



INDUSTRIAL TESTING LABORATORY

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TEST REPORT

Report Date: 18 August 2014
Project Name: La Casa Del Reflectivo 900558065-9 High Security Reflective Tape (25 mm Wide Silver Retroreflective Trim)
Manufactured by: La Casa del Reflectivo S. A. S. Bogota, Colombia
Test Laboratory: Calcoast - ITL San Leandro, CA 94577
Product: 25 mm Wide Silver Retroreflective Trim Heat Applied to 50 mm Wide Red Fabric submitted 17 July 2014

SUMMARY

Specification: ANSI / ISEA 107-2010 American National Standard for High-Visibility Safety Apparel Retroreflective Material, Level 1 or 2

Table with 2 columns: Test Item and Result. Items include Color (Prior to Exposure, Colorfastness), Photometric Performance (Level 2, Level 1), Retroreflection after Test Exposure (Abrasion, Flexing, Folding at Cold Temperatures, Exposure to Temperature Variation, Washing (50X), Dry-cleaning (0X)), Retroreflective Performance in Rainfall, and Flame Resistance.

Written and Approved by:

Handwritten signature of Mark A. Evans

Mark A. Evans Laboratory Director

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TEST DATA SHEET

Project: La Casa Del Reflectivo 900558065-9 High Security Reflective Tape
(25 mm Wide Silver Retroreflective Trim)

Retroreflective Performance, Initial

Requirement: ANSI/ISEA 107-2010 8.1 Table 5 (Level 1), Table 4 (Level 2)
Test Method: ASTM E808/E809

One (1) 200 mm x 200 mm retroreflective sample was created by cutting submitted material into 200 mm strips and mounting 8 strips side-by-side on a 200 mm x 200 mm black mounting surface. Measured sample at orientations of $\epsilon_1 = 0^\circ$ and $\epsilon_2 = 90^\circ$ where ϵ_1 mounting orientation is with the strips parallel to the projector/detector plane.

Sample Area: 0.0400 m²

Coefficient of Retroreflection, Candela/Lux/m²

Location from roll: 200 mm sections removed from various parts of the roll

Observation Angle	Entrance Angle	Minimum Requirement (ϵ_1/ϵ_2)		Measured	
		Level 2	Level 1	ϵ_1	ϵ_2
12' (0.20°)	5°	330 / 248	250 / 187.5	412.9	411.5
	20°	290 / 218	220 / 165	401.3	394.0
	30°	180 / 135	135 / 101.25	378.7	377.9
	40°	65 / 47	50 / 37.5	292.9	308.7
20' (0.33°)	5°	250 / 188	120 / 90	275.9	275.1
	20°	200 / 150	100 / 75	270.0	266.0
	30°	170 / 128	75 / 56.25	258.8	256.2
	40°	60 / 45	30 / 22.5	222.5	227.9
1.00°	5°	25 / 18.8	19 / 14.25	30.1	30.4
	20°	15 / 11.3	11 / 8.25	30.3	30.6
	30°	12 / 9	9 / 6.75	28.2	28.7
	40°	10 / 7.5	7 / 5.25	17.6	18.1
1°30' (1.50°)	5°	10 / 7.5	7 / 5.25	13.6	13.4
	20°	7 / 5.25	5 / 3.75	13.3	14.1
	30°	5 / 3.75	3 / 2.25	12.6	13.1
	40°	4 / 3	3 / 2.25	12.9	12.4

Sample meets requirements for ANSI 107-2010 Level 1 and Level 2 reflectivity.

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Abrasion

Requirement: ANSI / ISEA 107-2010 8.2
 Test Method: ANSI / ISEA 107-2010 9.4.1
 EN 530:1995, Method 2 (Wool Abradent / 5000 Cycles / 9 kPa)

Sample Area: 0.0081 m²
 Coefficient of Retroreflection, Candela/Lux/m²
 12' (0.20°) Observation Angle / 5° Entrance Angle
 Average of 3 samples

Sample	$\epsilon_1 = 0^\circ$		$\epsilon_2 = 90^\circ$	
	Measured	Required	Measured	Required
A1	380.3	100	382.0	75
A2	370.2	100	378.1	75
A3	392.7	100	390.3	75
Average	381.1	100	383.5	75

Samples meet Abrasion requirements.

Flexing

Requirement: ANSI / ISEA 107-2010 8.2
 Test Method: ANSI / ISEA 107-2010 9.4.2
 ISO 7854:1997 Method A (7500 Cycles)

Sample Area: 0.0031 m²
 Coefficient of Retroreflection, Candela/Lux/m²
 12' (0.20°) Observation Angle / 5° Entrance Angle
 Average of 3 samples

Sample	$\epsilon_1 = 0^\circ$		$\epsilon_2 = 90^\circ$	
	Measured	Required	Measured	Required
FL1	352.2	100	347.7	75
FL2	329.5	100	321.4	75
FL3	337.2	100	337.1	75
Average	339.6	100	335.4	75

Samples meet Flexing requirements.

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Folding at Cold Temperatures

Requirement: ANSI / ISEA 107-2010 8.2
Test Method: ANSI / ISEA 107-2010 9.4.3
ISO 4675: 1990 (-20°C)

Sample Area: 0.0026 m²
Coefficient of Retroreflection, Candela/Lux/m²
12' (0.20°) Observation Angle / 5° Entrance Angle
Average of 3 samples

Sample	$\epsilon_1 = 0^\circ$		$\epsilon_2 = 90^\circ$	
	Measured	Required	Measured	Required
F01	388.5	100	384.1	75
F02	406.6	100	410.4	75
F03	419.5	100	416.5	75
Average	404.9	100	403.7	75

Samples meet Cold Folding requirements.

Exposure to Temperature Variation

Requirement: ANSI / ISEA 107-2010 8.2
Test Method: ANSI / ISEA 107-2010 9.4.4
12 Hours, 50°C / 20 Hours, -30°C / Minimum 2 Hours, 20°C

Sample Area: 0.0047 m²
Coefficient of Retroreflection, Candela/Lux/m²
12' (0.20°) Observation Angle / 5° Entrance Angle
Average of 3 samples

Sample	$\epsilon_1 = 0^\circ$		$\epsilon_2 = 90^\circ$	
	Measured	Required	Measured	Required
T1	425.3	100	421.9	75
T2	443.6	100	439.5	75
T3	397.1	100	393.2	75
Average	422.0	100	418.5	75

Samples meet Temperature Variation Exposure requirements.

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Washing According to Care Label

Requirement: ANSI / ISEA 107-2010 8.2
 Test Method: ANSI / ISEA 107-2010 9.4.5.2
 ISO 6330:2000/Amd 1:2008 Method 2A

Number of Wash Cycles: 50
 After the last wash cycle the samples were dried, stress free, at 50°C.

Sample Area: 0.1300 m²
 Coefficient of Retroreflection, Candela/Lux/m²
 12' (0.20°) Observation Angle / 5° Entrance Angle
 Average of 3 samples

Sample	$\epsilon_1 = 0^\circ$		$\epsilon_2 = 90^\circ$	
	Measured	Required	Measured	Required
W1	170.0	100	171.5	75
W2	212.2	100	213.0	75
W3	196.9	100	199.3	75
Average	193.0	100	194.6	75

Samples meet Washing requirements.

Dry-cleaning According to Care Label

Requirement: ANSI / ISEA 107-2010 8.2
 Test Method: ANSI / ISEA 107-2010 9.4.5.3
 ISO 3175:1998 Method 9.1

Number of Dry-cleaning Cycles: 0

Coefficient of Retroreflection, Candela/Lux/m²
 12' (0.20°) Observation Angle / 5° Entrance Angle
 Average of 3 samples

Sample	$\epsilon_1 = 0^\circ$		$\epsilon_2 = 90^\circ$	
	Measured	Required	Measured	Required
DC1	-	100	-	75
DC2	-	100	-	75
DC3	-	100	-	75
Average	-	100	-	75

Not Applicable. Samples **not** tested for Dry-cleaning requirements.

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Retroreflective Performance in Rainfall

Requirement: ANSI / ISEA 107-2010 8.2
Test Method: ANSI / ISEA 107-2010 9.4.6, Appendix A

One (1) 203 mm x 200 mm retroreflective sample was created by cutting submitted material into 200 mm strips, removing excess background material, and mounting 4 strips side-by-side directly to test jig.

Retroreflection measured after a 2 minute water spray at a flow rate of 284 mm/hour.

Sample Area: 0.0416 m²
Coefficient of Retroreflection, Candela/Lux/m²
12' (0.20°) Observation Angle / 5° Entrance Angle

Sample	$\epsilon_1 = 0^\circ$		$\epsilon_2 = 90^\circ$	
	Measured	Required	Measured	Required
R1	173.6	100	161.5	75

Sample meets Rainfall requirements.

Flame Resistance

Requirement: ANSI / ISEA 107-2010 8.2
Test Method: ANSI / ISEA 107-2010 9.5
NFPA 1971-2007 8.46.4.4 Convective Heat Exposure Test

Samples subjected to NFPA 1971-2007 convective heat conditioning at 140°C for 10 min.

Sample Area: 0.0051 m²
Coefficient of Retroreflection, Candela/Lux/m²
12' (0.20°) Observation Angle / 5° Entrance Angle
Average of 3 samples

Sample	$\epsilon_1 = 0^\circ$		$\epsilon_2 = 90^\circ$	
	Measured	Required	Measured	Required
FR1	-	100	-	75
FR2	-	100	-	75
FR3	-	100	-	75
Average	-	100	-	75

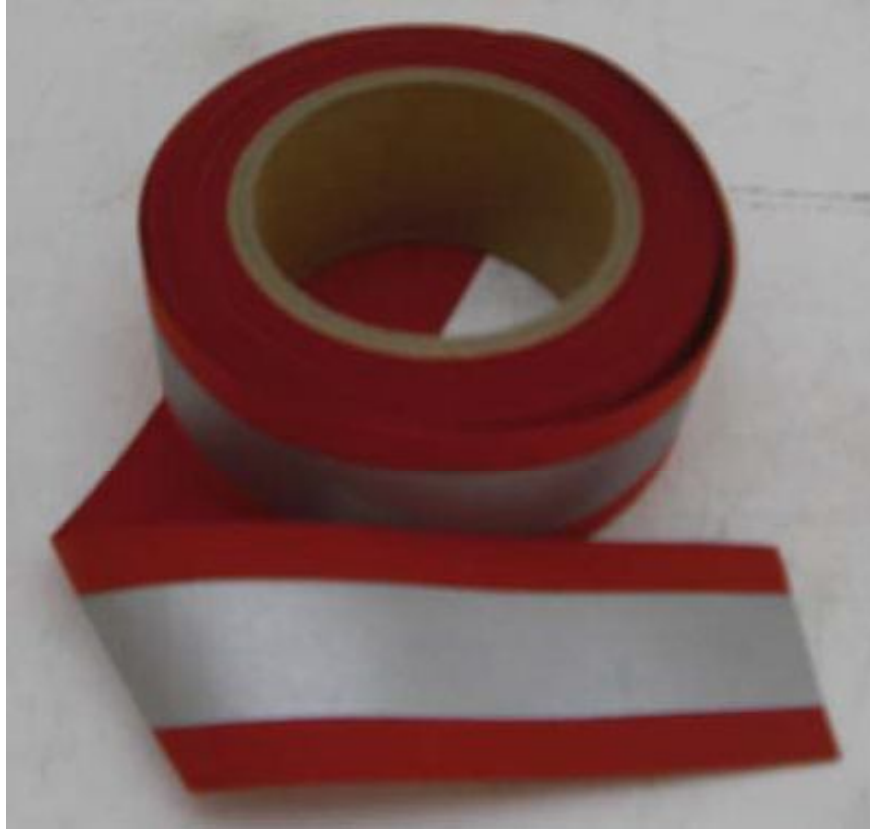
Not Applicable. The material is not heat resistant.

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PHOTOGRAPH OF PRODUCT



25 mm Wide Silver Retroreflective Trim
Heat Applied to 50 mm Wide Red Fabric

Also Available In Other Fabric Color