



INDUSTRIAL TESTING LABORATORY

Report No.: 210318-01A

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TEST REPORT

Report Date: 20 April 2021

Project Name: Jammy J-TRY-50 4 in. Wide Yellow Type V
Railcar Marking TapeSubmitted by: Jammy, Inc.
Fort Worth, TX 76107Test Laboratory: Calcoast - ITL
San Leandro, CA 94577Samples Submitted: One (1) roll, ~3.2 m long
submitted 18 March 2021**SUMMARY**

Specification: 49CFR224.103 / ASTM D4956-04 Type V Sheeting, Class 1 Backing

49 CFR 224.103

(a) ConstructionPassed
(b) ColorPassed
(c) Performance (Coefficient of Retroreflection)Passed
(d) CertificationPassed
(e) Alternative standardsNot Applicable

ASTM D4956-04

6.3 Daytime Color and LuminancePassed
6.4 Accelerated Outdoor Weathering (36 months)Not Tested
6.5 ColorfastnessNot Tested
6.6 ShrinkageNot Tested
6.7 FlexibilityNot Tested
6.8 Liner RemovalNot Tested
6.9 AdhesionNot Tested
6.10 Impact ResistanceNot Tested
6.11 Specular GlossNot Tested

Written by:

Douglas G. Cummins
Photometric Engineer

Approved by:

Mark A. Evans
Laboratory Director

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TEST DATA SHEET

Project Name: Jammy J-TRY-50 4 in. Wide Yellow Type V Railcar Marking Tape

224.103(a) Construction

Retroreflective sheeting consists of a smooth, flat, transparent exterior film with microprismatic retroreflective elements embedded in or suspended beneath the film so as to form a non-exposed retroreflective optical system.

224.103(b) Color / ASTM D4956-04 6.3 Daytime Color and Luminance

Requirement: ASTM D4956-04 Tables 10, 12, 14, and 17
(Type V or VII Sheeting)

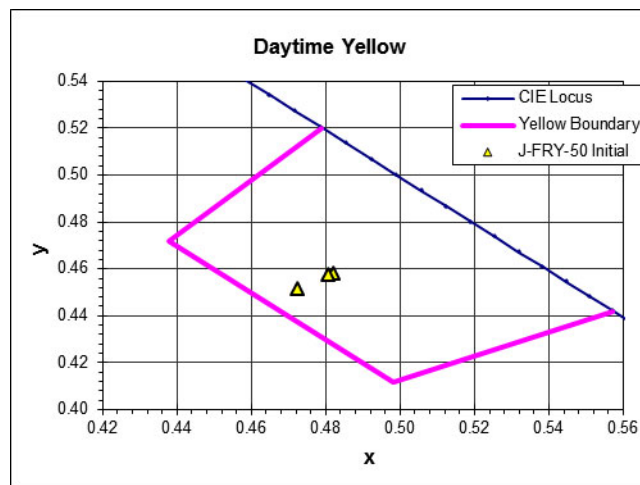
Test Method: ASTM E308, E1347, E1349, E991, E1164
(Illuminant D65, 2° Observer, Annular 45/0 Geometry)
Average of 8 reads, each read oriented 45° apart
Samples from 224.103(c) Performance

Instrument: Hunterlab Colorflex Spectrocolorimeter, 32 mm aperture port

Note: FRA 224.103(c) specifies sheeting shall meet the requirements for Type V sheeting if metalized or Type VII sheeting if non-metalized except for coefficient of retroreflection. The only other significant difference in requirements is for Luminance.

Sample		x	y	Y		
				Measured	Minimum	Maximum
J-TRY-50 Yellow	#1	0.4764	0.4538	12.68	12	30
	#2	0.4807	0.4573	12.33		
	#3	0.4726	0.4516	13.24		

Samples meet Daytime Color and Luminance requirements for Type V sheeting.

Daytime Color Plot

TEST DATA SHEET

Project Name: Jammy J-TRY-50 4 in. Wide Yellow Type V Railcar Marking Tape

224.103(c) Performance

Requirement: 49 CFR 224.103 / Table 1
 Test Method: ASTM E810 - Test Distance 100 feet (30.5 m)
 Projector: Hoffman GPS-102 (Illuminant A, 10 lx, 76 cm diameter)
 Sample Area: 200 mm x 203 mm, 0.041 m²

Samples created by mounting two (2) 100 mm strips on 203 mm x 203 mm x 1 mm thick 6061-T6 aluminum panels and trimming off the excess retroreflective trim. Vertical orientation ($\epsilon=0^\circ$) is parallel to roll direction with certification marks in normal operating position (see photos).

Tested in accordance to ASTM E810 10.7.1 - since no rotation angle is specified the average of the two orientations ($\epsilon=0^\circ$ and $\epsilon=90^\circ$) is required to meet minimum requirements.

Units: Candela per footcandle per square foot (Candela per Lux per square meter)

0.2° Observation Angle

Entrance Angle:		-4°				$+30^\circ$			
Sample		0°	90°	Avg (R_A)	Min R_A	0°	90°	Avg (R_A)	Min R_A
J-TRY-50 Yellow	#1	842.2	824.6	833.4	400	362.3	359.7	361.0	220
	#2	858.6	838.1	848.4		369.3	366.8	368.1	
	#3	849.3	830.4	839.9		364.2	362.3	363.3	
	Avg.	850.0	831.0	840.5		365.3	362.9	364.1	

0.5° Observation Angle

Entrance Angle:		-4°				$+30^\circ$			
Sample		0°	90°	Avg (R_A)	Min R_A	0°	90°	Avg (R_A)	Min R_A
J-TRY-50 Yellow	#1	129.8	119.4	124.6	100	128.8	141.7	135.3	45
	#2	133.3	121.2	127.3		131.3	144.8	138.1	
	#3	130.0	114.8	122.4		128.8	140.4	134.6	
	Avg.	131.0	118.5	124.8		129.6	142.3	136.0	

Samples meet Coefficient of Retroreflection requirements at the 0° , 90° and as the average of 0° and 90° rotations.

Note: Although 49CFR224.106 *Location of retroreflective sheeting* specifies both Vertical and Horizontal applications, the ASTM subcommittee for ASTM E810 has stated that this does not constitute an explicit statement that a rotation angle is specified and therefore ASTM E810 10.7.1 is applicable.

224.103(d) Certification

The characters "FRA-224" appear once every 100 mm (3.9 inches) in characters 3.2 mm high.

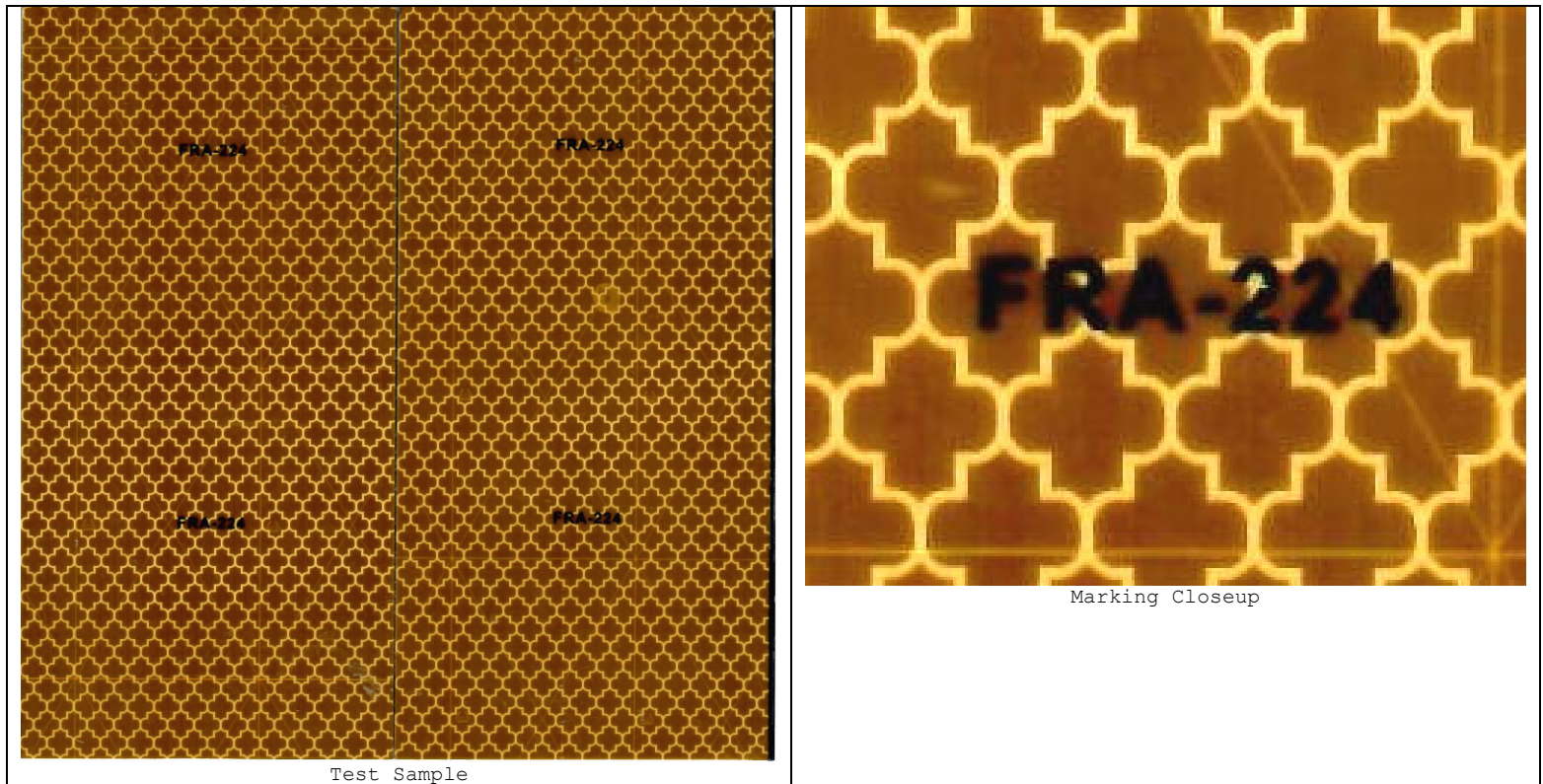
Characters are at least 3 mm high and are permanently stamped, etched, molded, or printed within the product and spaced no more than 4 inches apart. See photos.

Samples meet Certification requirements.

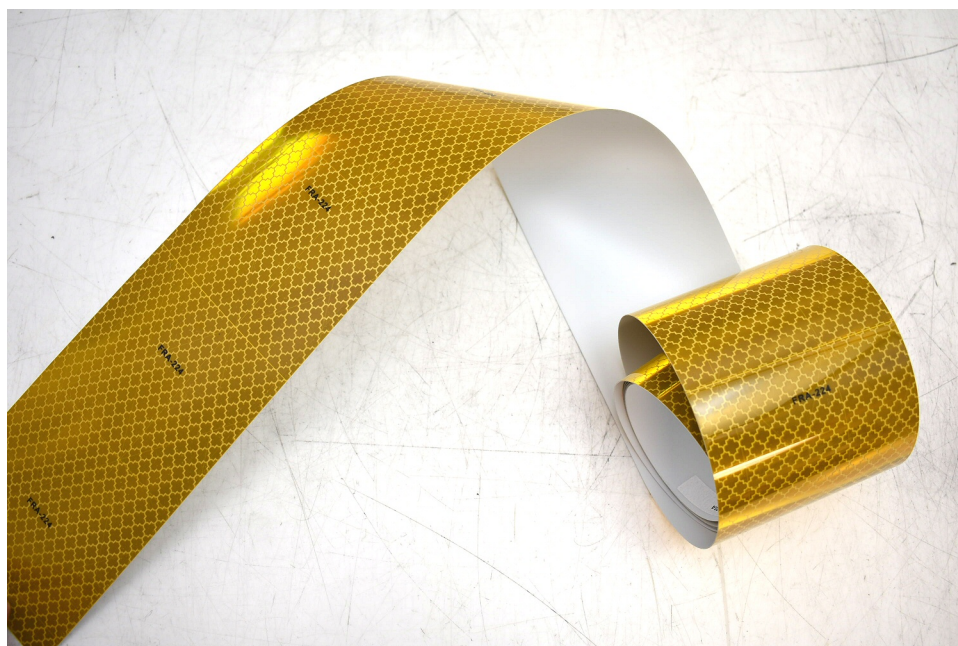
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Photographs



0°
90°
Sheeting Orientation



As received