder kit, apply the minimum tension needed to properly position the Series 3200 sheeting on the substrate. A nip roller pressure of 80 psi is recommended for a 48 in. laminator.

## 5 Cutting

Series 3200 sheetings may be hand cut, guillotined, die cut, and plotter cut.

### 5.1 Plotter Cutting

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 in. with a minimum stroke width of 3/8 in.

### 5.2 Premasking/Prespacing

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

## 6 Imaging by Screen Printing

Screen print Series 3200 sheetings using 3M's system of matched component materials (Table 4). Process at a temperature of 65°F to 100°F (18°C to 38°C) and at a relative humidity of 20–50%. It is the user's responsibility to determine the suitabilities and durabilities of any other process colors. 3M assumes no responsibility for the premature failures of sign face legends that have been processed with non-recommended or non-3M process colors. Since 3M has no control over colors made by other manufacturers, the user should check with the process color manufacturer for processing recommendations and assurance of performance prior to any extensive use. To screen process regulated and non-regulated signs, a P.E. 157 screen mesh screened with a fill pass is recommended. Clear coating is neither required nor recommended. Consult [3M Information Folder 1.8](#) for details.

**Table 4.** 3M System of Matched Component Materials.

| Matched Components |  |
|--------------------|--|
| Process Color      | Series 990                                   |
| Slipsheet          | 3M™ Slipsheeting (Primary Slipsheeting only) |
| Prespacing Tape    | SCPS-2 or SCPM-3                             |
| Premasking Tape    | SCPM-3                                       |
| Transfer Tape      | TPM-5  |

Applications other than vertical exposure on stationary objects may have a negative effect on durability. Periodic sign inspection and regular sign replacement are strongly recommended.

## 7 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 device or sign face. Flush with water following washing. Do not use solvents to clean signs. See [3M Information Folder 1.10](#) for further details.

## 8 Storage and Shelf Life

Series 3200 sheetings should be stored in a cool, dry area, preferably at a temperature of 65°F to 75°F (18°C to 24°C) and a relative humidity of 30–50%, and be applied within two years of date of manufacture. Rolls should be stored horizontally in their shipping cartons. Partially used rolls should be returned to their shipping cartons or suspended horizontally from rods or pipes through their cores. Unprocessed sheets should be stored flat. Refer to [3M Information Folder 1.11](#) for instructions on packing for storage and shipment.

Printed sign faces may be stored for an additional period of up to six months. Printed 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.

### 8.1 Signs Storage

Finished signs and applied blanks should be stored on edge. Processed sign faces must be protected with green 3M™ Slipsheeting (Primary Slipsheeting); white 3M™ Slipsheeting (Alternate Slipsheeting) is NOT suitable for use with screen printed sheeting. Place the glossy side of the slipsheet against the sign face. Double faced signs must have the glossy side of a slipsheet against each face of the sign.

Unmounted sign faces must be stored flat and interleaved with 3M™ Slipsheeting, glossy side against the sign face.

Avoid banding, crating, or stacking signs. Package for shipment in accordance with commercially accepted standards to prevent movement and chafing. Store sign packages indoors on edges.

Panels and finished signs must remain dry during shipment and storage. If packaged signs become wet, unpack immediately and allow signs to dry. Refer to [3M Information Folder 1.11](#) for instructions on packing for storage and shipment.

## 9 Durability

The durability of a Series 3200 sheeting application will depend upon substrate selection and preparation, compliance with recommended application procedures, geographic area, exposure conditions, and maintenance practices. Maximum durability can be expected in applications subject to vertical exposures on stationary objects when processed and applied to properly prepared aluminum according to 3M recommendations available in [3M Information Folder 1.7](#). The user must determine the suitability of any nonmetallic substrate for its intended use. Exposure to severe or unusual conditions and applications to unprimed, excessively rough, or non-weather-resistant surfaces can reduce durability.

The durability statements contained herein do NOT constitute warranties of quality, life, or characteristics. Purchaser should perform appropriate tests to determine if Series 3200 sheeting meets their performance requirements when applied to reboundable plastic substrates. Tests should incorporate plastic manufacturer's recommendations for impacting reboundable plastic traffic control devices.

### 9.1 Durability Considerations for Signing Applications

Applications other than vertical exposure on stationary objects may reduce durability. Periodic sign inspection and regular sign replacement are strongly recommended.

### 9.2 Durability Considerations for Work Zone Construction Signs

Work zone construction signs are exposed to severe or unusual conditions and are considered to be non-stationary objects which could result in reduced durability compared to permanent sign applications.

### 9.3 Exposure Considerations

Exposure to severe or unusual conditions can shorten the lifetimes of Series 3200 sheetings. Signs in mountainous areas that are covered by snow for prolonged periods may also have reduced durability. Atmospheric conditions in certain geographic areas may have a negative effect on durability.

### 9.4 Custom Process Colors Considerations

Custom colors may have reduced durability compared to regulated traffic colors.

## 10 Health and Safety Information

Read all health hazard, precautionary, and first aid statements found in the safety data sheets (SDS) and article information sheets for important health, safety, and environmental information. To obtain SDS and article information sheets for 3M products, go to [3M.com/SDS](http://3M.com/SDS), contact 3M by mail, or for urgent requests call 1-800-364-3577.

## 11 Warranty Information

### 11.1 3M Standard Warranty

3M warrants to the user that, at the time of shipment, series 3200 sheeting will (a) be free of defects in materials and manufacture and (b) meet the specifications stated in this product bulletin (“3M Standard Warranty”).

### 11.2 Exclusive Limited Remedy

If series 3200 sheeting is proven not to have met the 3M Standard Warranty on its shipment date, then a user's exclusive remedy, and 3M's sole obligation, at 3M's option, will be refund or replacement of the affected sheeting.

### 11.3 Disclaimer

THE 3M WARRANTY IS MADE IN LIEU OF ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY, OR FITNESS FOR A PARTICULAR PURPOSE, OR ANY IMPLIED WARRANTY ARISING OUT OF A COURSE OF DEALING OR OF PERFORMANCE, CUSTOM, OR USAGE OF TRADE.

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## 12 Other Product Information

Always confirm you have the most current version of the applicable product bulletin, information folder, or other product information from 3M's Website at <http://www.3M.com/roadsafety>.

## 13 Literature References

|                                    |   |
|------------------------------------|---|
| <a href="#">3M IF 1.4</a>          | Instructions for Interstate Squeeze Roll Applicator |
| <a href="#">3M IF 1.5</a>          | Hand Application Instructions                       |
| <a href="#">3M IF 1.6</a>          | Hand Squeeze Roll Applicator                        |
| <a href="#">3M IF 1.7</a>          | Sign Base Surface Preparation                       |
| <a href="#">3M IF 1.8</a>          | Process Color Instructions                          |
| <a href="#">3M IF 1.10</a>         | Cutting, Premasking, and Prespacing                 |
| <a href="#">3M IF 1.11</a>         | Reflective Sheeting Sign Maintenance Management     |
| <a href="#">3M PB 990</a>          | 3M™ Process Color Series 990                        |
| <a href="#">3M PB 1170</a>         | 3M™ ElectroCut™ Film Series 1170                    |
| <a href="#">3M PB Slipsheeting</a> | 3M™ Slipsheeting                                    |

ASTM Test Methods are available from ASTM International, West Conshohocken, PA.

## For Information or Assistance

Call: 1-800-553-1380

In Canada Call:

1-800-3M HELPS (1-800-364-3577)

## Internet:

<http://www.3M.com/roadsafety>

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3M Center, Building 223-3S-33  
St. Paul, MN 55144-1000 USA

Phone 1-800-553-1380

Web [3M.com/roadsafety](http://3M.com/roadsafety)

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