

Commercial Branding and Transportation Division

3M™ Vinyl Roll-Up Sign Sheeting Series RS30

Product Bulletin RS30
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1 Description

3M Vinyl Roll-Up Sign Sheeting Series RS30 (“Sheeting”) consists of retroreflective microprisms formed on a flexible glossy and UV-stabilized polymeric film, designed for the production of roll-up traffic control signs used in work zones and as emergency traffic control measures. This sign Sheeting has been designed to provide higher nighttime sign brightness. Series RS30 Sheeting has a protective film on the face side and does not require solvent cleaning or wiping prior to screen processing.

Series RS30 Sheeting is backed with a heavy duty vinyl coated fabric.

For details of the features and benefits of Series RS30 Sheeting, please refer to the 3M website at www.3M.com/roadsafety/.

Series RS30 Sheeting is available in the following colors.

Table 1. Product Codes by Color

Color	Product Code
White	RS30
Fluorescent Pink	RS33
Fluorescent Orange	RS34

2 Photometrics

2.1 Daytime Color (x, y, Y)

The chromaticity coordinates (x, y) and total daytime luminance factors (Y%) of Series RS30 retroreflective Sheetings conform to the values limits presented in Table 2 when tested in accordance with the methods specified in ASTM E-810.

Table 2. CIE Daytime Chromaticity Coordinate Limits^a and Luminance Factor Minima

	1		2		3		4		Luminance Factor Min.
Color	x	y	x	y	x	y	x	y	Y%
White	0.303	0.300	0.368	0.366	0.340	0.393	0.274	0.329	30
Fluorescent Pink	0.450	0.270	0.590	0.350	0.644	0.290	0.536	0.230	25
Fluorescent Orange	0.583	0.416	0.535	0.400	0.595	0.351	0.645	0.355	25

a. The four pairs of chromaticity coordinates define the acceptable color limits for CIE D65 illumination in terms of the CIE 1931 Standard Colorimetric System.

2.2 Color Test – Fluorescent Sheeting

Conformance to standard chromaticity (x, y) and luminance factor (Y%) requirements shall be determined instrumentally in accordance with ASTM E 991 on Sheeting applied to smooth 6061-T6 or 5052-H38 aluminum alloy test panels. Chromaticity values shall be determined on a HunterLab ColorFlex 45/0 spectrophotometer.

Computations shall be done using CIE Illuminant D65 and the 2° standard observer.¹

2.3 Color Test – Ordinary Colored Sheeting

Conformance to standard chromaticity (x,y) and luminance factor (Y%) requirements shall be determined instrumentally in accordance with ASTM E 1164, on Sheeting applied to smooth 6061-T6 or 5052-H38 aluminum alloy test panels. Chromaticity values shall be determined on a HunterLab ColorFlex 45/0 spectrophotometer.

Calculations shall be performed using CIE Illuminant D65 and the 2° standard observer.¹

2.4 Coefficients of Retroreflection (R_A)

The values presented in Table 3 are minimum coefficients of retroreflection, expressed in candelas per lux per square meter (cd/lux/m²). When tested in accordance with ASTM E-810 the welded sign blank material shall meet the minimum R_A values presented in Table 3.

Table 3. Minimum Coefficient of Retroreflection, R_A, Values for New Sheeting (cd/lux/m²)

Color	Observation Angle ^a	Entrance Angle ^b	
		-4°	30°
White	0.2°	250	95
	0.5°	120	50
Fluorescent Pink	0.2°	160	100
	0.5°	100	40
Fluorescent Orange	0.2°	200	100
	0.5°	90	34

a. Observation (Divergence) Angle - The angle between the illumination axis and the observation axis.

b. Entrance (Incidence) Angle - The angle from the illumination axis to the retroreflector axis.
The retroreflector axis is an axis perpendicular to the retroreflective surface.

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 shall be the referee instrument.

2.5 Test for Coefficients of Retroreflection

Conformance to coefficient of retroreflection requirements shall be determined instrumentally in accordance with ASTM E-810 "Test Method for Coefficient of Retroreflection of Retroreflective Sheeting." Per ASTM E-810, the values obtained at 0° and 90° rotations were averaged to determine the R_A values presented in Table 3.

3 Specifications

This prismatic retroreflective Sheeting, designed for use in the construction of roll-up sign blanks, shall consist of a high gloss transparent UV-stabilized film that has been bonded to a layer of cube corner prisms and backed with heavy duty vinyl coated fabric, and conform to the following specifications:

3.1 Conditioning

Flexibility and impact resistance measurements shall be performed on new test specimens that have been conditioned for 24 hours at a temperature of $73 \pm 3^\circ\text{F}$ ($23 \pm 1^\circ\text{C}$) and a relative humidity of $50 \pm 5\%$ prior to testing.

3.2 Flexibility

Test Method

After conditioning per Section 3.1, in one second, bend sample around a 1/8" (3.2mm) mandrel with the gray side of the samples facing the mandrel.

Requirement

There shall be no cracking or crazing of the Sheeting.

3.3 Ambient Temperature Impact Resistance

Test Method

After conditioning per Section 3.1, subject the Sheeting to the impact of a 4 lb. (1.82 kg) weight with a 5/8 inch (15.8mm) diameter rounded tip, dropped from the height necessary to generate an impact of 100 inch - lb., as per ASTM D4956.

Requirement

The Sheeting shall show no cracking or delamination outside the area of impact contacted by the weight.

3.4 Cold Temperature Impact Resistance

Test Method

After conditioning per Section 3.1, subject the Sheeting to the impact of a 4 lb. (1.82 kg) weight, with a 5/8" (15.8 mm) diameter rounded tip, dropped from the height necessary to generate an impact of 100 inch - lb., as per ASTM D4956.

Requirement

The Sheeting shall show no cracking or delamination outside the actual area of impact.

3.5 Tensile Strength

Requirement

Sheeting will meet a minimum tensile strength rating of 2600 PSI, when measured according to ASTM D-882.

3.6 Modulus of Elasticity

Requirement

Sheeting will meet a minimum modulus of elasticity value of 1600 PSI, when measured according to ASTM D-882.

3.7 Solvent Resistance

Requirement

Series RS30 Sheeting will not dissolve or pucker when wiped with a soft cloth containing mineral spirits, turpentine, methanol, VM&P Naphtha, aqueous HCl (5%), or aqueous NaOH (5%).

3.8 Accelerated Weathering

Requirement

Sheeting shall retain 50% of the R_A minimum requirement presented in Table 3 after 250 hours, when tested in accordance with ASTM G23 Type E or EH with humidity off.

4 Fabrication Procedures

4.1 Structural Support

As supplied, 3M Vinyl Roll-Up Sign Sheeting Series RS30 includes a plastic protective film which must be removed prior to fabricating the sign. The protective film can be easily lifted by bending the sign at a corner or seam, it must be removed prior to screen processing, and it is recyclable as classified under SPI Code 1. Screen processing should be completed within 24 hours of removing the plastic film. If the protective film is left on the Sheeting surface until immediately before screen processing, Series RS30 Sheeting does not require solvent cleaning or wiping prior to screen processing.

Note: Removal of the protective film may generate static electricity and should not be done in the presence of flammable solvents.

Series RS30 Sheeting has been designed to be sewn or riveted with corner pockets or snaps. Cross brace supports can then be used with the Sheeting in conjunction with portable sign stands. All corner pockets and washers should be nylon, rubber, or plastic materials. Avoid using hardware or mounting brackets that have sharp edges with the Sheeting.

Separate overlay (copy/symbol) pieces can be attached to roll-up signs using 3M Dual Lock™ Reclosable Fastener SJ3543 Type 250 Stems or 3M Scotchmate™ Hook and Loop Fastening System SJ3526 Loops with SJ3527 Hooks. Prepare Sheeting surface by cleaning it with an IPA (isopropyl alcohol) cleaning spray to remove dirt and other surface contaminants. Peel the protective liner off the fastener and apply it with firm roll down pressure to assure complete adhesive contact with the Sheeting. Apply fasteners at temperatures of 68°F (20°C) and above.

If the product is expected to perform in environments below 20°F (-7°C), sewing overlay pieces with an industrial sewing machine is highly recommended.

4.2 Screen Processing

Screen processing should be done within 24 hours of removing the protective film. The off-contact screen process method is the preferred screening method for roll-up sign Sheeting. The screening table must be perfectly flat. When screening roll-up Sheeting, hold sheets in place using a vacuum table or, if a vacuum table is not available, sheets can be held in place on a non-porous table surface using a thin, uniform layer of low tack pressure sensitive adhesive. Screen meshes should be P.E. 157 - P.E. 175 monofilament fabrics. A sharp squeegee made of medium or hard rubber is recommended. Do not stencil process colors or use of screen fabric mesh sizes other than those described above; doing so may result in unsatisfactory colors or durabilities.

Note: 3M Process Color 1805 Black is the recommended process color for Series RS30 roll-up sign Sheeting. Use 3M Thinner CGS-50 to thin process color 1805 Black. For a full color palette, 3M Process Color Series 990 may also be used on Series RS30 Sheeting. However, Series 990 Process Colors must be coated with 3M Scotchlite™ Screen Printing Glass Clear 4430R. 4430R can be applied only after the Series 990 ink has been allowed to dry for 2 hours. Screen printed Sheeting must be allowed to dry for 24 hours (on a drying rack) before being rolled up or having pockets attached.

See [3M Product Bulletin 1800](#) or call 3M Technical Services at 1-800-553-1380 for further details..

5 Storage, Packaging, and Cleaning

Unprocessed Sheeting should be stored in a cool, dry area, preferably at a temperature of 65°-75°F (18°-24°C) and a relative humidity of 30-50%, and should be used within two years of the date of manufacture.

Unprocessed sheets should be stored flat, as packaged and supplied. The Sheeting's protective film should be left on the Sheeting until processing.

See [3M Information folder 1.11](#) for details regarding storage and packaging. Finished roll-up signs should be stored dry and rolled up properly, as per the sign manufacturer's specifications.

6 Durability

The durability of RS30 Sheeting will depend upon substrate selection and preparation, compliance with recommended application procedures, geographic area, exposure conditions, and maintenance. Maximum durability of RS30 Sheeting can be expected in applications subject to vertical exposures on stationary objects, when processed and prepared according to the recommendations provided in [3M Information Folder 1.7](#).

7 Health and Safety Information

Read all health hazard, precautionary, and first aid statements found in the Safety Data Sheets (SDS) and Article Information Sheets for important health, safety, and environmental information. To obtain SDSs and Article Information Sheets for 3M products, go to 3M.com/SDS, contact 3M by mail, or for urgent requests call 1-800-364-3577.

8 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.3M.com/roadsafety>.

9 Literature References

3M IF 1.7	Sign Base Surface Preparation
3M IF 1.8	Process Color Instructions
3M IF 1.10	Cutting, Matching, Premasking & Prespacing Instructions
3M IF 1.11	Storage Maintenance and Removal Instructions
3M PB 990	3M™ Process Colors
3M PB 1800	3M™ Process Colors
3M PB 4400	Piezo Inkjet Ink Series 4400 Product & Instruction Bulletin

ASTM Test Methods are available from ASTM International, West Conshohocken, PA.

For Information or Assistance

Call: 1-800-553-1380

In Canada Call:

1-800-3M HELPS (1-800-364-3577)

Internet:

<http://www.3M.com/roadsafety>

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