



**Declaration of Conformity (page 2 of 2)**

**2. VISIBLE RETROREFLECTIVE MATERIAL**

- Amount of visible retroreflective material (smallest size offered) .13m<sup>2</sup> (201 in.<sup>2</sup>)

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

**Material 1 Test Data**

Test Lab: Calcoast – Test Report# 160613-04A	
Date: 7/12/2016	Style #: 1303-4
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  
SER #: 2519  
Lot #: ZY14100808  
Color Y-G (Yellow-Green)

Date: October 11, 2016

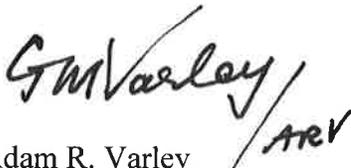
Report #: TINGLE.A120815A2

The submitted fabric **MEETS** the requirements of ANSI/ISEA 107– 2015 specification for the tests conducted in this report covering high visibility background material, provided a “Wash Separately” instruction is included on the care label.

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 60085120815A.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:** October 11, 2016 **FILE:** TINGLE.A120815A2  
**PO #:** 17092

**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  
SER #: 2519  
Lot #: ZY14100808  
Color Y-G (Yellow-Green)

**EXECUTIVE SUMMARY:**

PASS

FAIL



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, provided a "Wash Separately" instruction is included on the care label.

**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 = y = % Y =	N/A
			After 40x Xenon x = y = % Y =	N/A
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 = 0.377 y = 0.539 % Y = 107.69	PASS
			After 40x Xenon x = 0.372 y = 0.528 % Y = 104.32	PASS
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: 4.0 Cotton: 4.5 Nylon: 4.5 Polyester: 4.5 Acrylic: 4.5 Wool: 4.5	PASS PASS

## ISO/IEC 17025 Certified Third Party Test Report

FILE: TINGLE.A120815A2  
PO #: 17092

**SAMPLE IDENTIFIED BY CLIENT AS:**

Fabric Submitted  
Per ANSI/ISEA 107-2015 Specification  
SER #: 2519  
Lot #: ZY14100808  
Color Y-G (Yellow-Green)

**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	3.45 lbs average 5.73 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: 3.0 Cotton: 4.5 Nylon: 2.5 Polyester: 4.0 Acrylic: 5.0 Wool: 4.0	PASS FAIL
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: 4.0 Cotton: 4.5 Nylon: 4.0 Polyester: 4.5 Acrylic: 5.0 Wool: 4.5	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.A120815A2  
PO #: 17092

**SAMPLE IDENTIFIED BY CLIENT AS:**

Fabric Submitted  
Per ANSI/ISEA 107-2015 Specification  
SER #: 2519  
Lot #: ZY14100808  
Color Y-G (Yellow-Green)

**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: 5.0 Staining: 5.0	PASS
			300°F Shade Change: 5.0 Staining: 5.0	PASS
			390°F Shade Change: 5.0 Staining: 5.0	PASS
Colorfastness Dry Cleaning AATCC 132-2013	8.2.3 Table 4	Shade Change 4.0		N/A
Dimensional change Domestic AATCC 135-2012 MWW PP TDPP Unrestored	8.3.1	Woven L +/- 4% W +/-2%	5th Cycle Length= -0.3% Width = +0.1%	PASS
		Knit or Coated, Non-Woven L +/- 7% W +/-5%	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.A120815A2  
PO #: 17092

**SAMPLE IDENTIFIED BY CLIENT AS:**

Fabric Submitted  
Per ANSI/ISEA 107-2015 Specification  
SER #: 2519  
Lot #: ZY14100808  
Color Y-G (Yellow-Green)

**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 <sup>2</sup> /24 hr microporous  Procedure BW: 3600 g/m <sup>2</sup> /24 hr hydrophilic		N/A  N/A

Signed For The Company By

*Adam R. Varley / ARV*  
Adam R. Varley  
Technical Director

JG/12/230...JG/10



*Stacy Sadowy*  
Stacy Sadowy  
Quality Assurance Supervisor

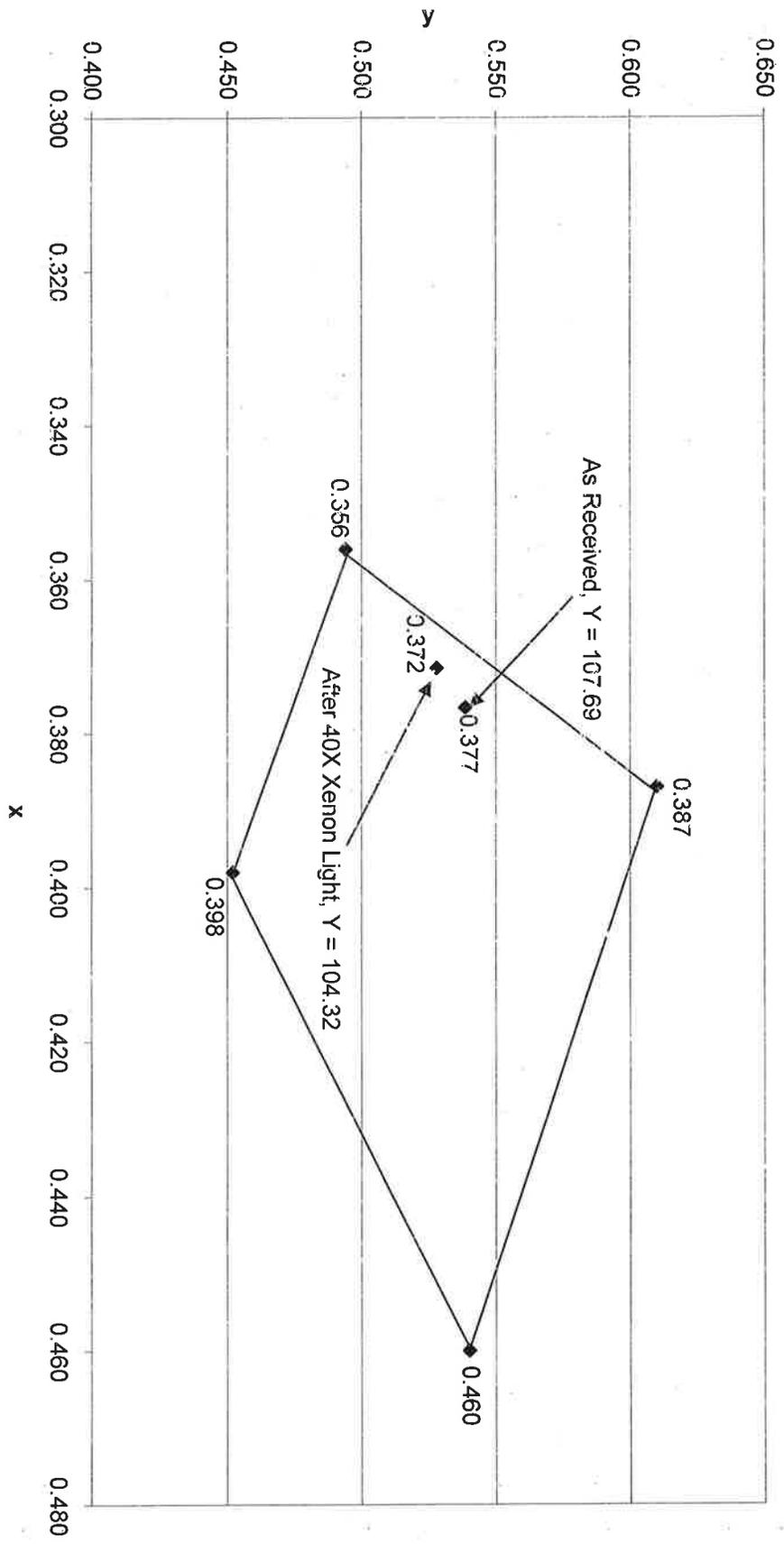
**Chromaticity Coordinates**

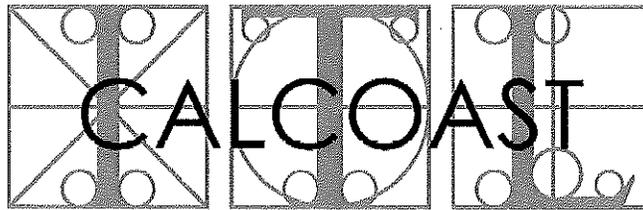
**TINGLE.A.120815A**

**Fluorescent Yellow-Green**

**ANSI 107-2015 Requirement:  $Y \geq 70$**

**Test Performed on Double Layers of Fabric**





INDUSTRIAL TESTING LABORATORY

Report No. 160613-04A

Page 1 of 7

TEST REPORT

Report Date: 12 July 2016
Project Name: Tingley N-FR Sew-on Chinastars 1303-4; T/C base [non-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 Chinastars 1303-4; T/C base  
[non-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 m<sup>2</sup>

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  $\varepsilon_1 = 0^\circ$  and  $\varepsilon_2 = 90^\circ$  where  $\varepsilon_1$  mounting orientation is with the strips parallel to the projector/detector plane.

Coefficient of Retroreflection, Candela/(Lux·m<sup>2</sup>)

Observation Angle	Entrance Angle	Minimum Requirement ( $\varepsilon_1/\varepsilon_2$ )	Measured	
			$\varepsilon_1$	$\varepsilon_2$
0.20° (12')	5°	330 / 248	445.7	444.6
	20°	290 / 218	437.8	436.1
	30°	180 / 135	425.9	425.3
	40°	65 / 47	384.1	386.5
0.33° (20')	5°	250 / 188	291.6	290.9
	20°	200 / 150	286.6	285.6
	30°	170 / 128	278.5	277.8
	40°	60 / 45	256.4	255.9
1.00°	5°	25 / 18.8	42.5	42.3
	20°	15 / 11.3	42.3	42.3
	30°	12 / 9	42.2	42.3
	40°	10 / 7.5	37.3	38.1
1.50° (1°30')	5°	10 / 7.5	13.5	13.6
	20°	7 / 5.25	13.2	13.3
	30°	5 / 3.75	12.7	12.7
	40°	4 / 3	12.4	12.4

Samples meet requirements for Retroreflective Performance Prior to Test Exposure.

**TEST DATA SHEET**

Project Name: Tingley N-FR Sew-on Chinastars 1303-4; T/C base  
[non-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 m<sup>2</sup>

Coefficient of Retroreflection, Candela/(Lux·m<sup>2</sup>)

Sample	$\varepsilon_1 = 0^\circ$		$\varepsilon_2 = 90^\circ$	
	Measured	Required	Measured	Required
A1	400.6	100	400.3	75
A2	389.9	100	389.7	75
A3	389.5	100	388.9	75
Average	393.3	100	393.0	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 m<sup>2</sup>

Coefficient of Retroreflection, Candela/(Lux·m<sup>2</sup>)

Sample	$\varepsilon_1 = 0^\circ$		$\varepsilon_2 = 90^\circ$	
	Measured	Required	Measured	Required
FL1	424.0	100	420.5	75
FL2	416.1	100	414.2	75
FL3	424.6	100	421.9	75
Average	421.6	100	418.9	75

Samples meet Flexing requirements.

**TEST DATA SHEET**

Project Name: Tingley N-FR Sew-on Chinastars 1303-4; T/C base  
[non-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 m<sup>2</sup>

Coefficient of Retroreflection, Candela/(Lux·m<sup>2</sup>)

Sample	$\epsilon_1 = 0^\circ$		$\epsilon_2 = 90^\circ$	
	Measured	Required	Measured	Required
CF1	428.2	100	427.5	75
CF2	431.5	100	428.3	75
CF3	431.0	100	428.4	75
Average	430.2	100	428.1	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 m<sup>2</sup>

Coefficient of Retroreflection, Candela/(Lux·m<sup>2</sup>)

Sample	$\epsilon_1 = 0^\circ$		$\epsilon_2 = 90^\circ$	
	Measured	Required	Measured	Required
T1	434.6	100	433.3	75
T2	446.3	100	438.7	75
T3	434.4	100	431.8	75
Average	438.4	100	434.6	75

Samples meet Exposure to Temperature Variation requirements.

**TEST DATA SHEET**

Project Name: Tingley N-FR Sew-on Chinastars 1303-4; T/C base  
[non-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 m<sup>2</sup>

Number of Wash Cycles: 25

Coefficient of Retroreflection, Candela/(Lux·m<sup>2</sup>)

Sample	$\varepsilon_1 = 0^\circ$		$\varepsilon_2 = 90^\circ$	
	Measured	Required	Measured	Required
W1	354.8	100	354.6	75
W2	360.4	100	358.2	75
W3	359.5	100	358.4	75
Average	358.2	100	357.1	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 m<sup>2</sup>

Number of Dry-cleaning Cycles: Not Applicable

Coefficient of Retroreflection, Candela/(Lux·m<sup>2</sup>)

Sample	$\varepsilon_1 = 0^\circ$		$\varepsilon_2 = 90^\circ$	
	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 Chinastars 1303-4; T/C base  
 [non-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 m<sup>2</sup>

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

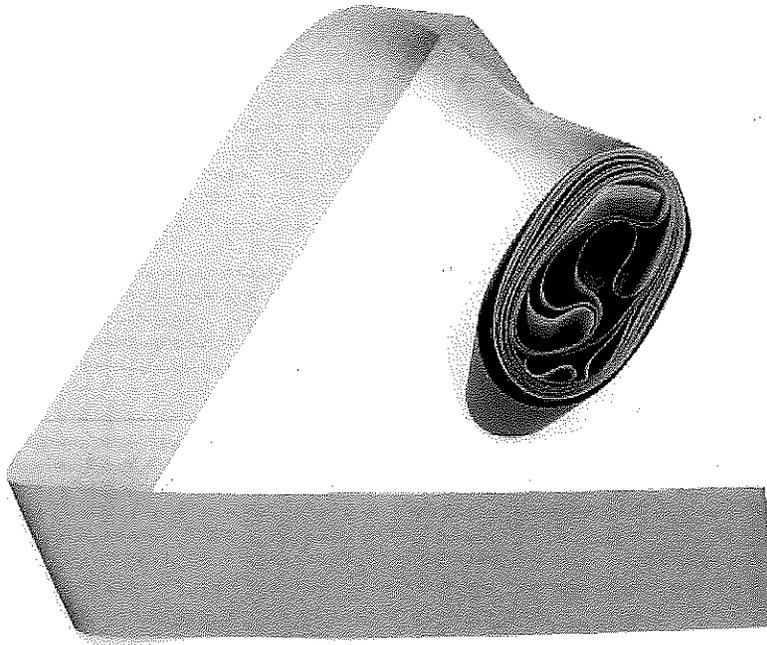
Coefficient of Retroreflection, Candela/(Lux · m<sup>2</sup>)

Sample	$\epsilon_1 = 0^\circ$		$\epsilon_2 = 90^\circ$	
	Measured	Required	Measured	Required
R1	179.5	100	169.0	75

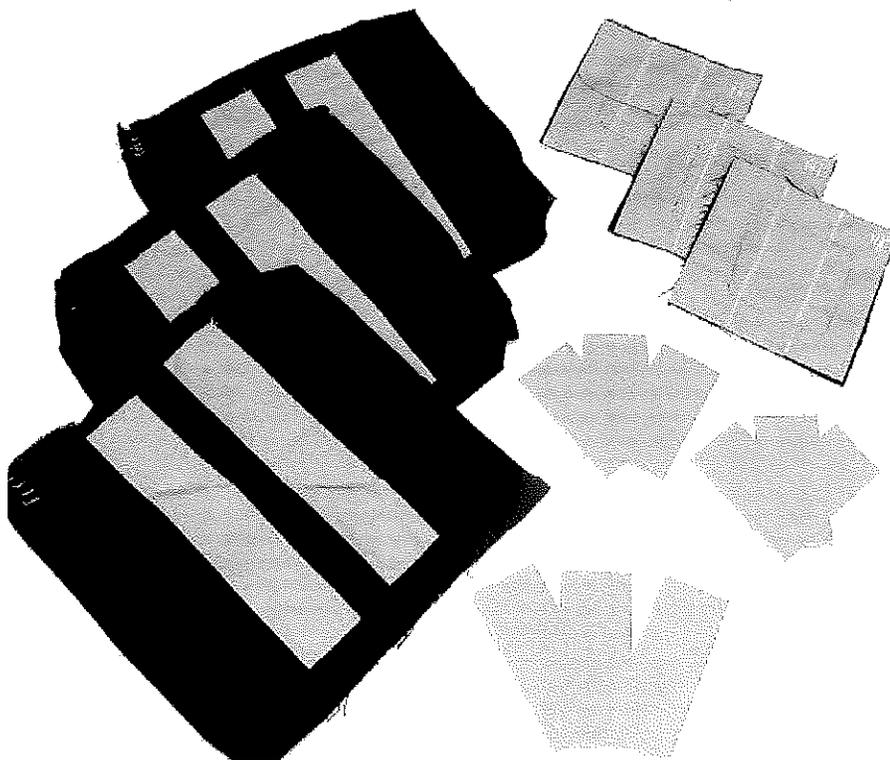
Sample meets Retroreflective Wet Performance requirements.

**PHOTOGRAPH SHEET**

Project Name: Tingley N-FR Sew-on Chinastars 1303-4; T/C base  
[non-waterproof] reflective trim



Roll, as received



Test Samples