



INDUSTRIAL TESTING LABORATORY

Report No. 150911-01A

Page 1 of 5

TEST REPORT

Report Date: 07 October 2015

Project Name: Aura 135-HY/TL-66HT-N1A 6/6 Red/White DOT-C2 Conspicuity Tape

Submitted by: Aura Optical Systems Ft. Worth, TX 76118

Test Laboratory: Calcoast - ITL San Leandro, CA 94577

Samples Submitted: One (1) roll alternating 153 mm Red / 153 mm White, 50 mm (2 in) wide trim; submitted 11 Sep 2015

SUMMARY

Specification: FMVSS 108 / ASTM D4956-90 Type V Sheeting, Class 1 Backing

FMVSS 108 S8.2.1

- S8.2.1.1 Construction ...Passed
S8.2.1.2 / S8.2.1.4 Pattern/Dimensions ...Passed
S8.2.1.3 Certification Marking ...Passed
S8.2.1.7 / Table XVI-c Coefficient of Retroreflection ...Passed

ASTM D4956-90

- 7.3 Daytime Color and Luminance ...Passed
7.4 Accelerated Weathering ...Not Tested
7.5 Colorfastness ...Not Tested
7.6 Shrinkage ...Not Tested
7.7 Flexibility ...Not Tested
7.8 Liner Removal ...Not Tested
7.9 Adhesion ...Not Tested
7.10 Impact Resistance ...Not Tested
7.11 Specular Gloss ...Not Tested

Note: Minimum amount of sheeting required to test to ASTM D4956 is four 300 mm x 300 mm sheets.

Written by:

Approved by:

[Signature of Douglas G. Cummins]

[Signature of Mark A. Evans]

Douglas G. Cummins
Photometric Engineer

Mark A. Evans
Laboratory Director

TEST DATA SHEET

Project Name: Aura 135-HY/TL-66HT-N1A 6/6 Red/White DOT-C2 Conspicuity Trim

S8.2.1.1 Construction

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

S8.2.1.2 Pattern / S8.2.1.4.1 Dimensions

Reflective sheeting is made up of alternating white and red color segments of the following dimensions:

Segment	Red	White	Required
Length	153 mm (50.0%)	153 mm (50.0%)	300 ± 150 mm
Width	50 mm	50 mm	50 mm (DOT-C2) 75 mm (DOT-C3) 100 mm (DOT-C4)

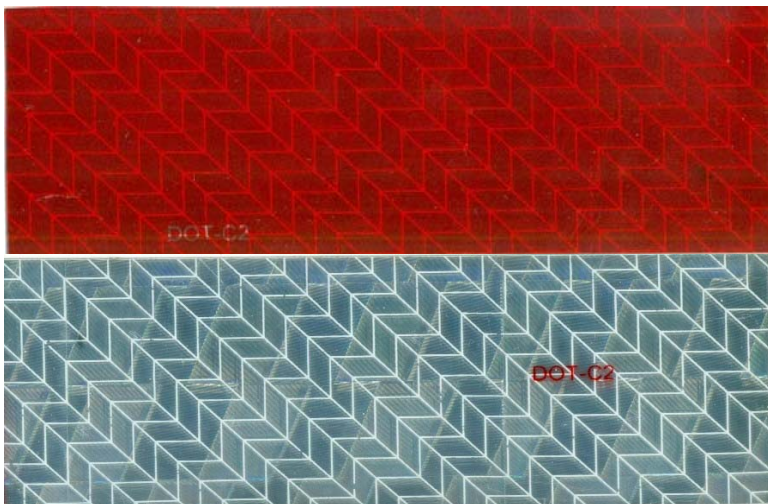
Neither white nor red sheeting shall represent more than two thirds (66.7%) of the aggregate of any continuous strip marking the width of a trailer, or any continuous or broken strip marking its length.

Samples meet Pattern/Dimension requirements.

S8.2.1.3 Certification Marking

The letters "DOT-C2" appear at least once on each white or red sheeting segment in characters at least 3 mm high or at least once every 300 mm on sheeting that is white only.

Samples meet Certification Marking requirements.



TEST DATA SHEET

Project Name: Aura 135-HY/TL-66HT-N1A 6/6 Red/White DOT-C2 Conspicuity Trim

S8.2.1.7 Coefficient of Retroreflection

Requirement: FMVSS 108 S8.2.1.7 / Table XVI-c

Test Method: ASTM E810

Samples tested in four orientations (0°, 90°, 180°, and 270°)

Sample Areas:

Red: 50 mm x 153 mm = 0.0077 m²

Sample	Entrance Angle	Orientation	Coefficient of Retroreflection (Candela / Lux / m ²)			
			0.2° Obs. Angle		0.5° Obs. Angle	
			Measured	Required	Measured	Required
Red #1	-4°	Horizontal (0°)	155.7	60	50.6	15
		Vertical (90°)	173.9	†	34.1	†
		Horizontal (180°)	155.8	60	52.3	15
		Vertical (270°)	173.4	†	34.1	†
	+30°	Horizontal (0°)	99.0	60	27.7	15
		Vertical (90°)	79.1	†	20.0	†
		Horizontal (180°)	99.8	60	28.6	15
		Vertical (270°)	81.5	†	20.9	†
	+45°	Horizontal (0°)	40.1	15	18.5	4
		Vertical (90°)	26.5	†	6.7	†
		Horizontal (180°)	40.1	15	19.0	4
		Vertical (270°)	26.6	†	7.1	†
Red #2	-4°	Horizontal (0°)	145.4	60	55.5	15
		Vertical (90°)	162.5	†	34.6	†
		Horizontal (180°)	146.3	60	54.7	15
		Vertical (270°)	161.9	†	34.3	†
	+30°	Horizontal (0°)	97.0	60	25.4	15
		Vertical (90°)	76.0	†	18.7	†
		Horizontal (180°)	94.7	60	27.6	15
		Vertical (270°)	73.6	†	20.3	†
	+45°	Horizontal (0°)	40.0	15	17.8	4
		Vertical (90°)	25.6	†	6.2	†
		Horizontal (180°)	38.9	15	18.1	4
		Vertical (270°)	25.6	†	6.9	†
Red #3	-4°	Horizontal (0°)	146.8	60	49.1	15
		Vertical (90°)	163.6	†	33.6	†
		Horizontal (180°)	146.1	60	50.6	15
		Vertical (270°)	165.5	†	34.0	†
	+30°	Horizontal (0°)	97.1	60	26.1	15
		Vertical (90°)	78.4	†	19.0	†
		Horizontal (180°)	94.7	60	26.3	15
		Vertical (270°)	76.3	†	20.0	†
	+45°	Horizontal (0°)	40.2	15	17.8	4
		Vertical (90°)	26.5	†	6.6	†
		Horizontal (180°)	38.7	15	18.3	4
		Vertical (270°)	26.3	†	6.9	†

† Note: Red not normally mounted on vehicle in vertical orientation. Testing only for sake of thoroughness.

Samples meet Coefficient of Retroreflection requirements.

TEST DATA SHEET

Project Name: Aura 135-HY/TL-66HT-N1A 6/6 Red/White DOT-C2 Conspicuity Trim

S8.2.1.7 Coefficient of Retroreflection (continued)

Requirement: FMVSS 108 S8.2.1.7 / Table XVI-c

Test Method: ASTM E810

Samples tested in four orientations (0°, 90°, 180°, and 270°)

Sample Areas:

White: 50 mm x 153 mm = 0.0077 m²

Sample	Entrance Angle	Orientation	Coefficient of Retroreflection (Candela / Lux / m ²)			
			0.2° Obs. Angle		0.5° Obs. Angle	
			Measured	Required	Measured	Required
White #1	-4°	Horizontal (0°)	593.9	250	197.9	65
		Vertical (90°)	693.8		163.2	
		Horizontal (180°)	595.2		202.9	
		Vertical (270°)	691.4		166.2	
	+30°	Horizontal (0°)	417.6	250	99.5	65
		Vertical (90°)	335.7		92.1	
		Horizontal (180°)	403.4		108.8	
		Vertical (270°)	328.3		96.1	
	+45°	Horizontal (0°)	181.5	60	75.2	15
		Vertical (90°)	119.4		30.7	
		Horizontal (180°)	181.1		74.6	
		Vertical (270°)	114.5		34.8	
White #2	-4°	Horizontal (0°)	565.5	250	204.0	65
		Vertical (90°)	650.1		163.1	
		Horizontal (180°)	565.9		213.2	
		Vertical (270°)	649.6		161.4	
	+30°	Horizontal (0°)	419.4	250	105.8	65
		Vertical (90°)	314.8		88.4	
		Horizontal (180°)	392.6		107.2	
		Vertical (270°)	320.2		90.5	
	+45°	Horizontal (0°)	185.0	60	75.5	15
		Vertical (90°)	115.7		31.5	
		Horizontal (180°)	177.1		75.4	
		Vertical (270°)	117.1		33.7	
White #3	-4°	Horizontal (0°)	580.6	250	179.7	65
		Vertical (90°)	676.3		154.3	
		Horizontal (180°)	582.5		188.3	
		Vertical (270°)	681.1		155.6	
	+30°	Horizontal (0°)	414.3	250	103.8	65
		Vertical (90°)	337.9		92.5	
		Horizontal (180°)	399.1		107.6	
		Vertical (270°)	342.8		95.0	
	+45°	Horizontal (0°)	181.9	60	70.7	15
		Vertical (90°)	120.1		35.3	
		Horizontal (180°)	172.8		71.5	
		Vertical (270°)	127.2		36.0	

Samples meet Coefficient of Retroreflection requirements.

TEST DATA SHEET

Project Name: Aura 135-HY/TL-66HT-N1A 6/6 Red/White DOT-C2 Conspicuity Trim

7.3 Daytime Color and Luminance

Requirement: ASTM D4956-90 Tables 8 and 10 (Type V Sheeting)

Test Method: ASTM E308, E1347, E1349, E991, E1164

(Illuminant C, 2° Observer, 45/0 Geometry)

Instrument: Hunterlab Colorflex A60 Spectrocolorimeter (No SCF available)

Color	Sample	x	y	Y		
				Measured	Minimum	Maximum
Red	#1	0.6376	0.3364	5.05	2.5	11
	#2	0.6451	0.3374	4.96		
	#3	0.6423	0.3386	5.09		
White	#1	0.2961	0.3048	18.72	15	-
	#2	0.2969	0.3059	18.94		
	#3	0.2962	0.3052	18.68		

Samples meet Daytime Color and Luminance requirements.

Note: Current ASTM D4956 uses D65 as illuminant instead of C.

Color Plots

