



INDUSTRIAL TESTING LABORATORY

Report No. 050107-02B

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TEST REPORT

Report Date: 11 February 2005

Test Component: King Tech Industry Corporation KT8086 2" High-Visibility Retroreflective Trim Applied to Fluorescent Yellow-Green Fabric
King Tech Industry Corporation KT8040 2" High-Visibility Retroreflective Trim (Heat Applied Silver Tape)

Submitted by: King Tech Industry Corporation
San Diego, CA 92122

Test Laboratory: Calcoast - ITL
Emeryville, CA 94608

Device Tested: King Tech KT8086 2" High-Visibility Retroreflective Trim Applied to Fluorescent Yellow-Green Fabric

SUMMARY

Specification: ANSI/ISEA 107-2004
American National Standard for High-Visibility Safety Apparel
Retroreflective Material, Level 2

Photometric Performance, InitialPassed
AbrasionPassed
FlexingPassed
Folding at Cold TemperaturesPassed
Exposure to Temperature VariationPassed
Domestic Washing (10X)Passed
Dry-cleaningNot Applicable
Retroreflective Performance in RainfallPassed

Signature of Responsible Laboratory Official:

Mark A. Evans
Photometric Engineer

TEST DATA SHEET

Material Tested: King Tech Industry Corporation KT8086 2" High-Visibility Retroreflective Trim Applied to Fluorescent Yellow-Green Fabric
 King Tech Industry Corporation KT8040 2" High-Visibility Retroreflective Trim (Heat Applied Silver Tape)

Retroreflective Performance, Initial

Requirement: ANSI/ISEA 107-2004 7.1

Test Method: ASTM E808/E809

Measured Coefficient of Retroreflection in $cd/(lx \cdot m^2)$

Product	High Visibility Trim							
Observation Angle	Entrance Angle ($\epsilon_1 = 0^\circ$)				Entrance Angle ($\epsilon_2 = 90^\circ$)			
	5°	20°	30°	40°	5°	20°	30°	40°
12'	409.0	393.8	377.5	333.3	409.9	393.1	370.6	321.7
20'	276.3	266.3	255.2	232.5	276.6	265.9	251.0	223.5
1°	40.8	42.5	42.8	33.4	41.6	42.9	42.9	34.2
1°30'	15.7	14.9	15.3	15.0	15.9	14.8	15.0	14.3

Note: Sample area = 0.438ft².

Level 2 Requirements for Coefficient of Retroreflection in $cd/(lx \cdot m^2)$

Observation Angle	Entrance Angle ($\epsilon_1 = 0^\circ$ or 90°)				Entrance Angle ($\epsilon_2 = 0^\circ$ or 90°)			
	5°	20°	30°	40°	5°	20°	30°	40°
12'	330	290	180	65	247.5	217.5	135.0	48.8
20'	250	200	170	60	187.5	150.0	127.5	45.0
1°	25	15	12	10	18.8	11.3	9.0	7.5
1°30'	10	7	5	4	7.5	5.3	3.8	3.0

Comments: Samples meet all requirements for Level 2 reflectivity.
 Vertical position = 0° / Horizontal position = 90°

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Abrasion

Requirement: ANSI/ISEA 107-2004 8.2.1

Test Method: ANSI/ISEA 107-2004 9.4.1
 EN 530:1994, Method 2 (Wool Abradent / 5000 Cycles / 9kPa)

After exposure each test specimen shall fulfill the photometric requirements of Section 8.2.1.

Post Exposure Coefficient of Retroreflection (R_A) - cd/(lx*m ²)				
Observation Angle = 12'				
Entrance Angle = 5°				
Product	$\epsilon_1 = 0^\circ$		$\epsilon_2 = 90^\circ$	
	Measured	Required	Measured	Required
High Visibility Trim	400.7	100	398.2	75

Comments: Tested in triplicate. Samples meet all abrasion requirements.
 Sample area = 0.111ft².

Flexing

Requirement: ANSI/ISEA 107-2004 8.2.1

Test Method: ANSI/ISEA 107-2004 9.4.2
 ISO 7854:1997 Method A (7500 Cycles)

After exposure each test specimen shall fulfill the photometric requirements of Section 8.2.1.

Post Exposure Coefficient of Retroreflection (R_A) - cd/(lx*m ²)				
Observation Angle = 12'				
Entrance Angle = 5°				
Product	$\epsilon_1 = 0^\circ$		$\epsilon_2 = 90^\circ$	
	Measured	Required	Measured	Required
High Visibility Trim	307.2	100	308.8	75

Comments: Tested in triplicate. Samples meet all flexing requirements.
 Sample Area = 0.198ft².

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Folding at Cold Temperatures

Requirement: ANSI/ISEA 107-2004 8.2.1

Test Method: ANSI/ISEA 107-2004 9.4.3
 ISO 4675:1990 (-20°C)

After exposure each test specimen shall fulfill the photometric requirements of Section 8.2.1.

Post Exposure Coefficient of Retroreflection (R_A) - cd/(lx*m ²)				
Observation Angle = 12'				
Entrance Angle = 5°				
	$\epsilon_1 = 0^\circ$		$\epsilon_2 = 90^\circ$	
Product	Measured	Required	Measured	Required
High Visibility Trim	429.8	100	424.7	75

Comments: Tested in triplicate. Samples meet all folding requirements.
 Sample Area = 0.056ft².

Exposure to Temperature Variation

Requirement: ANSI/ISEA 107-2004 8.2.1

Test Method: ANSI/ISEA 107-2004 9.4.4
 12 Hours at 50°C / 20 Hours at -30°C / 2 Hours at 20°C

After exposure each test specimen shall fulfill the photometric requirements of Section 8.2.1.

Post Exposure Coefficient of Retroreflection (R_A) - cd/(lx*m ²)				
Observation Angle = 12'				
Entrance Angle = 5°				
	$\epsilon_1 = 0^\circ$		$\epsilon_2 = 90^\circ$	
Product	Measured	Required	Measured	Required
High Visibility Trim	430.6	100	432.5	75

Comments: Tested in triplicate. Samples meet all temperature variation requirements. Sample Area = 0.098ft².

TEST DATA SHEET

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Washing (Domestic)

Requirement: ANSI/ISEA 107-2004 8.2.1

Test Method: ANSI/ISEA 107-2004 9.4.6
 ISO 6330:2000 Method 2A

After exposure each test specimen shall fulfill the photometric requirements of Section 8.2.1.

Number of Wash Cycles: 10				
Post Exposure Coefficient of Retroreflection (R_A) - $cd/(lx \cdot m^2)$				
Observation Angle = 12'				
Entrance Angle = 5°				
Product	$\epsilon_1 = 0^\circ$		$\epsilon_2 = 90^\circ$	
	Measured	Required	Measured	Required
High Visibility Trim	430.0	100	426.2	75

Comments: Tested in triplicate. Samples meet all domestic washing requirements when washed 10 times. Average sample Area = 0.132ft².

Dry-cleaning

Requirement: ANSI/ISEA 107-2004 8.2.1

Test Method: ANSI/ISEA 107-2004 9.4.7
 ISO 3175:1998 Method 8.1

After exposure each test specimen shall fulfill the photometric requirements of Section 8.2.1.

Number of Dry-cleaning Cycles: 0				
Post Exposure Coefficient of Retroreflection (R_A) - $cd/(lx \cdot m^2)$				
Observation Angle = 12'				
Entrance Angle = 5°				
Product	$\epsilon_1 = 0^\circ$		$\epsilon_2 = 90^\circ$	
	Measured	Required	Measured	Required
High Visibility Trim	N/A	100	N/A	75

Comments: Device not tested for dry-cleaning resistance.

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Retroreflective Performance in Rainfall

Requirement: ANSI/ISEA 107-2004 8.2.1

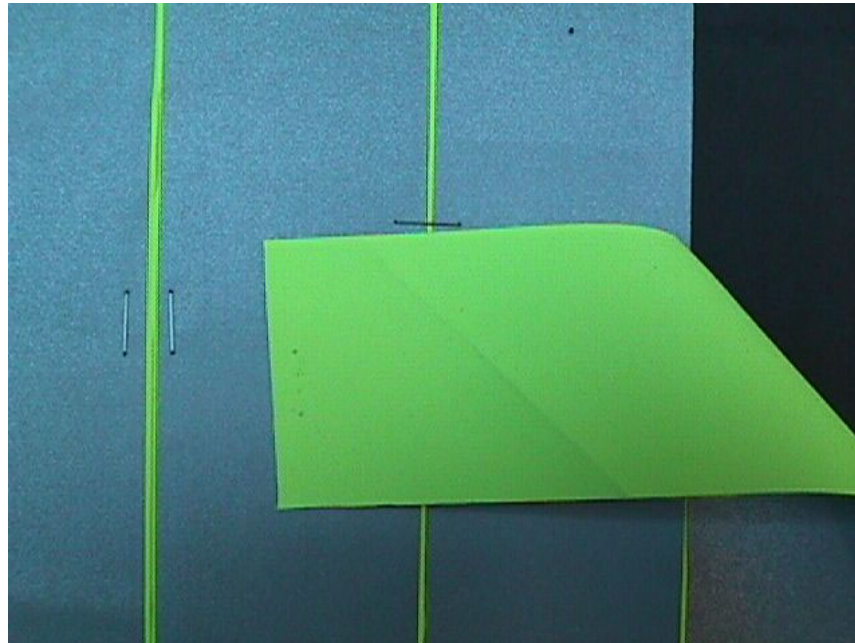
Test Method: ANSI/ISEA 107-2004 9.4.8

After exposure each test specimen shall fulfill the photometric requirements of Section 8.2.1.

Post Exposure Coefficient of Retroreflection (R_A) - $cd/(lx \cdot m^2)$				
Observation Angle = 12'				
Entrance Angle = 5°				
	$\epsilon_1 = 0^\circ$		$\epsilon_2 = 90^\circ$	
Product	Measured	Required	Measured	Required
High Visibility Trim	192	100	196	75

Comments: Sample meets all rainfall requirements. Sample Area = 0.438ft².

Photograph of Product



Typical product sample
 Background material cut away for testing