

Avery Dennison®
T-7513 Fluorescent Yellow-Green
Fluorescent Prismatic Grade Retroreflective Sheeting
Permanent Traffic Signage
Pressure Sensitive Adhesive for Aluminum

Data Bulletin # T-7513

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Description:

Avery Dennison® T-7513 Fluorescent Yellow-Green Prismatic Grade Retroreflective Sheeting is a super-high performance, durable micro-prismatic retroreflective sheeting. Its unique combination of long-term fluorescent light-fastness and microprismatic reflectivity offers the driver the highest levels of visibility available, 24-hours each day. The fluorescent yellow-green color offers exceptional daytime brightness, especially at twilight and dawn. Perfect for school zone and cross walk signs. Meets applicable requirements for Prismatic Grade sheeting applications for Type VIII retroreflective sheeting as set forth in ASTM D 4956.

Construction:

Reflective Layer:	Proprietary polymer composite
Adhesive	Permanent Pressure Sensitive (Class 1).
Liner:	Poly liner

Daytime Fluorescence:

Sheetings get their color by absorbing some wavelengths and emitting or reflecting other wavelengths. For non-fluorescent sheetings, the absorbed light is lost. For fluorescent sheetings, some of that absorbed light becomes additional emitted light. This is what produces the exceptionally bright colors of fluorescence. The brightness advantage is especially pronounced at twilight and dawn.

Standard daylight (D65 light source) colors of fluorescent sheetings can be measured in accordance with ASTM E-1349 using 45/0 (or equivalent 0/45) geometries, CIE illuminant D65, and the 1931 CIE 2-degree standard observer. The daytime (D65 light source) color of T-7513 shall conform to the requirements identified in the table below.

Daytime Color Box and Total Luminance Factor:

Daytime Color^a	x	y	Total Daytime Luminance Factor (Y%)^b	Minimum Y% for Avery Dennison T-7513
Fluorescent Yellow-Green	0.387 0.369 0.428 0.460	0.610 0.546 0.496 0.540	> 0.70 × Y _M	60

a. The four pairs of chromaticity coordinates determine the acceptable color in terms of the CIE 1931 Standard Colorimetric System measured with CIE Standard Illuminant D65.

b. Y_M, the MacAdam limit luminance factor, is defined as the maximum Y producible by any imaginable non-flourescent object (i.e. sheeting). For each chromaticity, in each illuminant, there is a unique optimal color having this maximum Y. To ensure the brilliant appearance of the fluorescent color exists, the total luminance factor (Y%) in illuminant D65 must remain above 70% of the MacAdam limit, Y_M. For a detailed discussion on MacAdam's limits and the calculation thereof, refer to Technical Bulletin 8.50.

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Twilight-Dawn Fluorescent Color:

The brightness of fluorescent colors is especially pronounced at twilight and dawn when the balance of light is tipped towards the absorbed wavelengths of the fluorescent sheetings. Since more light is absorbed, more light is emitted from the fluorescent sheeting. CIE non-standard illuminant D150 is a suitable representation of twilight-dawn light.

The twilight-dawn color of T-7513 sheeting shall conform to the requirements in the table below. To measure twilight-dawn color, a 2-monochromator spectrophotometer employing annular 45/0 (or equivalent 0/45) illuminating and viewing geometries should be utilized. The total chromaticity coordinates and total luminance factor shall be calculated from the measured spectral reflectance factor in accordance with ASTM E 308 using CIE non-standard illuminant D150 and the CIE 1931 standard observer.

Twilight-Dawn (D150) Color	Total Luminance Factor (Y%) ^c	Initial Y% (D150) for Avery Dennison T-7513
Fluorescent Yellow-Green	> 0.85 * Y _M	115 +/- 6.0

c. Y_M, the MacAdam limit luminance factor, is defined as the maximum Y producible by any imaginable non-fluorescent object (i.e. sheeting). For each chromaticity, in each illuminant, there is a unique optimal color having this maximum Y. To ensure that the brilliant appearance of the fluorescent color exists at twilight and dawn, the total luminance factor (Y%) in a D150 illuminant must remain above 85% of the MacAdam limit, Y_M. For a detailed discussion on MacAdam's limits and the calculation thereof, refer to Technical Bulletin 8.50.

Nighttime Color:

By nature, fluorescence is not a nighttime phenomenon and does not contribute to the color of sheeting at night. Instead, nighttime color is governed almost entirely by retroreflection. At night, T-7513 Fluorescent Yellow-Green Sheeting reflects a vibrant yellow color.

The nighttime color of T-7513 shall be defined by the four pairs of chromaticity coordinates identified below. Measurements of nighttime chromaticity shall be in accordance with test method ASTM E 811. The observation angle (alpha) shall be 0.33 degrees. The entrance angle shall be beta₁ = 5 degrees and beta₂ = 0 degrees. The rotation angle (epsilon) shall be 0 degrees. The chromaticity coordinates shall be calculated from the measured spectral reflectance factor in accordance with ASTM E 308 using CIE standard illuminant A and the CIE 1931 standard observer.

Nighttime Color Box:

Nighttime Color ^d	x	y
Fluorescent Yellow-Green	0.590	0.410
	0.550	0.410
	0.470	0.490
	0.480	0.520

d. The four pairs of chromaticity coordinates determine the acceptable color in terms of the CIE 1931 Standard Colorimetric System measured with CIE Standard Illuminant A with beta₁ = 5°, beta₂ = 0°, and rotational angle (epsilon) = 0°.

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Photometric Performance:

Minimum Coefficient of Retroreflection (R_A) (cd / lx / m²)

Observation Angle	Entrance Angle	Fluorescent Yellow-Green
0.1°	-4°	800
	30°	370
0.2°	-4°	560
	30°	260
0.5°	-4°	200
	30	92

Note: 0.1° Observation angle is a "Supplemental Requirement" in ASTM D-4956. It represents long highway viewing distances of about 275 Meters (900 ft.) and greater.

Other Specifications:

Consult your Avery Dennison Representative for information concerning additional world-wide specifications.

Physical Properties:

Outdoor Durability	Avery Dennison T-7513 provides exceptional outdoor durability and is suitable for use on permanent traffic signage applications. Refer to the appropriate Avery Dennison product warranty for specific details.
Minimum Surface & Ambient Air Application Temperature	65°F (18°C) when applied with a squeeze roll applicator.
Application Surface	Flat surfaces only. Not recommended for unpainted stainless steel. Always pretest your specific substrate prior to application. Note: Wet method of application is not recommended for Avery Dennison T-7513 reflective sheeting.
Service Temperature Range	-40°F to 180°F (-40°C to 82°C)
Typical Film Caliper (w/adhesive)	20 to 21 mils
Shelf Life	One year when stored at the following temperature and conditions 68° - 77°F (20° - 25°C) and 50% ± 5% R.H.
Other Tests:	T-7513 meets other requirements set forth in ASTM D 4956 including Shrinkage, Liner removal, Adhesion, Impact resistance, and Specular gloss.

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Application & Converting Information:

The following Avery Dennison literature will provide complete information to the user for proper application, storage, and other requirements and is available from your Avery Dennison representative or upon request:

Fluorescent products are sensitive to incidental contact that can cause a defect to the sheeting. Handle the rolls carefully to avoid damage to the sheeting. Take care not to fold the sheeting to a point that will create a material stress crease. Also, the lamination roll must be smooth. Dirt or debris on the lamination roll may create a blemish to the sheeting. Keep the original protective packaging on the roll. Remove it only after the roll has been loaded on to the squeeze roll applicator, and retain the protective packaging, and return it to the balance of the unused roll if returning to inventory.

Approved screen printing inks:

Ink Supplier	Ink Series	Ink System	Instructional Bulletins
Avery Dennison	4930	1 Part Solvent	#8.40
Avery Dennison	7T5™	1 Part Solvent	#8.37

Sign Mounting /Orientation:

This prismatic sheeting does not require a special orientation for mounting and thus does not require an orientation arrow (datum mark).

Instructional Bulletins:	
Sheeting Care & Handling	#8.00
Substrate Requirements	#8.01
Application Techniques for PS Sheeting	#8.10
Steel Rule Die-Cutting	#8.20
Thermal Die Cutting	#8.20
Screen Preparation	#8.30
Troubleshooting Printing & Processing	#8.34
Proper Sign Storage Booklet	#8.50

Warranty:

WARRANTY: All statements, technical information and recommendations about Avery Dennison products are based upon tests believed to be reliable but do not constitute a guarantee or warranty. All Avery Dennison products are sold with the understanding that Purchaser has independently determined the suitability of such products for its purposes. Avery Dennison products are warranted to be free from defects in material and workmanship for either one year (or the period stated on the specific product information literature in effect at time of delivery, if longer) from date of shipment if said product is properly stored and applied. It is expressly agreed and understood that Avery Dennison's sole obligation and Purchaser's exclusive remedy under this warranty, under any other warranty, express or implied, or otherwise, shall be limited to repair or replacement of defective product without charge at Avery Dennison's plant or at the location of product (at Avery Dennison's election), or in the event replacement or repairs is not commercially practical, to Avery Dennison's issuing Purchaser a credit reasonable in light of the defect in the product.

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