Flexible Prismatic Reflective Sheeting

Series 3300 With Pressure Sensitive Adhesive

For Use on Reboundable Plastic Traffic Control Devices

Product Bulletin 3300 **January 2024**

Replaces PB 3300 Dated May 2014

Description

3M™ Flexible Prismatic Reflective Sheeting Series 3300 is intended for reflectorizing rigid or reboundable traffic control devices such as drums, barricades and channelizers. Series 3300 consists of impact resistant prismatic lens reflective sheeting precoated with pressure sensitive adhesive and exceeds the reflectivity values of ASTM Type III.

Table I — Series 3300 is available in the following colors

Product Number	Color
3310	White
3311	Yellow
3312	Red
3314	Orange

Photometric

Daytime Color (x,y,Y)

The chromaticity coordinates and luminance factor of the retroreflective sheeting conform to Table II.

Color Test – Ordinary Color

Conformance to standard chromaticity (x,y) and luminance factor (Y %) requirements should be determined by instrumental method in accordance with ASTM E 1164 on sheeting applied to smooth aluminum test panels cut from Alloy 6061-T6 or 5052-H38. The values should be determined on a HunterLab ColorFlex 45/0 spectrophotometer. Computations will be done for CIE Illuminant D65 and the 2° standard observer.[1]

[1]The instrumentally determined color values of retroreflective sheeting can vary significantly depending on the make and model of colorimetric spectrophotometer as well as the color and retroreflective optics of the sheeting (David M. Burns and Timothy J. Donahue, Measurement Issues in the Color Specification of Fluorescent Retroreflective Materials for High Visibility Traffic Signing and Personal Safety Applications, Proceedings of SPIE: Fourth Oxford Conference on Spectroscopy, 4826, pp. 39-49, 2003). For the purposes of this document, the HunterLab ColorFlex 45/0 spectrophotometer should be the referee instrument.

Photometric (continued)

Table II — CIE Chromaticity Coordinate Limits[2] for new sheeting

	1		2		3		4		Limit Y (%)	
Color	x	y	x	y	x	y	x	y	Min.	Max
White	.303	.300	.368	.366	.340	.393	.274	.329	27	–
Orange	.558	.352	.636	.364	.570	.429	.506	.404	14	30
Yellow	.498	.412	.557	.442	.479	.520	.438	.472	15	45
Red	.648	.351	.735	.265	.629	.281	.565	.346	2.5	15

[2]The four pairs of chromaticity coordinates define the acceptable color in terms of the CIE 1931 standard colormetric system measured with standard illuminant D64.

Coefficients of Retroreflection (R_A)

The value in Table III are minimum coefficients of retroreflection expressed in candelas per lux per square meter (cd/lux/m2).

Test for Coefficients of Retroreflection

Conformance to coefficient of retroreflection requirements are determined by instrumented test method in accordance with ASTM E-810 "Test Method for Coefficient of Retroreflection Sheeting"

Table III
Minimum Coefficient of Retroreflection R_A Candelas per Foot Candle per Square Foot or Candelas per Lux per Square Meter (Average 0º and 90˚ Rotation)

3310 White

Observation Angle[3]	Entrance Angle	
	-4°	30°
0.1	300	180
0.2	250	150
0.5	95	65

3314 Orange

Observation Angle[3]	Entrance Angle	
	-4°	30°
0.1	120	72
0.2	100	60
0.5	30	25

3311 Yellow

Observation Angle[3]	Entrance Angle	
	-4°	30°
0.1	200	120
0.2	170	100
0.5	62	45

3312 Red

Observation Angle[3]	Entrance Angle	
	-4°	30°
0.1	54	32
0.2	45	25
0.5	15	10

[3]Observation Angle — The angle between the illumination axis and the observation axis.

Recommended Substrates & Application Procedures

Series 3300 is designed for application to clean polyethylene-based work zone devices such as drums, tubes, and posts. Series 3300 sheeting is designed for use on clean, smooth, relatively non-porous, weather resistant surfaces when prepared as detailed in Information Folder 1.7. Series 3300 sheeting may be applied using a squeeze roll applicator or by hand. The application temperature (and substrate temperature) should exceed 60˚F. If hand applied, sheeting should be applied with firm pressure using a plastic squeegee or rubber roller. Without endorsement of the use of such substrates, some comments regarding their use can be made. The polyethylene substrate must be properly flame-treated or corona treated before sheeting application (see Information Folder 3.3 for substrate preparation).

Plastics, including fiberglass laminates, vary as to type, composition, and manufacture, so that their use as an application surface requires careful evaluation under actual use conditions. Some plastics embrittle on exposure and some plastics contain migrating constituents that may contaminate the adhesive or cause sheeting discoloration and adversely affect performance. Also, some plastics are affected by ingredients in the sheeting adhesives that migrate into the panel. 3M Information Folder 1.7 may provide further insight into applications on plastic substrates.

Note: Care must be exercised to avoid stretching material when aligning during application. This sheeting has sufficient elongation to permit its flexing on reboundable plastic devices when impacted. However, if it is stretched during application, this feature will be significantly reduced and cracking may result.

Adhesive and Film Properties

Standard Test Panels

Unless otherwise specified herein, sheeting should be applied to test panels and conditioned in accordance with ASTM D4956 and test methods and conditions should conform to ASTM D4956.

Properties

The following properties should conform to the requirements in ASTM D4956.

1. Adhesion
2. Outdoor weathering
   – retained coefficient of retroreflection
   – colorfastness
3. Shrinkage
4. Flexibility
5. Liner removal
6. Impact resistance
7. Night time color

In addition, Series 3300 sheeting will conform to the following properties.

1. Gloss
   Test Method — Test in accordance with ASTM D523 using a 60° glossmeter.
   Requirement — Rating not less than 50.
2. Optical Stability
   Test Method — Apply a 3 inch x 6 inch sample to a test panel. Measure R_A then place it in an oven at 71°C ± 3°C (160°F ± 5°F) for 24 hours followed by conditioning at standard conditions for two hours.
   Remeasure R_A.
   Requirement — The sheeting will retain a minimum of 85% and a maximum of 115% of the original coefficient of retroreflection.

Cleaning

Sheeting that requires cleaning should be flushed with water, then washed with a detergent solution and soft bristle brush or sponge. Avoid pressure that may damage the materials. Flush with water following washing. Do not use solvents to clean sheeting. See Information Folder 1.10.

Storage and Packaging	Series 3300 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 two years of the date of manufacture. 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. Devices such as drums should be stored or shipped vertically stacked to avoid scuffing during shipment.
Health and Safety Information	Read all health hazard, precautionary and first aid statements found in the Material Safety Data Sheet, and/or product label of chemicals prior to handling or use.
General Performance Considerations	The durability of Series 3300 depends upon many factors including, but not limited to, substrate selection and preparation, compliance with recommended application procedures, geographic area, exposure conditions, and maintenance. The user must determine the suitability of this material on any specific substrate or device for its intended use. Applications on improperly prepared, excessively rough or non-weather resistant surfaces, or exposure to severe or unusual conditions can reduce the durability of such applications. Purchaser should select a suitable test for determining reflective sheeting performance on any device or substrate. For reboundable substrates, the test should include plastic manufacturer's recommendation for impacting reboundable plastic traffic control devices.
3M Basic Product Warranty and Limited Remedy	3M™ Flexible Prismatic Reflective Sheeting Series 3300 ("Product") 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. If the Product is proven not to have met the Basic Warranty on its shipment date, then a buyer's exclusive remedy, and 3M's sole obligation, at 3M's option, will be refund or replacement of the Product.
Limitation of Liability and Remedies	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 PERFORMANCE, CUSTOM OR USAGE OF TRADE.
Literature Reference	Information Folder 1.5 Hand Application Instructions Information Folder 1.6 Hand Squeeze Roll Applicator Information Folder 1.7 Sign Base Surface Preparation Information Folder 1.8 Process Color Instructions Information Folder 1.10 Cutting, Premasking, and Prespacing Instructions Information Folder 1.11 Reflective Sheeting Sign Maintenance Management

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