

EXPECTED IMPLEMENTATION JULY 2010

994 RETROREFLECTIVE AND NONREFLECTIVE SHEETING FOR TRAFFIC CONTROL DEVICES.

(REV 11-16-09) (FA 11-30-09) (7-10)

SECTION 994 (PAGES 977 – 980) is deleted and the following substituted:

SECTION 994 RETROREFLECTIVE AND NONREFLECTIVE SHEETING FOR TRAFFIC CONTROL DEVICES

994-1 Description.

994-1.1 General: This Section specifies the requirements for retroreflective and nonreflective sheeting materials, transparent and opaque process inks for retroreflective sheeting materials and film overlays for traffic control devices.

994-1.2 Classification: Retroreflective sheeting material Types III, IV, V, and VI shall be classified in accordance with ASTM D-4956. In addition, a special classification, Type VII (Special) is added for super high intensity retroreflective sheeting. This special classification shall include materials classified as Type VIII and above in accordance with ASTM D-4956.

994-1.3 Qualified Products List: All sheeting, process inks and film overlay materials shall be listed on the Qualified Products List (QPL). Manufacturers seeking evaluation of their products shall submit product data sheets, performance test reports from an independent laboratory showing the product meets the requirements of this section, and a QPL application in accordance with Section 6. Information on the QPL application must include the product colors included in the application, classification, adhesive backing class, and liner type. Information on the QPL application for process inks and film overlay products must also include the compatible reflective sheeting material.

994-2 Materials.

Sheeting shall meet the requirements of Types III, IV, V, VI in ASTM D-4956 or Type VII (Special) and fluorescent pink listed below in accordance with their approved usage.

994-3 Performance Requirements.

994-3.1 General: Sheeting, process inks and film overlay materials shall be tested in accordance with, and meet all the performance requirements of ASTM D-4956, including Supplemental Requirement S2, Reboundable Sheeting Requirements, except as amended in this Section. Classification Type VII (Special) shall be tested in accordance with, and meet the performance requirements of ASTM D-4956 Type VIII, except as amended in this Section. For performance requirements that are color dependant, each color included in the QPL application must be tested and meet the requirements identified in ASTM D-4956 or this Section as applicable. Process inks and film overlay materials shall be applied to reflective sheeting in accordance with Section 994-4 for testing. Fungal resistance testing is required.

994-3.2 Retroreflective Intensity: The retroreflective sheeting shall meet the minimum initial requirements as stated for 0.2 degree and 0.5 degree observation angles in ASTM D-4956. Type VI fluorescent pink sheeting and Type VII (Special) sheeting shall meet the minimum retroreflectivity requirements listed below.

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Type VII (Special) Sheeting										
Minimum Coefficient of Retroreflection (cd/foot-candle·ft ²)(cd/fc·ft ²)										
Observation/Entrance Angle (degree)	White	Yellow	Red	Orange	Blue	Green	Brown	Fluorescent Orange	Fluorescent Yellow	Fluorescent Yellow/Green
0.2/-4	380	304	95	250	19	38	19	180	220	360
0.5/-4	250	195	55	100	12	25	8	60	145	235
0.2/30	220	176	48	110	11	22	9	85	125	205
0.5/30	135	105	30	50	7	14	3	33	75	125

Type VI Sheeting	
Minimum Coefficient of Retroreflection (cd/foot-candle·ft ²)(cd/fc·ft ²)	
Observation/Entrance Angle (degree)	Fluorescent Pink
0.2/-4	160
0.5/-4	100
0.2/30	100
0.5/30	40

994-3.3 Color: The fluorescent pink initial color shall meet the following x, y chromaticity coordinates:

Fluorescent Pink	1	2	3	4
x	.450	.590	.644	.536
y	.270	.350	.290	.230

Fluorescent pink sheeting shall have a minimum luminance factor of 25.

994-3.4 Outdoor Weathering: Outdoor weathering exposure of sign sheeting materials shall be in accordance with, and meet the requirements of ASTM D-4956 for each product color and classification and conducted at an exposure location meeting the Tropical Summer Rain Climate Type (Miami, Florida or equivalent). Outdoor weathering is not required for Type VI fluorescent pink and fluorescent yellow.

994-4 Direct and Reverse Screen Processing.

The transparent and opaque process inks furnished for direct and reverse screen processing shall be of a type and quality formulated for retroreflective sheeting materials as listed on the QPL and applied in accordance with the manufacturer's instruction. Screen processing in accordance with the techniques and procedures recommended by the manufacturer shall produce a uniform legend of continuous stroke width of either transparent or opaque ink, with sharply defined edges and without blemishes on the sign background that will affect the intended sign use.

The retroreflective sheeting shall permit color processing with compatible transparent and opaque process inks as approved by the sheeting manufacturer and listed on the QPL.

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994-5 In-Service Minimum Requirements.

The retroreflective sheeting and screen processed retroreflective sheeting shall have the minimum coefficient of retroreflection as shown in ASTM D-4956, Outdoor Weathering Photometric Requirements for All Climates except Type VI fluorescent pink and fluorescent yellow. In addition, Type VII (Special) classified sheeting materials shall have a minimum coefficient of retroreflection of 80% of the values listed in the above table. Only the observation angle of 0.2 degrees and an entrance angle of -4 degrees shall be used in measuring in-service minimums. The in-service life for opaque overlay films, black processing inks and opaque lettering shall equal the life of the reflective sheeting to which it is applied.

994-6 Packaging and Labeling.

Packaging and labeling shall meet the requirements of ASTM D-4956.

994-7 Samples.

Field samples will be obtained in accordance with the Department's Sampling, Testing and Reporting Guide Schedule or on a random basis at the discretion of the Engineer.