

Declaration of Conformity (page 2 of 2)

2. VISIBLE RETROREFLECTIVE MATERIAL

- Amount of visible retroreflective material (smallest size offered) .20m² (310 in.²)

Please list each type of material that contributes towards **VISIBLE RETROREFLECTIVE MATERIAL** listed above.

Material 1 Test Data

Test Lab: Calcoast – Test Report# 160613-02A	
Date: 7/12/2016	Style #: VB211A
Description: 50mm wide sew on silver reflective trim	

Material 2 Test Data

Test Lab:	
Date:	Style #:
Description:	

**Use separate sheet for additional materials*

The undersigned hereby warrants that he/she is authorized to legally bind the company identified above.

Signed: _____ Title: _____

Print Name: _____ Date: _____

Third Party Certification
(ANSI/ISEA 107-2015)
HIGH VISIBILITY COMPLIANCE CERTIFICATE

Submitted by: Tingley Rubber Corporation
Name: Phase 3
Color Hi Vis Fluorescent Yellow Green & Gray

Date: February 23, 2016

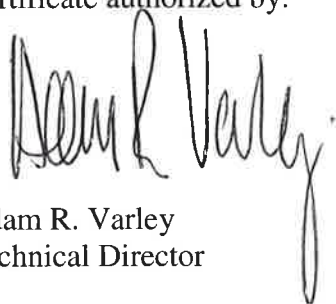
Report #: TINGLE.A020416I

The submitted fabric **MEETS** the requirements of ANSI/ISEA 107-2015 specification for the tests conducted in this report covering high visibility background material.

All of the above tests and evaluations were performed in accordance with ISO/IEC 17025 Quality Systems.

This certification applies to the background material only.

Certificate authorized by:



Adam R. Varley
Technical Director



Serial 60085020416I.TINGLE

*This certification applies to the particular sample tested and to the specific tests carried out as dated and detailed in the report referenced above. It does not signify any measure of approval, control, supervision, or surveillance by Vartest Laboratories Inc. to this or any related product.

ISO/IEC 17025 Certified Third Party Test Report

DATE: February 26, 2016 **FILE:** TINGLE.A020416I
PO #: 17119

CLIENT: Tingley Rubber Corporation **ATTN:** Erika Puello
1551 S Washington Ave, Suite 403
Piscataway, NJ 08854

SAMPLE IDENTIFIED BY CLIENT AS:

Fabric Submitted
Per ANSI/ISEA 107-2015 Specification
Name: Phase 3
Color Hi Vis Fluorescent Yellow Green & Gray

EXECUTIVE SUMMARY:

PASS

FAIL

X

The submitted fabric **MEETS** the requirements of ANSI/ISEA 107-2015 Specification for the applicable tests conducted in this report covering high visibility background material.

REQUIRED TESTS:

Test/Method	Section	ANSI/ISEA 107 REQUIREMENTS	TEST RESULT	PASS/FAIL/NA
Determination of Color ASTM E1164-12 (Single layer)	8.1.1 8.2.4 10.2	Test specimen must fulfill the colorimetric requirements of Table 3 for background material	As submitted: x = 0.380 y = 0.544 % Y = 106.66	PASS
			After 40x Xenon x = 0.373 y = 0.533 % Y = 105.56	PASS
Determination of Color ASTM E1164-12 (Two layers of the same material)	8.1.1 8.2.4 10.2	Test specimen must fulfill the colorimetric requirements of Table 3 for background material	As submitted: x = y = % Y =	N/A
			After 40x Xenon x = y = % Y =	N/A
Colorfastness Crocking AATCC 8-2013	8.2.1	Wet 3.0 Dry 3.0	Wet: 4.5 Dry: 5.0	PASS PASS
Colorfastness Perspiration AATCC 15-2013	8.2.2	Shade change 4.0 Staining 3.0	Shade Change: 4.5 Acetate: 5.0 Cotton: 5.0 Nylon: 5.0 Polyester: 5.0 Acrylic: 5.0 Wool: 5.0	PASS PASS

ISO/IEC 17025 Certified Third Party Test Report

FILE: TINGLE.A0204161

PO #: 17119

SAMPLE IDENTIFIED BY CLIENT AS:

Fabric Submitted

Per ANSI/ISEA 107-2015 Specification

Name: Phase 3

Color Hi Vis Fluorescent Yellow Green & Gray

REQUIRED TESTS (Cont.):

Test/Method	Section	ANSI/ISEA 107 REQUIREMENTS	TEST RESULT	PASS/FAIL/NA
Bursting Strength (Knitted or Other Nonwovens) ASTM D6797-07 (2011)	8.4.1	267 N (60 lbf) (27.2fkg)		N/A
Tear Resistance (Woven) ASTM D1424-09 (2013)	8.4.2	13 N (1326 gf) (2.92 lbf) Avg. force machine Avg. force cross-machine	5.65 lbs average 12.75 lbs average	PASS PASS

TESTED AS CARE LABEL DICTATES:

Test/Method	Section	ANSI/ISEA 107 REQUIREMENTS	TEST RESULT	PASS/FAIL/NA
Colorfastness Domestic Laundry AATCC 61-2013-2A 105°F (Modified)	8.2.3 Table 4	Shade Change 4.5 Staining 3.0	Shade Change: 4.5 Acetate: 4.5 Cotton: 5.0 Nylon: 4.0 Polyester: 5.0 Acrylic: 5.0 Wool: 4.5	PASS PASS
Colorfastness Commercial Laundry AATCC 61-2013-3A 145°F (Modified)	8.2.3 Table 4	Shade Change 4.5 Staining 3.0	Shade Change: Acetate: Cotton: Nylon: Polyester: Acrylic: Wool:	N/A N/A
Colorfastness Water AATCC 107-2013	8.2.3 Table 4	Shade Change 3.0 3.0	Shade Change: 4.5 Acetate: 4.5 Cotton: 5.0 Nylon: 4.5 Polyester: 5.0 Acrylic: 5.0 Wool: 5.0	PASS PASS
Colorfastness Hypochlorite Bleaching AATCC 61-2013-4A (Commercial)	8.2.3 Table 4	Fading 4.0		N/A
Colorfastness Hypochlorite Bleaching AATCC 61-2013-5A (Domestic)	8.2.3 Table 4	Fading 4.0		N/A

ISO/IEC 17025 Certified Third Party Test Report

FILE: TINGLE.A0204161

PO #: 17119

SAMPLE IDENTIFIED BY CLIENT AS:

Fabric Submitted

Per ANSI/ISEA 107-2015 Specification

Name: Phase 3

Color Hi Vis Fluorescent Yellow Green & Gray

TESTED AS CARE LABEL DICTATES:

Test/Method	Section	ANSI/ISEA 107 REQUIREMENTS	TEST RESULT	PASS/FAIL/NA
Colorfastness Hot-pressing AATCC 133-2013	8.2.3 Table 4	Shade Change: 4.5 Staining: 3.0	230°F Shade Change: Staining:	N/A
			300°F Shade Change: Staining:	N/A
			390°F Shade Change: Staining:	N/A
Colorfastness Dry Cleaning AATCC 132-2013	8.2.3 Table 4	Shade Change 4.0		N/A
Dimensional change Domestic AATCC 135-2012 (3)IIIA(ii) @ 105°F	8.3.1	Woven L +/- 4% W +/-2%	5th Cycle Length= -0.9% Width = -0.3%	PASS
		Knit or Coated, Non-Woven	5th Cycle Length= Width =	N/A

TESTED AS CARE LABEL DICTATES (cont.):

Test/Method	Section	ANSI/ISEA 107 REQUIREMENTS	TEST RESULT	PASS/FAIL/NA
Dimensional change Commercial AATCC 96-2012 IIIC-A and/or E@145°F	8.3.1	Woven L +/- 4% W +/-2%	5th Cycle Length= Width =	N/A
		Knit or Coated, Non-Woven L +/- 7% W +/-5%	5th Cycle Length= Width =	N/A
Dimensional change Drycleaning AATCC 158-2011	8.3.1	Woven L +/- 4% W +/-2%	5th Cycle Length= Width =	N/A
		Knit or Coated, Non-Woven L +/- 7% W +/-5%	5th Cycle Length= Width =	N/A

ISO/IEC 17025 Certified Third Party Test Report

FILE: TINGLE.A0204161

PO #: 17119

SAMPLE IDENTIFIED BY CLIENT AS:

Fabric Submitted
Per ANSI/ISEA 107-2015 Specification
Name: Phase 3
Color Hi Vis Fluorescent Yellow Green & Gray

TESTED AS CARE LABEL DICTATES (cont.):

Test/Method	Section	ANSI/ISEA 107 REQUIREMENTS	TEST RESULT	PASS/FAIL/NA
Water Repellency AATCC 22-2010	8.5.1	90 New 70 After 5X Launderings	New: After:	N/A N/A
Water Resistance AATCC 35-2013	8.5.2	≤ 1 g of water penetration Level 1	New: After 5X Launderings:	N/A N/A
Waterproof AATCC 127-2013	8.5.3	200 cm New 200 cm After 5X Launderings	New: After:	N/A N/A
Breathability ASTM E96-2013 Procedure B or BW	8.6	Procedure B: 600 g/m ² /24 hr microporous		N/A
		Procedure BW: 3600 g/m ² /24 hr hydrophilic		N/A

Signed For The Company By

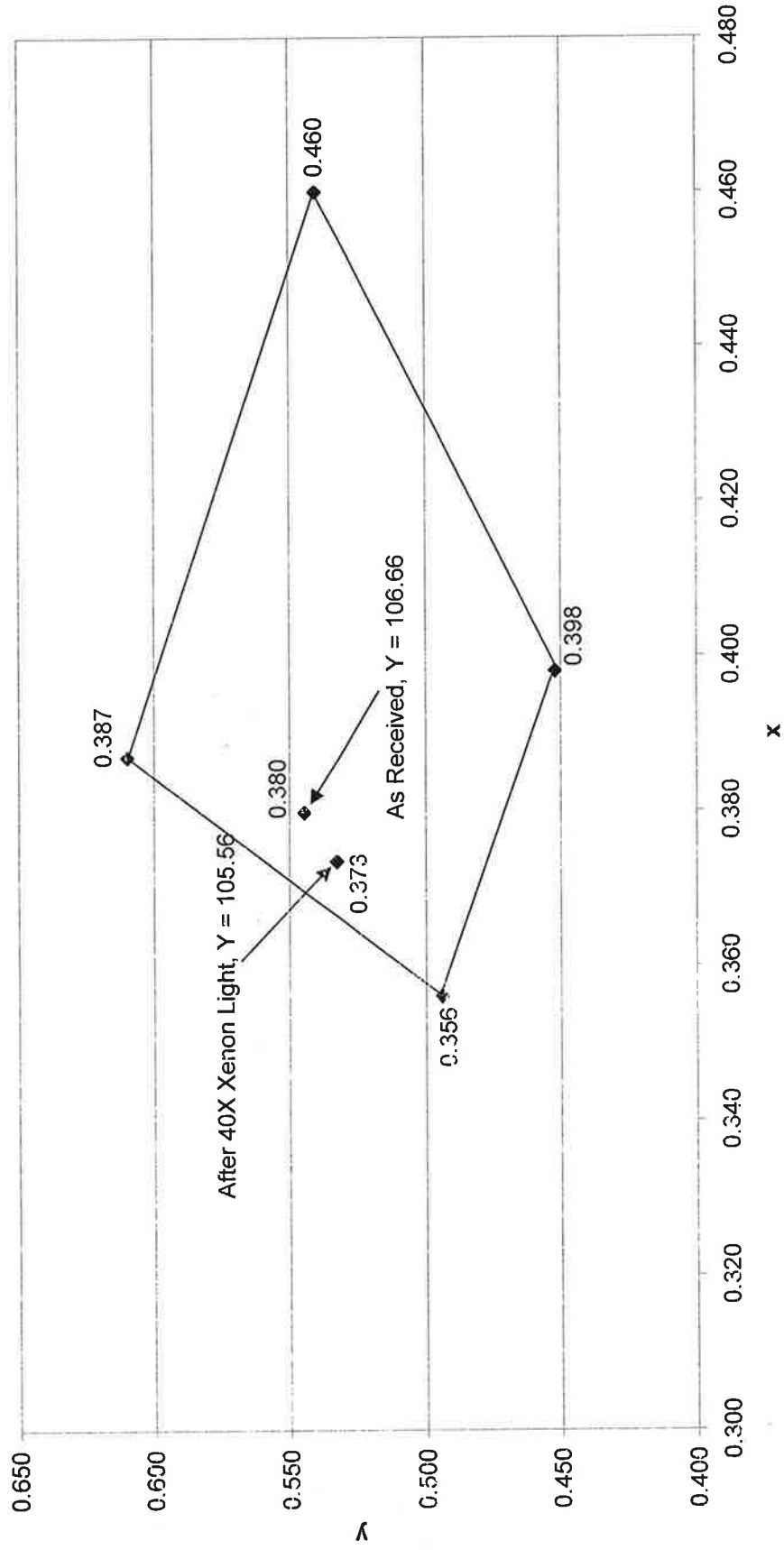
Adam R. Varley
Adam R. Varley
Technical Director

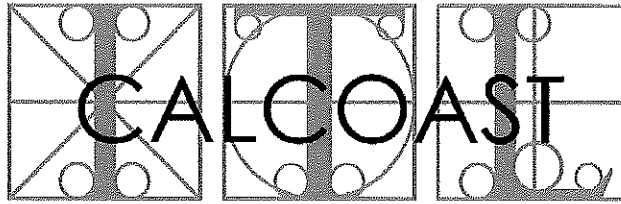
JG/02/208



Stacy Sadowy
Stacy Sadowy
Quality Assurance Supervisor

Chromaticity Coordinates
TINGLE.A.020416I
Fluorescent Yellow-Green
ANSI 107-2015 Requirement: $Y \geq 70$





INDUSTRIAL TESTING LABORATORY

Report No. 160613-02A

Page 1 of 7

TEST REPORT

Report Date: 12 July 2016

Project Name: Tingley N-FR Sew-on Manunite VB211A 500 CPL [waterproof] reflective trim

Submitted by: Tingley Rubber Corporation
South Plainfield, NJ 07080

Test Laboratory: Calcoast - ITL
San Leandro, CA 94577

Product: 50 mm wide silver retroreflective trim,
submitted 13 June 2016

SUMMARY

Specification: ANSI/ISEA 107-2015
American National Standard for High-Visibility Safety Apparel
Retroreflective and Combined Performance Material

Color, Combined Performance Material

Prior to Exposure..... Not Applicable
Colorfastness..... Not Applicable

Retroreflective Performance Prior to Test Exposure Passed

Retroreflective Performance after Test Exposure

Abrasion..... Passed
Flexing..... Passed
Folding at Cold Temperatures..... Passed
Exposure to Temperature Variation..... Passed
Washing (25X)..... Passed
Dry-cleaning (0X)..... Not Tested
Retroreflective Performance in Rainfall..... Passed

Written by:

Douglas G. Cummins
Photometric Engineer

Approved by:

Mark A. Evans
Laboratory Director

TEST DATA SHEET

Project Name: Tingley N-FR Sew-on Manunite VB211A 500 CPL [waterproof]
reflective trim

Retroreflective Performance Prior to Exposure

Requirement: ANSI/ISEA 107-2015 9.1 Table 5
 Test Method: ASTM E808, E809
 Projector: Hoffman GPS-102 (Illuminant A, 10.7 Lux, 750 mm diameter)
 Sample Area: 200 mm x 200 mm, 0.040 m²

Test sample created by cutting submitted material into 200 mm strips and mounting 4 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.

Coefficient of Retroreflection, Candela/(Lux·m²)

Observation Angle	Entrance Angle	Minimum Requirement (ϵ_1/ϵ_2)	Measured	
			ϵ_1	ϵ_2
0.20° (12')	5°	330 / 248	427.3	425.6
	20°	290 / 218	410.1	410.0
	30°	180 / 135	390.8	400.8
	40°	65 / 47	313.3	340.3
0.33° (20')	5°	250 / 188	252.3	253.0
	20°	200 / 150	242.9	243.2
	30°	170 / 128	230.3	235.4
	40°	60 / 45	202.8	215.6
1.00°	5°	25 / 18.8	56.4	55.4
	20°	15 / 11.3	56.6	54.7
	30°	12 / 9	55.2	54.2
	40°	10 / 7.5	45.7	47.0
1.50° (1°30')	5°	10 / 7.5	14.7	15.3
	20°	7 / 5.25	14.9	15.4
	30°	5 / 3.75	14.5	15.0
	40°	4 / 3	14.7	14.6

Samples meet requirements for Retroreflective Performance Prior to Test Exposure.

TEST DATA SHEET

Project Name: Tingley N-FR Sew-on Manunite VB211A 500 CPL [waterproof] reflective trim

Abrasion

Requirement: ANSI/ISEA 107-2015 9.2
 Performance at 0.20° Observation / 5° Entrance Angle only
 Test Method: ANSI/ISEA 107-2015 10.4.1
 ISO 12947-2:1998, (Wool Abradent / 5000 Cycles / 9 kPa)
 Instrument in inverted mode (sample on abradent table and abradent in test piece holder) per EN530:1995, Method 2 to provide suitable area for post-abrasion testing
 Abrasion performed by:
 SGS North America, report # 4004985TX-01
 Average of 3 samples
 Sample Area: 75 mm x 75 mm, 0.005625 m²

Coefficient of Retroreflection, Candela/(Lux·m²)

Sample	$\epsilon_1 = 0^\circ$		$\epsilon_2 = 90^\circ$	
	Measured	Required	Measured	Required
A1	367.0	100	366.7	75
A2	381.7	100	383.6	75
A3	383.7	100	383.6	75
Average	377.5	100	378.0	75

Samples meet Abrasion requirements.

Flexing

Requirement: ANSI/ISEA 107-2015 9.2
 Performance at 0.20° Observation / 5° Entrance Angle only
 Test Method: ANSI/ISEA 107-2015 10.4.2
 ISO 7854:1995 Method A (7500 Cycles)
 Average of 3 samples
 Sample Area: 50 mm x 50 mm, 0.006 m²

Coefficient of Retroreflection, Candela/(Lux·m²)

Sample	$\epsilon_1 = 0^\circ$		$\epsilon_2 = 90^\circ$	
	Measured	Required	Measured	Required
FL1	428.4	100	423.6	75
FL2	427.8	100	423.8	75
FL3	417.2	100	416.0	75
Average	424.5	100	421.1	75

Samples meet Flexing requirements.

TEST DATA SHEET

Project Name: Tingley N-FR Sew-on Manunite VB211A 500 CPL [waterproof]
reflective trim

Folding at Cold Temperatures

Requirement: ANSI/ISEA 107-2015 9.2
Performance at 0.20° Observation / 5° Entrance Angle only
Test Method: ANSI/ISEA 107-2015 10.4.3
ISO 4675:1990 (-20°C)
Average of 3 samples
Sample Area: 50 mm x 100 mm, 0.005 m²

Coefficient of Retroreflection, Candela/(Lux·m²)

Sample	$\epsilon_1 = 0^\circ$		$\epsilon_2 = 90^\circ$	
	Measured	Required	Measured	Required
CF1	421.5	100	428.7	75
CF2	432.0	100	440.3	75
CF3	433.6	100	442.4	75
Average	429.0	100	437.1	75

Samples meet Folding at Cold Temperatures requirements.

Exposure to Temperature Variation

Requirement: ANSI/ISEA 107-2015 9.2
Performance at 0.20° Observation / 5° Entrance Angle only
Test Method: ANSI/ISEA 107-2015 10.4.4
12 Hours at 50°C immediately followed by 20 Hours at -30°C
Average of 3 samples
Sample Area: 50 mm x 100 mm, 0.005 m²

Coefficient of Retroreflection, Candela/(Lux·m²)

Sample	$\epsilon_1 = 0^\circ$		$\epsilon_2 = 90^\circ$	
	Measured	Required	Measured	Required
T1	411.5	100	415.9	75
T2	422.5	100	422.4	75
T3	425.6	100	430.1	75
Average	419.9	100	422.8	75

Samples meet Exposure to Temperature Variation requirements.

TEST DATA SHEET

Project Name: Tingley N-FR Sew-on Manunite VB211A 500 CPL [waterproof] reflective trim

Washing

Requirement: ANSI/ISEA 107-2015 9.2
Performance at 0.20° Observation / 5° Entrance Angle only

Test Method: ANSI/ISEA 107-2015 10.4.5.2
ISO 6330:2012, Method 6N
After the last wash cycle the samples were dried, stress free, at 50°C.
Average of 3 samples

Sample Area: Two (2) strips, 50 mm x 250 mm, 0.025 m²

Number of Wash Cycles: 25

Coefficient of Retroreflection, Candela/(Lux·m²)

Sample	$\epsilon_1 = 0^\circ$		$\epsilon_2 = 90^\circ$	
	Measured	Required	Measured	Required
W1	255.0	100	255.2	75
W2	246.7	100	244.7	75
W3	254.8	100	254.6	75
Average	252.2	100	251.5	75

Samples meet Washing requirements.

Dry-cleaning

Requirement: ANSI/ISEA 107-2015 9.2
Performance at 0.20° Observation / 5° Entrance Angle only

Test Method: ANSI/ISEA 107-2015 10.4.5.3
ISO 3759-2011 (ISO 3175:1998 Method 9.1)
Average of 3 samples

Sample Area: Two (2) strips, 50 mm x 250 mm, 0.025 m²

Number of Dry-cleaning Cycles: Not Applicable

Coefficient of Retroreflection, Candela/(Lux·m²)

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

No samples tested.

TEST DATA SHEET

Project Name: Tingley N-FR Sew-on Manunite VB211A 500 CPL [waterproof]
reflective trim

Retroreflective Wet Performance

Requirement: ANSI/ISEA 107-2015 9.2
Performance at 0.20° Observation / 5° Entrance Angle only
Test Method: ANSI/ISEA 107-2015 10.4.6, Appendix A
Rainfall flow rate: 284 mm/hour
Retroreflection measured after 2 minutes exposure
while maintaining water spray
Projector: Hoffman GPS-102 (Illuminant A, 10.7 Lux, 750 mm diameter)
Sample Area: 200 mm x 200 mm, 0.040 m²

Sample from Retroreflective Performance Prior to Exposure used for
Retroreflective Wet Performance.

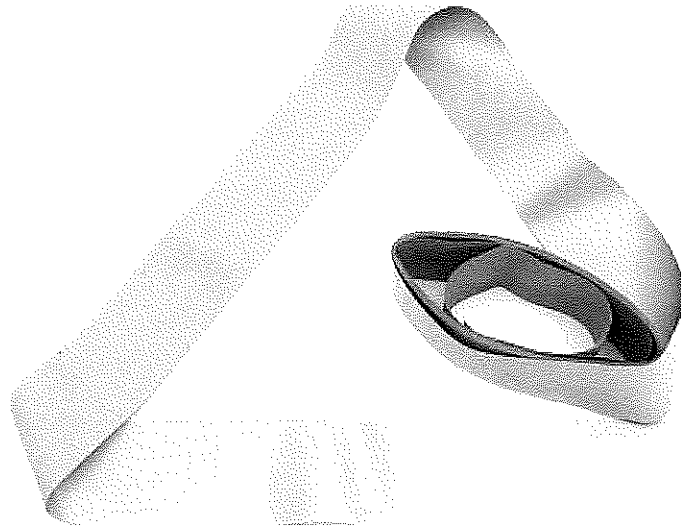
Coefficient of Retroreflection, Candela/(Lux·m²)

Sample	$\epsilon_1 = 0^\circ$		$\epsilon_2 = 90^\circ$	
	Measured	Required	Measured	Required
R1	139.8	100	140.8	75

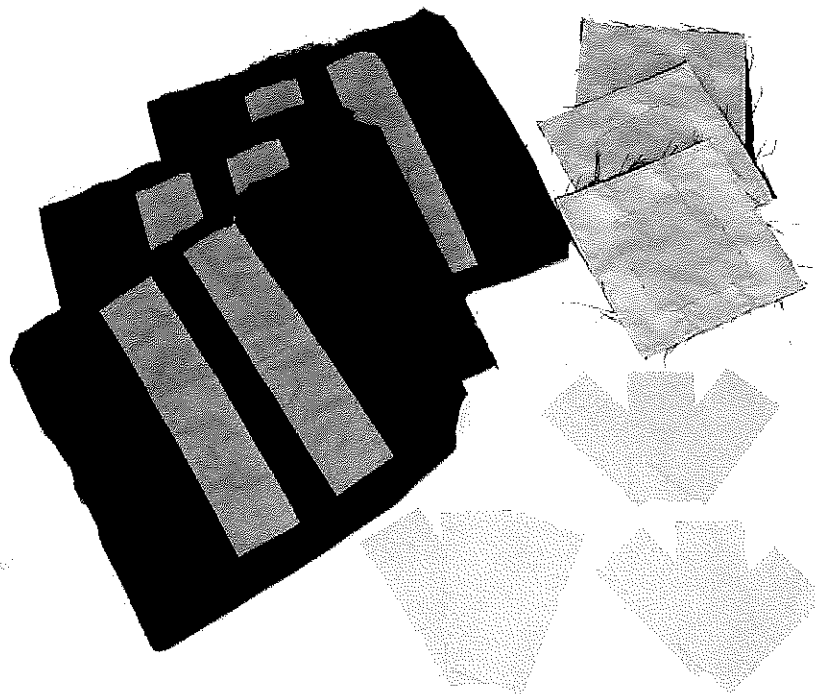
Sample meets Retroreflective Wet Performance requirements.

PHOTOGRAPH SHEET

Project Name: Tingley N-FR Sew-on Manunite VB211A 500 CPL [waterproof]
reflective trim



Roll, as received



Test Samples