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Commercial Branding and Transportation Division

3M™ High Intensity Prismatic Reflective Digital Sheeting Series 3930UDS

Product Bulletin Series 3930UDS February 2025

1 Description

3M™ High Intensity Prismatic Reflective Digital Sheeting Series 3930UDS ("Sheeting") is a retroreflective microprismatic digital sheeting that has been designed to optimize digital imaging of traffic control signs that are exposed vertically in service, when imaged with ultraviolet ink jet (UVIJ) inks, or latex ink jet inks and overlaminated with clear 3M™ Protective Overlay Film 1170C or 3M™ Premium Protective Overlay Film 1160i.

Sheeting is not suitable for a sign application without 3M™ Protective Overlay Film 1170C or 3M™ Premium Protective Overlay Film Series 1160i as overlaminate. Series 3930UDS comprises solventless adhesive[1], coated without the use of organic solvents.

CE 3M™ High Intensity Prismatic Reflective Digital Sheeting Series 3930UDS is certified for the manufacturing of signfaces for traffic signs with a European Technical Assessment (ETA). All provisions concerning the assessment and verification of constancy of performance described in the ETA-24/0244 were applied and the product fulfills all the prescribed requirements (see the Declaration of Performance at the end of this document for more details). The producer of digitally printed sign face constructions may use cascaded Initial Type Testing for the traffic colors and combinations that are covered in ETA 24/0244.

The Sheeting is available in the following colors.

Color	Product Code
White	3930UDS
Yellow	3931UDS

Table 1. *Product codes by color.*

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

2 Photometric and Colorimetric Properties

The initial minimum coefficient of retroreflection of 3M™ High Intensity Prismatic Reflective Digital Sheeting Series 3930UDS, when laminated with clear 3M™ ElectroCut™ Film 1170C or 3M™ Premium Protective Overlay Film Series 1160i, measured in accordance with the procedure specified in CIE Publication No. 54.2 using CIE standard illuminant A, conforms to the values in Table A. The angular definitions apply for the CIE Goniometer system (co-planar geometry). The sheeting shall be mounted in 0° orientation on the goniometer (as shown below).

Table A conforms to the requirements for Class RA2 in EN 12899-1:2007.

Geometry of measurements $\beta_2 = 0, \varepsilon = 0$	$\alpha = 0.2°$			$\alpha = 0.33°$			$\alpha = 2°$		
	$\beta_1 =$			$\beta_1 =$			$\beta_1 =$		
	5°	30°	40°	5°	30°	40°	5°	30°	40°
White	250	150	110	180	100	95	5	2.5	1.5
Yellow	170	100	70	120	70	60	3	1.5	1.0

Table A: Minimum Coefficient of Retroreflection [cd / (lx * m^2)] for Class RA2

The initial chromaticity coordinates and luminance factors conform to the colorbox of Table B, when illuminated with CIE standard illuminant D65 and measured with 45/0 geometry. The colorbox is similar to Class CR2 of EN 12899-1:2007 for Class RA 2 materials.

Color	1		2		3		4		Luminance factor Class B2
	x	y	x	y	x	y	x	y	β
White	0.305	0.315	0.335	0.345	0.325	0.355	0.295	0.325	≥ 0.27
Yellow	0.494	0.505	0.470	0.480	0.513	0.437	0.545	0.454	≥ 0.16

Table B: Chromaticity and luminance factors

For printed transparent color areas on white and yellow sheetings, when processed according to 3M recommendations, the coefficients of retroreflection shall not be less than 70% of the requirements for the corresponding color. For unprinted sheeting, covered with clear 3M™ Protective Overlay Film 1170C or 3M™ Premium Protective Overlay Film 1160i, when processed according to 3M recommendations, the coefficients of retroreflection shall not be less than 100% of the value in Table A. The chromaticity coordinates and luminance factors shall conform to table B. This complies with respective requirements in EN 12899-1 and ETA-24/0244.

3 System of Matched Components

For a complete list of matched components for the Sheeting, please see the 3M™ Sign Warranty Bulletin.

4 Orientation

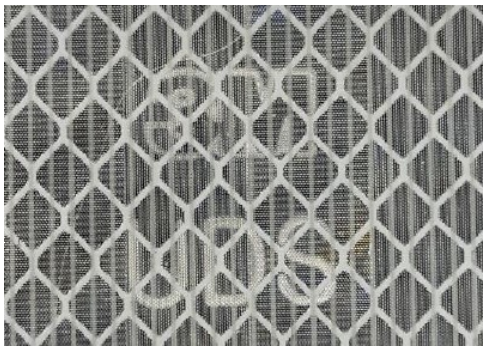

Figure 1 – Sheeting is positioned at 0° orientation

3M™ High Intensity Prismatic Reflective Digital Sheeting Series 3930UDS is differentiated from other prismatic or encapsulated lens sheeting by the distinctive surface pattern, permanently integrated in the sheeting.
3M™ High Intensity Prismatic Reflective Digital Sheeting Series 3930UDS has integrated 'UDS' marks to allow differentiation from regular 3M™ High Intensity Prismatic Series 3930 Sheeting.

The Sheeting is designed to be an effective wide angle reflective sheeting regardless of the orientation on the substrate or ultimate application 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.

4.1 Fabrication Lines

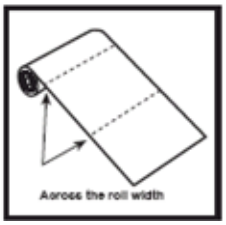

Figure 2 – Fabrication Lines

The manufacturing of prismatic sheeting results in fabrication lines being present in the product. In 3M™ High Intensity Prismatic Reflective Digital Sheeting Series 3930UDS these lines are slightly thicker than the seal pattern legs. Fabrication lines are noticeable in shop lights but are not observable on the road either in daylight or at night (Figure 2).

5 Substrates

Refer to 3M Information Folder 1.7 for surface preparation recommendations.

For traffic sign use, product application is limited to properly prepared aluminum. The substrate should be conditioned prior to application to provide a minimum surface temperature of 15°C (59°F).

Extrusions and flat panel signs are to be carefully trimmed, so that sheeting from adjacent panels do not touch on assembled signs. Users are urged to carefully evaluate all other substrates for adhesion and sign durability. 3M™ High Intensity Prismatic Reflective Digital Sheeting Series 3930UDS 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.

6 Sign Fabrication Methods

6.1 Squeeze Roll Application

Sheeting should be applied to Sign substrates at temperatures of 18°C (65°F) and higher using either of the following methods:

Mechanical squeeze roll applicator – refer to 3M Information Folder 1.4. Applications to extrusions that are edge wrapped require sufficient softening of the Sheeting prior to edge wrapping. Softening can be accomplished by directing additional heat to the “next to last” edge roller. This practice may increase productivity and minimize cracking.

Hand squeeze roll applicator – refer to 3M Information Folder 1.6 for details.

Background and complete Sign applications of Sheeting must be performed using a roll laminator, either mechanical or hand driven.

6.2 Splices

3M™ High Intensity Prismatic Reflective Digital Sheeting Series 3930UDS should be butt spliced when more than one piece of sheeting is used on one piece of substrate. The sheeting pieces should not touch each other. A splice gap of up to 1.5 mm is acceptable. This is to prevent buckling as the sheeting expands in extreme temperature and humidity exposure.

7 Imaging

Sheeting may be processed into traffic Signs using the imaging methods described below. Compatibility is backed with a 3M™ MCS™ Warranty or 3M™ MCS™ Warranty for Traffic when the printing guidelines referred to in the Literature References of Section 15 are followed. See Section 13 of this document for more information regarding the warranties. 3M assumes no responsibility for the failures of Sign face legends or backgrounds that have not been processed according to the 3M Sign Warranty Bulletin.

7.1 Digital Imaging

Sheeting is compatible with all 3M qualified digital printers and ink systems. Refer to 3M Information Folder 1.19, 3M Information Folder 1.20, 3M Information Folder 1.17 and HP Large Format Printing Knowledge Center for details. Use of 3M™ Protective Overlay Film 1170C or 3M™ Premium Protective Overlay Film 1160i is required.

8 Cutting

Sheeting may be cut. Sealing the cut edges of Sheeting is not required.

8.1 Plotter Cutting

Flatbed plotters can be used to cut Sheeting and offer the most consistent and reliable performance.

8.2 Other Cutting Methods

Sheeting may be hand cut or die cut one sheet at a time. Cutting procedures can be found in 3M Information Folder 1.10.

9 Shelf-Life, Processing, Storage, Packaging, and Cleaning

Please refer to 3M Information Folder 1.11.

10 Durability

Please refer to 3M Information Folder 1.7. Periodic Sign inspection and regular Sign replacement are strongly recommended to help Sign owners establish their own effective service life expectations, beyond the warranty period.

11 Health and Safety Information

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

12 General Performance Considerations

The performance and durability of 3M™ High Intensity Prismatic Reflective Digital Sheeting Series 3930UDS will depend upon a number of factors including (but not limited to):

- Application procedures
- Geographic area
- Exposure and atmospheric conditions (e.g. snow, frost)
- Correct combination of sheeting, piezo inkjet ink and overlay film
- Ink drying/UV curing methods
- Cleaning and maintenance methods

13 Warranty Information

Subject to terms and conditions 3M™ High Intensity Prismatic Reflective Digital Sheeting Series 3930UDS sold by 3M to be used for traffic control signs and devices in Europe may be warranted for a period up to 10 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, provided that:

If 3M™ High Intensity Prismatic Reflective Digital Sheeting Series 3930UDS 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.

This warranty is personal to the original purchaser of the 3M™ High Intensity Prismatic Reflective Digital Sheeting Series 3930UDS and may not be transferred or assigned without 3M approval.

13.1 Important Notice to Purchaser

So far as permitted by law all statements, technical information and recommendations herein are based on tests 3M believes 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.

13.2 Disclaimer

SO FAR AS IS PERMITTED BY LAW 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.

13.3 Limitation of Liability

So far as permitted by law 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.

13.4 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.

14 Literature References

3M IF 1.4	Instructions for Interstate Squeeze Roll Applicator
3M IF 1.5	Hand Application Instructions
3M IF 1.6	Hand Squeeze Roll Applicator
3M IF 1.7	Sign Base Surface Preparation
3M IF 1.10	Cutting, Premasking, and Prespacing
3M IF 1.11	Sign Maintenance Management
3M IF 1.17	User Guide 3M™ Reflective Sheeting and HP Latex 360/365 Printers
3M IF 1.19	Digital Imaging with Durst 163TS Printers on 3M™ Reflective Sheeting
3M IF 1.20	Digital Imaging with EFI H1625 RS Printer on 3M™ Reflective Sheeting
3M PB 1160i	3M™ Premium Protective Overlay Film 1160i
3M PB 1170	3M™ ElectroCut™ Film Series 1170
3M PB Slipsheeting	3M™ Slipsheeting

3M Sign Warranty Bulletin
3M™ MCS™ Warranty for Traffic Matrix for EFI H1625-RS
3M™ MCS™ Warranty Matrix for EFI H1625-RS
3M™ MCS™ Warranty Matrix for HP Latex 360/365 Printers
3M™ MCS™ Warranty for Traffic Matrix HP 360-365
3M™ MCS™ Warranty Matrix for Durst 163TS and 163TS-HS Printers
3M™ MCS™ Warranty for Traffic Matrix for Durst 163TS & 163TS-H
3M™ MCS™ Warranty Matrix for HP Latex 1500 Printer
3M™ MCS™ Warranty Matrix for Traffic for HP Latex 1500 Printer
HP 700, HP 800 Matrix
HP 700, HP 800 Matrix for Traffic
HP Large Format Printing Knowledge Center

Internet: http://www.mmm.com/roadsafety

3M assumes no responsibility for any injury, loss, or damage arising out of the use of a product that is not of our manufacture. Where reference is made in literature to a commercially available product, made by another manufacturer, it shall be the user's responsibility to ascertain the precautionary measures for its use outlined by the manufacturer.

Important Notice

All statements, technical information and recommendations contained herein are based on tests 3M believes to be reliable at the time of this publication, but the accuracy or completeness thereof is not guaranteed, and the following is made in lieu of all warranties, or conditions express or implied. Seller's and manufacturer's only obligation shall be to replace such quantity of the product proved to be defective. Neither seller nor manufacturer shall be liable for any injury, loss, or damage, direct, indirect, special, or consequential, arising out of the use of or the inability to use the product. Before using, user shall determine the suitability of the product for his/her intended use, and user assumes all risk and liability whatsoever in connection therewith. Statements or recommendations not contained herein shall have no force or effect unless in an agreement signed by officers of seller and manufacturer.

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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