



Flexible Prismatic Reflective Barricade Sheeting

Series 3334/3336 With Pressure Sensitive Adhesive

Product Bulletin 3334/3336

May 2014

Replaces MT PB 334/336 dated June 2008

Description

3M™ Flexible Prismatic Reflective Barricade Sheeting Series 3334/3336 is a prestriped orange and white or red and white barricade sheeting intended for reflectorizing traffic control barricades. Series 3334/3336 sheeting is designed for use on aluminum, wood substrates, and flame treated rigid plastic board panels as detailed in 3M Information Folder 1.7. Series 3334/3336 consists of impact resistant prismatic lens reflective sheeting precoated with pressure sensitive adhesive and exceeds the reflectivity values of ASTM Type III and Type IV. Series 3334/3336 is available in the following prestriped configurations:

Table 1
Barricade Sheeting Configuration

Orange/White
4-inch left stripe 3334L O/W
4-inch right stripe 3334R O/W
6-inch left stripe 3336L O/W, 3326L R/W
6-inch right stripe 3336R O/W, 3326R R/W

Note: "Left" sheetings have stripes that slope from the upper left to lower right and are placed on the left side of the roadway to move traffic to the right. Right sheetings are the opposite.

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

¹The 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 Limits² for new sheeting**

Color	1		2		3		4		Limit Y (%)	
	x	y	x	y	x	y	x	y	Min.	Max
White	.305	.305	.355	.355	.335	.375	.285	.325	40	—
Orange	.558	.352	.636	.364	.570	.429	.506	.404	14	30
Red	.648	.351	.753	.265	.629	.281	.565	.346	2.5	15

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

Coefficients of Retroreflection

The values in Table II are minimum coefficients of retroreflection expressed in candelas per foot candle per square foot (candelas per lux per square meter).

Test for Coefficients of Retroreflection

Conformance to coefficient of retroreflection requirements should be determined by instrumental 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 Meter (90° Rotation)

Observation ¹ Angle	-4° Entrance Angle ²	
	0.2°	0.5°
Orange/White	145/360	60/150
Red/White	65/360	27/150

Observation ¹ Angle	30° Entrance Angle ²	
	0.2°	0.5°
Orange/White	68/170	28/72
Red/White	30/170	13/72

¹Observation Angle - The angle between the illumination axis and the observation axis.

**Recommended
Application
Procedures**

Series 3334/3336 sheeting may be applied to barricade panels 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.

3M recognizes that some customers will choose to apply Series 3334/3336 sheetings to plastic substrates. Without endorsement of the use of such substrates, some comments regarding their use can be made. 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. Sheeting must NOT be applied to transparent or translucent materials as light transmission may adversely affect adhesion.

3M Information Folder 1.7 may provide further insight into applications on plastic substrates.

Note: Care must be taken to avoid stretching Series 3334/3336 sheetings during application.

Adhesive and Film Properties	<p>Standard Test Panels</p> <p>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.</p> <p>Properties</p> <p>The following properties should conform to the requirements in ASTM D4956.</p> <ol style="list-style-type: none"> 1. Adhesion 2. Outdoor weathering <ul style="list-style-type: none"> – retained coefficient of retroreflection – colorfastness 3. Shrinkage 4. Flexibility 5. Liner removal 6. Impact resistance 7. Night time color <p>In addition, Series 3334/3336 sheeting will conform to the following properties.</p> <ol style="list-style-type: none"> 1. Gloss <p>Test Method — Test in accordance with ASTM D523 using a 60° glossmeter.</p> <p>Requirement — Rating not less than 50.</p> 2. Optical Stability <p>Test Method — Apply a 3 inch x 6 inch sample to a test panel. Measure R_A then place it in an oven at $71^{\circ}\text{C} \pm 3^{\circ}\text{C}$ ($160^{\circ}\text{F} \pm 5^{\circ}\text{F}$) for 24 hours followed by conditioning at standard conditions for two hours. Remeasure R_A.</p> <p>Requirement — The sheeting shall retain a minimum of 85% and a maximum of 115% of the original coefficient of retroreflection.</p>
Cleaning	<p>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.</p>
Storage and Packaging	<p>Series 3334/3336 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. Devices such as drums should be stored or shipped vertically stacked to avoid scuffing during shipment.</p>
Health and Safety Information	<p>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.</p>
3M Basic Product Warranty and Limited Remedy	<p>3M™ Flexible Prismatic Reflective Barricade Sheeting Series 3334/3336 (“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.</p>
General Performance Considerations	<p>The durability of 3M™ Flexible Prismatic Reflective Barricade Sheeting Series 3334/3336 will depend 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.</p>

Limitation of Liability and Remedies	<p>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.</p> <p>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.</p>
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Literature Reference	Information Folder 1.3	Instructions for Squeeze Roll Applicator
	Information Folder 1.5	Hand Application Instructions
	Information Folder 1.6	Instructions for Hand Squeeze Roll Applicator
	Information Folder 1.7	Sign Base Materials
	Information Folder 1.8	Color Application Instructions
	Information Folder 1.10	Cutting, Matching, Premasking, and Prespacing Instructions
	Information Folder 1.11	Storage Maintenance, and Removal Instructions

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