



INDUSTRIAL TESTING LABORATORY

Report No. 141103-01Esup1

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SUPPLEMENTAL TEST REPORT

Report Date: 24 November 2014

Project Name: Huangshan Xingwei XW7200 Series Engineering Grade Retroreflective Sheeting

Submitted by: Huangshan Xingwei Reflectorized Material Co., Ltd. Huang Shan City, An Hui Province, China 245200

Test Laboratory: Calcoast - ITL San Leandro, CA 94577

Products Tested: XW7212 White, XW7204 Yellow, XW7208 Green, XW7205 Red, XW7206 Blue

SUMMARY

Specification: BS EN 12899-1:2007

Section 4 Retroreflective sign face material - 4.1 Glass bead material

- 4.1.1 Visual Performance
4.1.1.3 Daylight chromaticity and luminance factor, Class CR1 ....Passed
4.1.1.4 Coefficient of Retroreflection RA, Class RA1.....Passed
4.1.1.5 Durability
4.1.1.5.1 Resistance to weathering .....Not Tested
4.1.1.5.2 Accelerated natural weathering .....Not Tested
4.1.1.5.3 Accelerated artificial weathering .....Not Tested
4.1.2 Impact resistance .....Not Tested

Written by:

[Signature of Douglas G. Cummins]

Douglas G. Cummins
Photometric Engineer

Approved by:

[Signature of Mark A. Evans]

Mark A. Evans
Laboratory Director

**TEST DATA SHEET**

Project Name: Huangshan Xingwei XW7200 Series Engineering Grade Retroreflective Sheeting

**4.1.1.3 Daytime chromaticity and luminance**

Requirement: Table 1, Class CR1

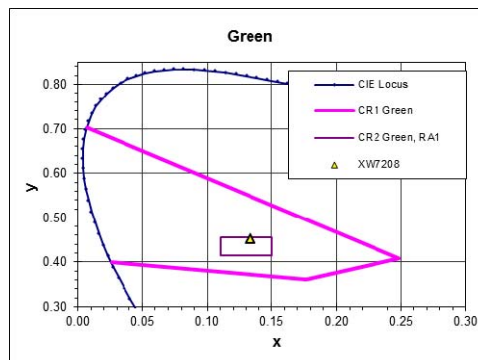
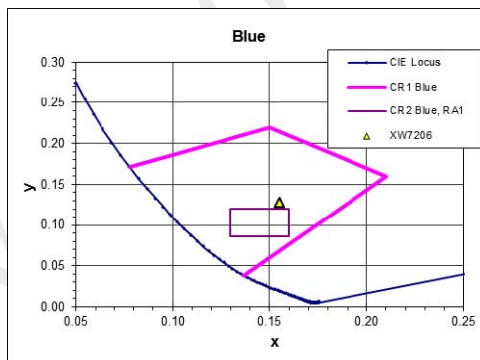
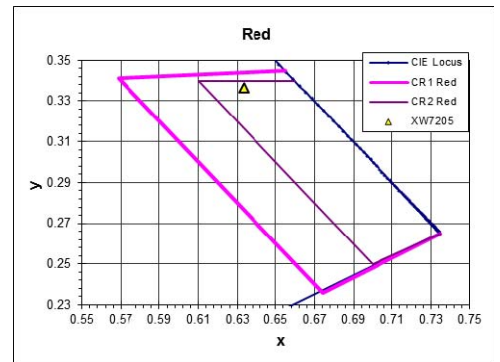
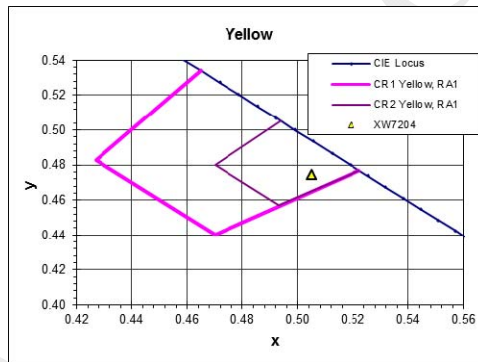
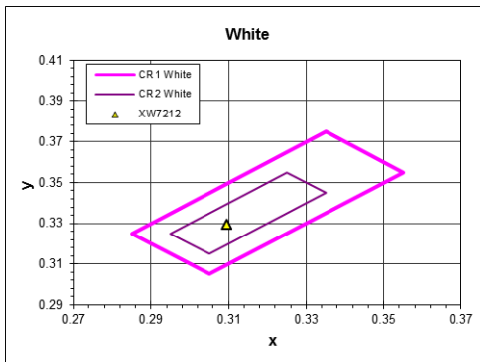
Test Method: CIE 15 / ASTM E308, E1347, E1349, E991, E1164  
(Illuminant D65, 2° Observer, Annular 45/0 Geometry)  
Average of 8 reads, each read oriented 45° apart

Instrument: Hunterlab Colorflex A60 Spectrocolorimeter (No SCF available)

Sample	x	y	$\beta$		
			Measured	Minimum	Maximum
XW7212 White	0.3096	0.3292	0.4558	0.35	-
XW7204 Yellow	0.5049	0.4745	0.2843	0.27	-
XW7205 Red	0.6334	0.3363	0.0916	0.05	-
XW7206 Blue	0.1553	0.1275	0.0275	0.01	-
XW7208 Green	0.1334	0.4532	0.0934	0.04	-

Samples conform to Daytime chromaticity and luminance requirements for Class CR1.

White, Yellow, Red, and Green samples conform to requirements for Class CR2.



**TEST DATA SHEET**

Project Name: Huangshan Xingwei XW7200 Series Engineering Grade  
Retroreflective Sheeting

**4.1.1.4 Coefficient of retroreflection  $R_A$** 

Requirement: Table 3, Class RA1

Test Method: CIE 54.2 / ASTM E810 - Test Distance 30.5 m ( $\beta_2 = 0$ )

Projector: Hoffman GPS-102 (Illuminant A, 10.7 Lux, 76 cm diameter)

Sample Area: 8.0 in. x 8.0 in., 0.444 ft<sup>2</sup> (204 mm x 204 mm, 0.0416 m<sup>2</sup>)

CIE 54.2 does not specify what orientation to make the retroreflective measurements. Measurements were made at orientations of  $\varepsilon=0^\circ$  and  $90^\circ$ , with the  $\varepsilon=0^\circ$  orientation arbitrarily chosen (see report 141103-01E). The average of the samples was also reported. The material does not appear to be rotationally sensitive.

Sample	$\beta_1$	#	$\alpha: 0.20^\circ (12')$				$0.33^\circ (20')$				$2.0^\circ$			
			$0^\circ$	$90^\circ$	Avg	Min	$0^\circ$	$90^\circ$	Avg	Min	$0^\circ$	$90^\circ$	Avg	Min
XW7212 White	5	1	97.7	97.7	97.7	70	73.4	73.2	73.3	50	8.8	8.9	8.9	5
		2	102.7	102.6	102.7		78.1	77.7	77.9		8.6	8.7	8.7	
		3	104.0	103.7	103.9		79.7	79.3	79.5		8.3	8.4	8.4	
		Avg	101.5	101.3	101.4		77.1	76.7	76.9		8.6	8.7	8.6	
	30	1	47.6	46.6	47.1	30	40.6	39.7	40.2	24	7.3	7.3	7.3	2.5
		2	48.5	48.0	48.3		41.8	41.3	41.6		7.2	7.2	7.2	
		3	47.0	46.3	46.7		40.7	40.1	40.4		6.8	6.8	6.8	
		Avg	47.7	47.0	47.3		41.0	40.4	40.7		7.1	7.1	7.1	
	40	1	23.2	23.1	23.2	10	20.8	20.7	20.8	9	5.2	5.1	5.2	1.5
		2	23.3	23.4	23.4		21.0	21.1	21.1		5.0	5.0	5.0	
		3	21.8	21.7	21.8		19.7	19.6	19.7		4.6	4.6	4.6	
		Avg	22.8	22.7	22.8		20.5	20.5	20.5		4.9	4.9	4.9	
XW7204 Yellow	5	1	70.3	70.2	70.3	50	50.8	50.7	50.8	35	7.1	7.0	7.1	3
		2	70.1	70.1	70.1		50.4	50.6	50.5		7.4	7.3	7.4	
		3	70.6	70.6	70.6		51.1	51.1	51.1		7.3	7.2	7.3	
		Avg	70.3	70.3	70.3		50.8	50.8	50.8		7.3	7.2	7.2	
	30	1	41.8	39.9	40.9	22	34.3	33.0	33.7	16	5.9	5.7	5.8	1.5
		2	41.5	39.7	40.6		34.2	33.0	33.6		5.9	5.8	5.9	
		3	40.4	39.2	39.8		33.6	32.8	33.2		5.8	5.7	5.8	
		Avg	41.2	39.6	40.4		34.0	32.9	33.5		5.9	5.7	5.8	
	40	1	22.7	21.3	22.0	7	19.8	18.7	19.3	6	4.6	4.3	4.5	1.0
		2	22.1	20.9	21.5		19.3	18.3	18.8		4.5	4.3	4.4	
		3	21.7	20.7	21.2		19.0	18.2	18.6		4.4	4.2	4.3	
		Avg	22.2	21.0	21.6		19.4	18.4	18.9		4.5	4.3	4.4	
XW7205 Red	5	1	16.2	16.2	16.2	14.5	13.5	13.5	13.5	10	1.2	1.3	1.3	1
		2	18.0	18.1	18.1		14.7	14.7	14.7		1.4	1.5	1.5	
		3	16.4	16.5	16.5		13.5	13.5	13.5		1.3	1.4	1.4	
		Avg	16.9	16.9	16.9		13.9	13.9	13.9		1.3	1.4	1.4	
	30	1	6.2	5.7	6.0	6	5.6	5.2	5.4	4	0.8	0.8	0.8	0.5
		2	7.5	7.1	7.3		6.7	6.3	6.5		1.0	1.0	1.0	
		3	7.0	6.6	6.8		6.3	5.9	6.1		0.9	0.9	0.9	
		Avg	6.9	6.5	6.7		6.2	5.8	6.0		0.9	0.9	0.9	
	40	1	2.7	2.3	2.5	2	2.4	2.2	2.3	1.8	0.5	0.5	0.5	0.5
		2	3.2	3.0	3.1		3.0	2.8	2.9		0.6	0.6	0.6	
		3	3.2	2.9	3.1		3.0	2.8	2.9		0.6	0.5	0.6	
		Avg	3.0	2.7	2.9		2.8	2.6	2.7		0.6	0.5	0.6	

**TEST DATA SHEET**

Project Name: Huangshan Xingwei XW7200 Series Engineering Grade  
Retroreflective Sheeting

**4.1.1.4 Coefficient of retroreflection  $R_A$  (continued)**

Sample	$\beta_1$	#	$\alpha: 0.20^\circ (12')$				$0.33^\circ (20')$				$2.0^\circ$			
			$0^\circ$	$90^\circ$	Avg	Min	$0^\circ$	$90^\circ$	Avg	Min	$0^\circ$	$90^\circ$	Avg	Min
XW7208 Green	5	1	17.5	17.4	17.5	9	12.6	12.6	12.6	7	1.6	1.6	1.6	0.5
		2	14.5	14.5	14.5		10.5	10.5	10.5		1.4	1.5	1.5	
		3	15.3	15.2	15.3		10.8	10.8	10.8		1.5	1.6	1.6	
		Avg	15.8	15.7	15.7		11.3	11.3	11.3		1.5	1.6	1.5	
	30	1	8.8	8.3	8.6	3.5	7.2	6.9	7.1	3	1.1	1.1	1.1	0.3
		2	7.1	6.9	7.0		5.9	5.7	5.8		1.0	1.0	1.0	
		3	7.7	7.4	7.6		6.3	6.1	6.2		1.1	1.1	1.1	
		Avg	7.9	7.5	7.7		6.5	6.2	6.4		1.1	1.1	1.1	
	40	1	4.2	4.0	4.1	1.5	3.7	3.5	3.6	1.2	0.8	0.8	0.8	0.2
		2	3.3	3.2	3.3		3.0	2.9	3.0		0.7	0.7	0.7	
		3	3.7	3.6	3.7		3.3	3.1	3.2		0.8	0.8	0.8	
		Avg	3.7	3.6	3.7		3.3	3.2	3.3		0.8	0.8	0.8	
XW7206 Blue	5	1	6.8	6.8	6.8	4	5.1	5.1	5.1	2	0.6	0.6	0.6	#
		2	6.8	6.7	6.8		5.1	5.1	5.1		0.6	0.5	0.6	
		3	6.6	6.7	6.7		5.0	5.0	5.0		0.6	0.6	0.6	
		Avg	6.7	6.7	6.7		5.1	5.1	5.1		0.6	0.6	0.6	
	30	1	2.9	2.8	2.9	1.7	2.5	2.4	2.5	1	0.3	0.3	0.3	#
		2	2.9	2.6	2.8		2.4	2.3	2.4		0.3	0.3	0.3	
		3	2.7	2.7	2.7		2.3	2.3	2.3		0.3	0.3	0.3	
		Avg	2.8	2.7	2.8		2.4	2.3	2.4		0.3	0.3	0.3	
	40	1	1.3	1.2	1.3	0.5	1.2	1.1	1.2	#	0.2	0.2	0.2	#
		2	1.3	1.1	1.2		1.2	1.0	1.1		0.2	0.2	0.2	
		3	1.3	1.2	1.3		1.1	1.1	1.1		0.2	0.2	0.2	
		Avg	1.3	1.2	1.2		1.2	1.1	1.1		0.2	0.2	0.2	

# Indicates "Value greater than zero but not significant or applicable"

Note: The Coefficient of Retroreflection of all printed colors (does not include White) shall not be less than 70% of the values of Table 3.

Samples meet Coefficient of Retroreflection requirements for Class RA1 Sheeting.