# Engineer Grade Reflective Sheeting

## Series 3290I

**Product Bulletin 3290I** **April 2009**

Replaces PB 3200I dated Feb. 2004

## 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.

## Description

3M™ Engineer Grade Reflective Sheeting Series 3290I is a glass-bead retroreflective sheeting, backed with a pressure sensitive adhesive designed for the production of durable traffic control signs, work zone devices and delineators, that are exposed vertically in service. Applied to properly prepared sign substrates, Series 3290I provides long term reflectivity and durability.

Series 3290I can either be supplied with a standard adhesive for high energy surfaces (e.g. aluminum) or with a high tack adhesive for medium energy surfaces (e.g. powder or PU coated aluminum and paints).

| Sheeting | Color |
|---|---|
| 3290I | White |
| 3271I | Yellow |
| 3272I | Red |
| 3275I | Blue |
| 3277I | Green |
| 3279I | Brown |

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3M™ Engineer Grade Reflective Sheeting Series 3290I is approved for the manufacturing of permanent vertical traffic signs according EN 12899-1:2007.
All provisions concerning the attestation of conformity and the performances described in Annex ZA of the standard EN 12899-1:2007 were applied and the product fulfills all the prescribed requirements (see the EC-declaration of conformity at the end of this document for more details).

## Properties

The initial minimum coefficient of retroreflection conforms to Table 3 of EN 12899-1:2007 for class RA1 materials (Table A).

| Geometry of measurements | | Color | | | | | |
|---|---|---|---|---|---|---|---|
| $\alpha$ | $\beta_1$ ($\beta_2$=0) | White | Yellow | Red | Green | Blue | Brown |
| 12' | + 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 | - |
| 20' | + 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 Coefficient of Retroreflection [cd/(lx · m$^2$)]**

The initial chromaticity coordinates and luminance factors conform to table 2 of EN 12899-1:2007 for Class CR2 (Table B).

| Color | 1 | | 2 | | 3 | | 4 | | Luminance factor |
|---|---|---|---|---|---|---|---|---|---|
| | x | y | x | y | x | y | x | y | $\beta$ |
| White | 0,305 | 0,315 | 0,335 | 0,345 | 0,325 | 0,355 | 0,295 | 0,325 | ≥ 0,35 |
| Yellow | 0,494 | 0,505 | 0,470 | 0,480 | 0,493 | 0,457 | 0,522 | 0,477 | ≥ 0,27 |
| Red | 0,735 | 0,265 | 0,700 | 0,250 | 0,610 | 0,340 | 0,660 | 0,340 | ≥ 0,05 |
| Blue | 0,130 | 0,086 | 0,160 | 0,086 | 0,160 | 0,120 | 0,130 | 0,120 | ≥ 0,01 |
| Green | 0,110 | 0,415 | 0,150 | 0,415 | 0,150 | 0,455 | 0,110 | 0,455 | ≥ 0,04 |
| Brown | 0,455 | 0,397 | 0,523 | 0,429 | 0,479 | 0,373 | 0,558 | 0,394 | 0,03 ≤ ß ≤ 0,09 |

**Table B: Chromaticity and luminance factors**

## 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.
This complies with the respective requirements in EN 12899-1:2007.

## Application

Engineer Grade Reflective Sheeting Series 3290I should be conditioned prior to application to provide a minimum sheeting temperature of 18°C throughout the roll or sheeting stack.
Series 3290I 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. For further information refer to Information Folder 1.4, 1.5 and 1.6.

## Compatible Products

*Screen Print Applications*

- 3M™ Process Colors 700
- 3M™ Process Colors 990

*Copy Part Applications*

- 3M™ Scotchcal™ Film 3650-12 (Black)
- 3M™ Scotchcal™ Film 100-12
- 3M™ ElectroCut™ Film Series 1170
- 3M™ TFEC 260 D

*All Applications*

- Selected 3M application tapes

**Important: Screen-printed sign faces must be sufficiently ventilated during the filling of the rack or immediately run through a conveyor. If the print is not ventilated properly, the solvents will soften the sheeting, making it difficult to laminate. Refer to Product Bulletin 700 and 990 and Information Folder 1.8 for more details.**

## General Performance Considerations

The performance and durability of 3M™ Engineer Grade Reflective Sheeting Series 3290I 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

**Warranty**

In Europe 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 3290I 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:

If Sheeting Series 3290I 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.

**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.

## Literature Reference

| | |
|---|---|
| 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 | IF1.8 |
| Cutting, Matching, Premasking and Prespacing Instructions | IF 1.10 |
| Storage and Packaging | IF 1.11 |

# EC-Declaration of Conformity

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Retroreflective Sign Face Material

3M Engineer Grade Reflective Sheeting Series 3290 I
White 3290 I
Yellow 3271 I
Red 3272 I
Blue 3275 I
Green 3277 I
Brown 3279 I

**Retroreflective Sheeting, using glass bead technology, for use on fixed vertical road traffic signs**

**Product Performance according to EN 12899-1:2007**

**Visibility Characteristics**
Daylight Chromaticity & Luminance Factor: Pass, Class CR2
Coefficient of Retroreflection: Class RA1
**Durability**
Resistance to weathering: Pass
Impact Resistance: Pass

Neuss, april 2009

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