



INDUSTRIAL TESTING LABORATORY

Report No. 101119-01C

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TEST REPORT

Report Date: 13 December 2010

Project Name: Aura 135 DOT-C2 6" Red / 6" White Conspicuity Tape

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

Test Laboratory: Calcoast - ITL
Emeryville, CA 94608

Samples Submitted: Three (3) strips, 50 mm wide x ~1.5 m long

SUMMARY

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

FMVSS-108 S5.7.1

- S5.7.1.1 ConstructionPassed
- S5.7.1.2 / Figure 29 Coefficient of RetroreflectionPassed
- S5.7.1.3 Pattern/DimensionsPassed
- S5.7.1.5 Certification/MarkingsPassed

FMVSS 108 S5.7.1.2 / ASTM D4956-90

- 6.3 Daytime Color and LuminancePassed
- 6.4 Outdoor WeatheringNot 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

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

Written by:

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Photometric Engineer

Approved by:

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Laboratory Director

TEST DATA SHEET

Project: Aura 135 DOT-C2 6" Red / 6" White Conspicuity Tape

S5.7.1.2 Coefficient of Retroreflection

Requirement: FMVSS 108 S5.7.1 / Figure 29

Test Method: ASTM E810

Sample Areas:

Red: 50 mm x 152 mm = 0.0076 m² White: 50 mm x 152 mm = 0.0076 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	229.4	60	42.2	15
		Vertical	149.4	†	31.8	†
	+30°	Horizontal	118.2	60	23.9	15
		Vertical	101.8	†	15.2	†
	+45°	Horizontal	38.5	15	10.4	4
		Vertical	45.3	†	19.3	†
Red #2	-4°	Horizontal	219.2	60	48.3	15
		Vertical	140.5	†	40.8	†
	+30°	Horizontal	109.8	60	23.3	15
		Vertical	84.2	†	20.8	†
	+45°	Horizontal	36.7	15	9.9	4
		Vertical	34.7	†	16.6	†
Red #3	-4°	Horizontal	218.5	60	47.3	15
		Vertical	141.0	†	40.8	†
	+30°	Horizontal	112.4	60	23.2	15
		Vertical	83.8	†	21.1	†
	+45°	Horizontal	37.6	15	10.0	4
		Vertical	34.3	†	16.6	†
White #1	-4°	Horizontal	624.5	250	147.0	65
		Vertical	395.3		111.6	
	+30°	Horizontal	331.6	250	94.8	65
		Vertical	270.8		65.8	
	+45°	Horizontal	115.4	60	38.5	15
		Vertical	126.6		52.9	
White #2	-4°	Horizontal	675.9	250	170.5	65
		Vertical	409.0		133.4	
	+30°	Horizontal	367.2	250	84.0	65
		Vertical	378.7		88.5	
	+45°	Horizontal	130.9	60	33.5	15
		Vertical	182.0		79.2	
White #3	-4°	Horizontal	658.8	250	166.8	65
		Vertical	418.9		141.9	
	+30°	Horizontal	349.0	250	93.5	65
		Vertical	289.7		75.4	
	+45°	Horizontal	124.0	60	37.3	15
		Vertical	136.9		57.9	

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

Samples meet Coefficient of Retroreflection requirements.

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6.3 Daytime Color and Luminance

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

Test Method: ASTM E308, E1347, E1349, E991, E1164
(Illuminant C, 2° Observer, 45/0 Geometry)

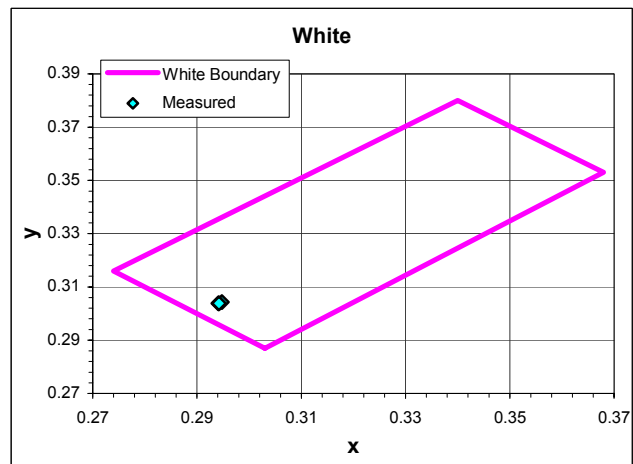
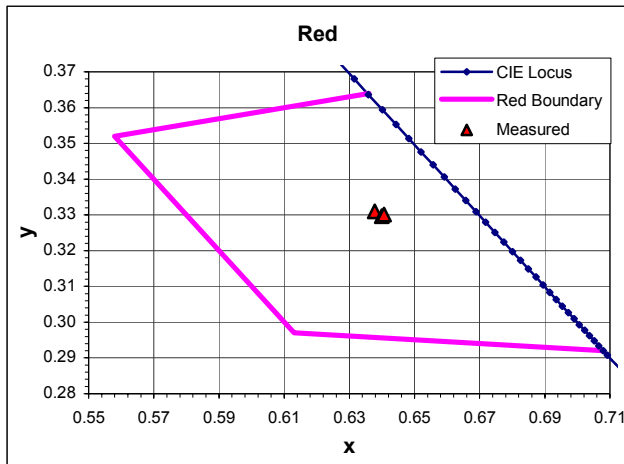
Instrument: Hunterlab Colorflex A60 Spectrocolorimeter (No SCF available)

Color	Sample	x	y	Y		
				Measured	Minimum	Maximum
Red	#1	0.6378	0.3310	3.86	2.5	11
	#2	0.6400	0.3297	3.99		
	#3	0.6407	0.3301	3.98		
White	#1	0.2948	0.3043	17.61	15	-
	#2	0.2941	0.3038	17.34		
	#3	0.2942	0.3038	17.19		

Samples meet Daytime Color and Luminance requirements.

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

Color Plots



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S5.7.1.1 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.

S5.7.1.3 Pattern / Dimensions

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

Segment	Red	White	Required
Length	152 mm (50.0%)	152 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.

S5.7.1.5 Certification

The letters "DOT-C2" appear on both red and white sheeting segments in characters at least 3 mm high. Does meet FMVSS 108 S5.7.1.5 Certification/Markings requirements.

Note: The white lettered "DOT-C2" on the red segment is hard to see and read. However, the minimal requirement is that 'DOT-C2' "... shall appear at least once on the exposed surface of each white or red segment of the retroreflective sheeting."

Photograph

