

Transportation Safety Division

3M™ Flexible Engineer Grade Prismatic Reflective Sheeting Series 7600

Product Bulletin Series 7600

April 2023

1 Description

3M™ Flexible Engineer Grade Prismatic Reflective Sheeting Series 7600 with Pressure Sensitive Adhesive is a non-metalized micro-prismatic lens reflective sheeting designed for the production of durable traffic control signs and devices, that are exposed vertically in service.


Series 7600 is PVC free and comprises solventless adhesive¹, coated without the use of organic solvents.

Flexible Engineer Grade Prismatic Series 7600 utilizes a microseal technology that provides a uniform appearance and a whiter base color than typical enclosed lens glass beaded sheetings. The incorporated microseal technology also makes the Series 7600 plotter- and die-cuttable, and eliminates the need for edge sealing.

Series 7600 sheeting can easily be identified by the visible integral marking.

Applied to properly prepared sign substrates, Series 7600 provides long-term reflectivity and durability.

Sheeting	Color
7610	White

 3M™ Flexible Engineer Grade Prismatic Reflective Sheeting Series 7600 has been approved for the manufacturing of signfaces for traffic signs with a European Technical Assessment (ETA). All provisions concerning the attestation of conformity and the performances described in the ETA 19/0839 were applied and the product fulfills all the prescribed requirements (see the Declaration of Performance at the end of this document for more details).

¹ Due to the use of ancillary organic materials in the manufacturing of the adhesive, traces of organic solvent may be found in the product

2 Properties

The initial minimum coefficient of retroreflection of Flexible Engineer Grade Prismatic, when measured according to CIE 54.2 using CIE standard illuminant A, conforms to Table 3 of EN 12899-1:2007 for Class RA1 materials (Table A).

Geometry of measurements		Color					
α	β_1 ($\beta_2=0$)	White	Yellow	Red	Green	Blue	Brown
0,2°	+5°	70	50	14,5	9	4	1
	+30°	30	22	6	3,5	1,7	0,3
	+40°	10	7	2	1,5	0,5	#
0,33°	+5°	50	35	10	7	2	0,6
	+30°	24	16	4	3	1	0,2
	+40°	9	6	1,8	1,2	#	#
2°	+5°	5	3	1	0,5	#	#
	+30°	2,5	1,5	0,5	0,3	#	#
	+40°	1,5	1,0	0,5	0,2	#	#

“#“ indicates "Value greater than zero but not significant or applicable"

Table A: Minimum Initial Values for Retroreflection [$cd / (lx * m^2)$] for Class RA1

The above angular definitions apply for the CIE Goniometer system (co-planar geometry). The sheeting shall be mounted in 0° orientation on the goniometer.

The initial chromaticity coordinates and luminance factors conform to Table B (compare Class CR2 of EN 12899-1:2007).

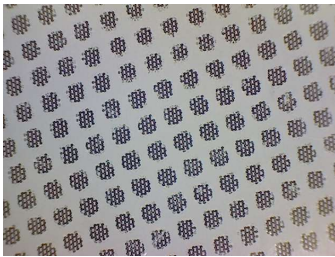
Color	1		2		3		4		Luminance factor β
	x	y	x	y	x	y	x	y	
White	0,305	0,315	0,335	0,345	0,325	0,355	0,295	0,325	$\geq 0,35$
Yellow	0,494	0,505	0,470	0,480	0,513	0,437	0,545	0,454	$\geq 0,27$
Red	0,735	0,265	0,700	0,250	0,610	0,340	0,660	0,340	$\geq 0,05$
Blue	0,130	0,090	0,160	0,090	0,160	0,140	0,130	0,140	$\geq 0,01$
Green	0,110	0,415	0,170	0,415	0,170	0,500	0,110	0,500	$\geq 0,04$
Brown	0,455	0,397	0,523	0,429	0,479	0,373	0,558	0,394	$0,09 \geq \beta \geq 0,03$

Table B: Chromaticity and luminance factors

3 Printed Colors

For printed color areas on white sheeting, when processed according to 3M™ recommendations, the coefficients of retroreflection shall not be less than 70% of the value for the corresponding color in table A. The chromaticity coordinates and luminance factors shall conform to table B.

4 Surface Pattern



The Flexible Engineer Grade Prismatic sheeting is differentiated from other prismatic or encapsulated lens sheeting by the distinctive surface pattern and the visible integral marking.

Figure 1 – Sheeting is positioned at 0° orientation

5 Orientation

Flexible Engineer Grade Prismatic Sheeting is designed to be an effective wide-angle reflective sheeting regardless of its orientation on the substrate or ultimate orientation after installation.

However, because the efficiency of light return from cube corner reflectors is not equal at all rotation angles, the sheeting should be positioned in 0° or 90° application orientation on the completed sign when wide entrance angle performance is important for a given sign type or situation.

6 Application

Flexible Engineer Grade Prismatic sheeting should be conditioned prior to application to provide a minimum sheeting temperature of 18°C throughout the roll or sheeting stack. The sheeting should be applied with mechanical squeeze roll applicators to properly prepared substrates.

If the application is done by hand, use firm pressure with a rubber roller or equivalent to obtain maximum initial adhesion. Use multiple, heavy overlapping strokes. Re-roll all edges. Hand application is recommended for copy only.

For further information refer to Information Folder IF 1.4, 1.5 and 1.6.

7 Splices

Flexible Engineer Grade Prismatic sheeting should be butt spliced or overlap spliced when more than one piece of sheeting is used on one piece of substrate. In case of butt-splice, the sheeting pieces should not touch each other. A splice gap of 1.5 mm + 0.5 mm is recommended. This is to prevent buckling as the sheeting expands in extreme temperature and humidity exposure.

8 Substrates

For fixed vertical road traffic sign use, product application is limited to properly prepared aluminum (see Information Folder 1.7). The substrate should be conditioned prior to application to provide a minimum surface temperature of 18°C.

Users are urged to carefully evaluate all other substrates for adhesion and sign durability. Flexible Engineer Grade Prismatic sheeting is designed primarily for applications to flat substrates. Rivets or bolts should also support any use that requires a radius of curvature of less than 130 mm.

Sign failures caused by the substrate or improper surface preparation are not the responsibility of 3M.

9 Compatible Products

Screenprint Applications

- 3M™ Process Color Series 990

Digital Printing Applications

- 3M™ Piezo Inkjet Ink Series 8800UV

(for Durst Rho 161TS and 162TS printer)

- 3M™ Piezo Inkjet Ink Series 8900UV

(for Durst Rho 163TS and EFI H1625RS printer)

- 3M™ Protective Overlay Film 1170

Copy Part Applications

- 3M™ Scotchcal™ Opaque Graphic Film 100-12

(other colors of Scotchcal™ Opaque Graphic Film Series 100 are compatible, regional warranties apply)

- 3M™ ElectroCut Film 1178

- 3M™ TFEC 260 D

All Applications

- Selected 3M application tapes

Important: Screen-printed sign faces must be sufficiently ventilated during the filling of the drying rack or immediately run through a conveyor. If the print is not ventilated properly, the solvents may damage the top film of the sheeting. Refer to Product Bulletin for 990 inks and Information Folder 1.8 for more details. Care should be taken to avoid flexing Series 7600 sheeting before and especially after screening.

10 Health and Safety Information

Read all health hazard, precautionary and first aid statements found in the Material Safety Data Sheets and/or product label of chemicals prior to handling or use.

11 General Performance Considerations

The performance and durability of 3M™ Flexible Engineer Grade Prismatic Reflective Sheeting Series 7600 will depend upon a number of factors including (but not limited to):

- Selection, preparation and temperature of the substrate
- Application procedures
- Geographic area
- Exposure and atmospheric conditions (e.g. snow, frost)
- Correct combination of sheeting, ink and overlay film
- Ink formulation
- Ink drying/curing methods
- Cleaning and maintenance methods

11.1 Warranty

3M™ Flexible Engineer Grade Prismatic Reflective Sheeting Series 7600 sold by 3M to be used for permanent traffic control signs and devices in Europe is warranted for a period up to 7 years from date of application (concrete definition of the period is subject to the terms of sale) to be free of defects in material and workmanship, subject to the following provisions:

If Sheeting Series 7600 is 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.

11.2 Important Notice to Purchaser

All statements, technical information and recommendations herein are based on tests we believe to be reliable, but the accuracy or completeness thereof is not guaranteed. Before using, user shall determine the suitability of the product for its intended use, and user assumes all risk and liability whatsoever in connection therewith. All questions of warranty and liability relating to this product are governed by the terms of the sale subject where applicable to the prevailing law.

No statement or recommendation not contained herein shall have any force or effect unless in an agreement signed by authorized personnel of seller and manufacturer.

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.

11.4 Limitation of Liability

Except for the limited remedy stated above, and except where prohibited by law, 3M will not be liable for any loss or damage arising from the Signs or any 3M product, whether direct, indirect, special, incidental or consequential damages (including but not limited to lost profits, business or revenue in any way), regardless of the legal theory asserted including warranty, contract, negligence or strict liability.

11.5 Other Product Information

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

11.6 Literature References

Instructions for Squeeze Roll Applicator	IF 1.4
Hand Application Instructions	IF 1.5
Instructions for Hand Squeeze Roll Applicator	IF 1.6
Sign Base Materials	IF 1.7
Instructions for using 3M Process Colors	IF 1.8
Cutting, Matching, Premasking and Prespacing Instructions	IF 1.10
Storage and Packaging	IF 1.11
3M Process Color Series 990	PB 990
Piezo Inkjet Ink Series 8800UV	PB 8800UV
Piezo Inkjet Ink Series 8900UV	PB 8900UV

For Further Assistance

For help on specific questions relating to 3M™ reflective products, please contact your local 3M Application Engineer or contact:

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