

**LOUISIANA  
DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT  
SPECIFICATIONS**

**DOTD TYPE-X REFLECTIVE SHEETING**

**DESCRIPTION:**

DOTD Type-X reflective sheeting shall conform to ASTM D 4956 except as modified herein. DOTD Type-X reflective sheeting shall be an approved product listed in AML (Approved Materials List) for Reflective Sheeting, DOTD Type X, Permanent.

**MATERIALS:**

The sheeting shall be a super high-intensity retroreflective sheeting having highest retroreflectivity characteristics at medium distances. This sheeting is typically an unmetalized microprismatic retroreflective element material.

- 1.) DOTD Type X Retroreflective Sheeting: Physical properties shall comply with ASTM D 4956. Color shall conform to ASTM D 4956, Table 11. Luminance shall conform to ASTM D 4956, Table 2. Retroreflectivity properties shall be as follows:

- (a) Retroreflectivity: Minimum Coefficients of Retroreflection shall be as specified in Table 1015-3.

Table 1015-3

Coefficients of Retroreflection for DOTD Type X Sheeting<sup>1</sup>

Observation Angle, (degrees)	0.2	0.2	0.5	0.5
Entrance Angle, (degrees)	-4	+30	-4	+30
White	560	280	200	100
Yellow	420	210	150	75
Orange	210	105	75	37
Green	56	28	20	10
Red	84	42	30	15
Blue	28	14	10	5.0
Brown	17	8.4	6.0	3.0
Fluorescent Yellow-Green	450	220	160	80
Fluorescent Yellow	340	170	120	60
Fluorescent Orange	170	84	60	30

<sup>1</sup>Minimum Coefficient of Retroreflection ( $R_A$ ) ( $\text{cd lx}^{-1}\text{m}^{-2}$ )

- (b) Adhesive Classes: The adhesive required for retroreflective sheeting shall be Class 1 (pressure sensitive) as specified in ASTM D 4956.
- (c) Accelerated Weathering: Reflective sheeting, when processed, applied and cleaned in accordance with the manufacturer's recommendations shall perform in accordance with Table 1015-4

Table 1015-4  
 Accelerated Weathering Standards<sup>1</sup>

Type	Retroreflectivity <sup>2</sup>				Colorfastness <sup>3</sup>	
	Orange/ Fluorescent Orange		All colors, except Orange/ Fluorescent Orange		Orange/ Fluorescent Orange	All colors, except Orange/ Fluorescent Orange
DOTD X	1 year	80 <sup>4</sup>	1 year	80 <sup>4</sup>	1 year	3 years

<sup>1</sup>At an angle of 45° from the horizontal and facing south in accordance with ASTM G7 at an approved test facility in Louisiana or South Florida.

<sup>2</sup>Percent retained retroreflectivity of referenced table after the outdoor test exposure time specified.

<sup>3</sup>Colors shall conform to the color specification limits of ASTM D 4956 after the outdoor test exposure time specified.

<sup>4</sup>Table 1015-3

- (d) Performance: Reflective sheeting for signs, when processed, applied and cleaned in accordance with the manufacturer's recommendations shall perform outdoors in accordance with the performance standards in Table 1015-5.

Table 1015-5  
 Reflective Sheeting Performance Standards

Type	Retroreflectivity <sup>1</sup> -- Durability <sup>2</sup>				Colorfastness <sup>3</sup>
	Orange/ Fluorescent Orange		All colors, except orange/Fluorescent Orange		
DOTD Type X	3 years	80 <sup>5</sup>	10 years	80 <sup>5</sup>	3 years

<sup>1</sup>Percent retained retroreflectivity of referenced table after installation and the field exposure time specified.

<sup>2</sup>All sheeting shall maintain its structural integrity, adhesion and functionality after installation and the field exposure time specified.

<sup>3</sup>All colors shall conform to the color specification limits of ASTM D 4956 after installation and the field exposure time specified.

<sup>4</sup>Table 1015-3

- (e) Temporary Signs, Barricades, Channelizing Devices, Drums and Cones: temporary warning construction signs used on the mainline of freeways and expressways shall be fluorescent orange and meet the requirements of DOTD Type X.
- (f) Sheeting Guaranty. The contractor shall provide the Department with a guaranty from the sheeting manufacturer stating that if the retroreflective sheeting fails to comply with the performance requirements of this subsection, the sheeting manufacturer shall do the following as indicated in Table 1015-6:

Table 1015-6  
 Manufacturer's Guaranty-Reflective Sheeting

Type	Manufacturer shall restore the sign face in its field location to its original effectiveness at no cost to the Department if failure occurs during the time period <sup>1</sup> as specified below		Manufacturer shall replace the sheeting required to restore the sign face to its original effectiveness at no cost to the Department if failure occurs during the time period <sup>1</sup> as specified below
	Orange/Fluorescent Orange	All colors, except orange/Fluorescent Orange	All colors, except orange/Fluorescent Orange
DOTD Type X	<3 years	<7 years	7-10 years

<sup>1</sup> From the date of sign installation.

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12074-12092, 50591, and 50593

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Replacement sheeting for sign faces, material, and labor shall carry the unexpired guaranty of the sheeting for which it replaces.

The sign fabricator shall be responsible for dating all signs with the month and year of fabrication at the time of sign fabrication. This date shall constitute the start of the guaranty obligation period.

**PACKING AND MARKING:**

The DOTD Type X reflective sheeting shall be packaged in suitable containers to which it will not adhere during shipment and storage. Each container label shall designate the color, manufacturer's name, batch number and the date of manufacture. Each batch manufactured shall have its own separate number. The label shall specify the application requirements (primer, preheating of pavement, etc.) for the material. Application instructions shall be provided with each batch of material.

**CERTIFICATION:**

The successful vendor(s) shall provide a Certificate of Compliance indicating the material conforms to these requirements with each shipment. Certificate will be kept on file by the Department.