Technical Data Sheet

3M™ Scotchlite™ Reflective Material

Fabrics

Description

3M™ Scotchlite™ Reflective Material – Fabrics are designed for use on safety garments and in athletic and casual wear. When properly used, Scotchlite reflective material helps enhance the visibility of the wearer in nighttime or low-light conditions when illuminated by a light source, such as headlights, by returning the light back toward the original source and reaching the automobile driver's eye. Fluorescent color fabrics are also available to enhance daytime and low-light visibility. Scotchlite reflective material – fabrics are composed of wide angle, exposed retroreflective lenses bonded to a durable cloth backing and are available in home wash and industrial wash constructions. Flame resistant fabrics are also available. The fabric backing on some products is printed with 3M trademarks for easy product identification.

3M™ Scotchlite™ Reflective Material					
Product Number	**Fabric Backing**	**Home Wash[1]**	**Industrial Wash[1]**	**Flame Resistant**	**Recommended for Occupational Apparel[2]**
8906 Silver Fabric Trim	70% polyester / 30% cotton printed with 3M trademarks	X			X
8910 Silver Fabric	65% polyester / 35% cotton printed with 3M trademarks	X			X
8912 Silver Fabric[3]	65% polyester / 35% cotton printed with 3M trademarks	X			X
8925 Silver Fabric	65% polyester / 35% cotton	X			X
8935 Silver Industrial Wash Flame Resistant Fabric	100% FR treated cotton	X	X	X	X
8940 Silver Industrial Wash Flame Resistant Fabric	100% aramid printed with 3M trademarks	X	X	X	X
8965 White Fabric	65% polyester / 35% cotton	X			
8986 Fluorescent red-orange Flame Resistant Fabric	94% polyester / 6% nylon tricot knit	X		X	X
8987 Fluorescent lime-yellow Flame Resistant Fabric	94% polyester / 6% nylon tricot knit	X		X	X
8986 NFPA Fluorescent red-orange Flame Resistant Fabric	100% FR treated cotton	X		X	X
8987 NFPA Fluorescent lime-yellow Flame Resistant Fabric	100% FR treated cotton	X		X	X
9910 Silver Industrial Wash Fabric	100% polyester printed with 3M trademarks	X	X		X
9920 Silver Industrial Wash Fabric	100% polyester printed with 3M trademarks	X	X		X

[1]See Care and Maintenance Instructions section for recommended Home Wash and Industrial Wash guidelines.
[2]Certified to an occupational or industrial clothing standard such as ANSI/ISEA 107-2010 American National Standard for High Visibility Safety Apparel and Headwear; NFPA 1971 Standard for Protective Clothing and Equipment for Structural Fire Fighting and Proximity Fire Fighting, 2007 Edition; or CAN/CSA Z96-09 High Visibility Safety Apparel. Customers should contact 3M Technical Service regarding certifications to specific standards.
[3]3M™ Scotchlite™ Reflective Material – 8912 Silver Fabric has "3M" imaged on its silver surface.

3M

Retroreflective Performance

The coefficient of retroreflection (R_A, in cd/lux/m²) of 3M™ Scotchlite™ Reflective Material is measured by methods based on either of the following retroreflective intensity testing procedures:

ASTM E809-08 and E810-03 (R_A)

CIE 54.2:2001 (R')

Reflected color of 3M™ Scotchlite™ Reflective Material – Fabrics is white.

Retroreflective performance data was generated by 3M and is based on testing new product. The R_A values listed in the following tables were measured at +5.0° entrance and 0.2° observation angles.

It is important to note that use, wear, laundering, and environmental conditions will affect performance. Please contact your 3M representative for proposed product specifications.

Product Certification

ANSI/ISEA 107-2010 and CAN/CSA Z96-09

The following Scotchlite reflective material – fabrics have certificates available for the ANSI/ISEA 107-2010 American National Standard for High-Visibility Safety Apparel and Headwear for Level 2 retroreflective performance and meet the requirements for CAN/CSA Z96-09 High Visibility Safety Apparel. Scotchlite reflective material that is certified to ANSI/ISEA 107-2010 will also meet the requirements for retroreflective material in ANSI/ISEA 207-2006 American National Standard for High-Visibility Public Safety Vests.

3M™ Scotchlite™ Reflective Material					
Product Number	**Daytime Color**	**Initial Average R_A[4]**	**Minimum R_A[5]**	**Washing Cycles[6]**	**Dry Cleaning Cycles[7]**
8906 Silver Fabric Trim	Silver	500	330	30	0
8910 Silver Fabric	Silver	500	330	50	20
8912 Silver Fabric	Silver	500	330	60	0
8925 Silver Fabric	Silver	500	330	75	25
8935 Silver Industrial Wash Flame Resistant Fabric	Silver	500	330	50	30
8940 Silver Industrial Wash Flame Resistant Fabric	Silver	500	330	50	30
9910 Silver Industrial Wash Fabric	Silver	500	330	100	50
9920 Silver Industrial Wash Fabric	Silver	500	330	100	50

[4]Measured by 3M on new product at +5.0° entrance and 0.2° observation angles
[5]ANSI/ISEA 107-2010 minimum coefficient of retroreflection for Level 2 retroreflective material
[6]ISO 6330 Method 2A at 60 °C (140 °F) and $R_A \geq 100$ cd/lux/m² (home wash)
[7]ISO 3175 Method 8.1 and $R_A \geq 100$ cd/lux/m²

NFPA and CAN/CGSB

The following 3M™ Scotchlite™ Reflective Material – Fabrics are flame resistant and certified to NFPA and CAN/CGSB standards as components for fire fighting and technical rescue clothing and equipment, including: NFPA 1971 Standard on Protective Clothing and Equipment for Structural Fire Fighting and Proximity Fire Fighting, 2007 edition; NFPA 1977 Standard on Protective Clothing and Equipment for Wildland Fire Fighting, 2005 Edition; NFPA 1951 Standard on Protective Ensembles for Technical Rescue Incidents, 2007 Edition, or CAN/CGSB 155.1 Firefighters' Protective Clothing for Protection Against Heat and Flame, 2001 Edition. See the Physical Performance section for specific test methods used to evaluate heat and flame resistance.

3M™ Scotchlite™ Reflective Material				
Product Number	**Daytime Color**	**Initial Average R_A[4]**	**NFPA 1971 Minimum R_A**	**Fluorescent NFPA 1971 Sec. 8.46.4.2**
8935 Silver Industrial Wash Flame Resistant Fabric	Silver	500	100	No
8940 Silver Industrial Wash Flame Resistant Fabric	Silver	500	100	No
8986 NFPA Fluorescent red-orange Flame Resistant Fabric	Fluorescent red-orange	175	100	Yes
8987 NFPA Fluorescent lime-yellow Flame Resistant Fabric	Fluorescent lime-yellow	175	100	Yes

[4]Measured by 3M on new product at +5.0° entrance and 0.2° observation angles

Products Not Certified for Occupational Use in U.S.

The following 3M™ Scotchlite™ Reflective Material products are not certified to a specific standard for occupational work wear in the United States. The products may be regulated or conform to standards in other parts of the world. The products offer other features such as fluorescence and printing. Test methods listed in the U.S. standards are used to evaluate the performance of these products. Please consult the website of the country of interest through 3M.com for more information on regional standards or contact Technical Service for additional assistance with product selection.

3M™ Scotchlite™ Reflective Material		
Product Number	**Daytime Color**	**Initial Average R_A[4]**
8965 White Fabric	White	90
8986 Fluorescent red-orange Flame Resistant Fabric	Fluorescent red-orange	175
8987 Fluorescent lime-yellow Flame Resistant Fabric	Fluorescent lime-yellow	175

[4]Measured by 3M on new product at +5.0° entrance and 0.2° observation angles

Other Standards

Scotchlite reflective material products are used globally. Please visit our website at Scotchlite.com for more information on certification to other high visibility and flame resistant standards such as CAN/CGSB 155.2, EN 471, and AS/NZS 1906.

Scotchlite reflective material – fabrics are not certified for marine safety applications requiring IMO type approval.
3M™ Scotchlite™ Reflective Material – SOLAS Grade Products have this type of certificate.

Physical Performance

3M™ Scotchlite™ Reflective Material – Fabrics will meet or exceed the following specifications as noted. All R_A values are at +5.0° entrance angle and 0.2° observation angle. (See product certificates on website for testing laboratory and test date.)

3M™ Scotchlite™ Reflective Material		
Physical Performance	**Test Method**	**Approved Products**
Retroreflectivity: (Initial)	ANSI/ISEA 107-2010 Level 2 (Table 5) ASTM E809 (NFPA 1971, NFPA 1977)	Listed under Product Certification–ANSI/ISEA 107-2010 Listed under Product Certification–NFPA
Abrasion: $R_A \geq 100$	EN 530 Method 2, 5000 cycles	Listed under Product Certification–ANSI/ISEA 107-2010
Flexing: $R_A \geq 100$	ISO 7854 Method A, 7500 cycles	Listed under Product Certification–ANSI/ISEA 107-2010
Cold Fold: $R_A \geq 100$	ISO 4675, -20 °C (-4 °F)	Listed under Product Certification–ANSI/ISEA 107-2010
Temperature Cycle: $R_A \geq 100$	12 hours @ 50 °C (122 °F); 20 hours @ -30 °C (-22 °F)	Listed under Product Certification–ANSI/ISEA 107-2010
Wash: $R_A \geq 100$	ISO 6330 Method 2A @ 60 °C (140 °F) number of cycles listed	Listed under Product Certification–ANSI/ISEA 107-2010
Dry Clean: $R_A \geq 100$	ISO 3175 Method 8.1 number of cycles listed	Listed under Product Certification–ANSI/ISEA 107-2010
Wet Reflectivity: $R_A \geq 100$	ANSI/ISEA 107-2010, Appendix A NFPA 1971, 2007 (EN 471, Annex D)	Listed under Product Certification–ANSI/ISEA 107-2010 Listed under Product Certification–NFPA
Flame Resistance:	ASTM D 6413, 4" char length	Listed under Product Certification–NFPA
	ASTM D 6413, 6" char length	8986 Fluorescent red-orange Flame Resistant Fabric 8987 Fluorescent lime-yellow Flame Resistant Fabric
Heat Resistance:	ISO 17493, 5 minutes @ 260 °C (500 °F)	Listed under Product Certification–NFPA
Convective Heat: $R_A \geq 100$	10 minutes @ 140 °C (285 °F)	Listed under Product Certification–NFPA

Performance

While use of 3M™ Scotchlite™ Reflective Material enhances visibility, no reflective material can guarantee absolute visibility, particularly in adverse weather conditions. Performance will vary depending upon actual use, exposure conditions and maintenance. Customers should be aware that 3M presents a Scotchlite reflective material product portfolio that offers a range of product attributes, and users should test the reflective material on their finished garments to satisfy conformance to their own requirements.

3M recommends that all customers, in accordance with good manufacturing practices, establish an ongoing quality system. Customers should implement continuous testing throughout their production and on their finished garments that reflects their garment needs.

Please visit our website, Scotchlite.com for new or updated technical literature as well as contacting your local 3M Protective Apparel and Footwear Market Center Technical Service.

Application Instructions

Whenever two or more pieces of 3M™ Scotchlite™ Reflective Material – Fabrics are used together on a single surface or as a set, they should be matched to ensure uniform daytime color and nighttime reflectivity. All high visibility safety garments should be constructed in accordance with the appropriate standard(s).

Cutting – Die-cutting is recommended, although it can also be hand-cut or guillotined.

Sewing – For the best results, sew in place using a lockstitch and with no more than 12 stitches per inch (2.54 cm), and not less than 5/64" (2 mm) from the edge of the reflective fabric. For best results, apply Scotchlite reflective material – fabrics to recommended fabric weights. 100% polyester thread is recommended for sewing 3M™ Scotchlite™ Reflective Material – 9910 Silver Industrial Wash Fabric and 3M™ Scotchlite™ Reflective Material – 9920 Silver Industrial Wash Fabric. Use appropriate thread for flame resistant applications.

3M™ Scotchlite™ Reflective Material	
Recommended for Light to Medium Weight Fabrics	**Recommended for Medium and Heavy Weight Fabrics**
8906 Silver Fabric Trim	8935 Silver Industrial Wash Flame Resistant Fabric
8910 Silver Fabric	8940 Silver Industrial Wash Flame Resistant Fabric
8912 Silver Fabric	8986 Fluorescent red-orange Flame Resistant Fabric
8925 Silver Fabric	8987 Fluorescent lime-yellow Flame Resistant Fabric
8965 White Fabric	8986 NFPA Fluorescent red-orange Flame Resistant Fabric
	8987 NFPA Fluorescent lime-yellow Flame Resistant Fabric
	9910 Silver Industrial Wash Fabric
	9920 Silver Industrial Wash Fabric

Screen Printing – Images may be printed on the surface of Scotchlite reflective material – fabrics. All inks should be continuously tested to ensure acceptable adhesion in the event of changes occurring in the manufacturing process or composition of the ink. Prior to printing, wiping the surface with a soft cloth lightly dampened with isopropyl alcohol may help ink adhesion. Printed areas will not be retroreflective. **Please refer to 3M Technical Bulletin "Recommendations for Screen Printing Inks for 3M™ Scotchlite™ Reflective Material - Transfer Films, Pressure Sensitive Adhesive Films, Fabrics and Trims" for ink and application recommendations.**

Sublimation Printing – 3M™ Scotchlite™ Reflective Material – 8965 White Fabric offers good ink adhesion and durability for sublimated colors and images. For further information, contact 3M Protective Apparel and Footwear Market Center Technical Service.

Handling Precautions

1. Most Scotchlite reflective material – fabrics contain an aluminum layer as part of their construction. Blemishing of this aluminum layer can occur if the front surface of the product has direct contact from hands during application and is then exposed to hot and humid conditions, greater than 26.7 °C (80 °F) and greater than 70% relative humidity, for a period of weeks. These blemishes do not affect performance of the product. Please refer to 3M Technical Bulletin "Care Guidelines to Reduce Staining on 3M™ Scotchlite™ Reflective Material".

2. Fabrics finished with dyes containing sulfur compounds should not be used with 3M™ Scotchlite™ Reflective Material – 9920 Silver Industrial Wash Fabric. Exposure to sulfur compounds in dyes or in the environment will darken the retroreflective material and may affect retroreflectivity.

3. 3M™ Scotchlite™ Reflective Material – 8910 Silver Fabric may discolor fabrics containing an acidic dye. Every substrate should be tested for compatibility to these products.

Care and Maintenance Instructions

Important: Test each application according to appropriate care instructions required for the finished product. Actual life of 3M™ Scotchlite™ Reflective Material depends on cleaning methods and wear conditions.

Home Wash Guidelines

Home laundering means using a top or front loading consumer type home washing machine with a consumer detergent at moderate water temperatures (up to 60 °C , 140 °F). Garment finishing such as tumble drying at high temperatures can limit garment life and should be considered as part of the cleaning process.

3M™ Scotchlite™ Reflective Material – Fabrics may be home washed. Dry-cleaning may also be used for certain products. If bleach is needed, only non-chlorine bleach should be used. **High alkaline treatments such as stain removal products should not be used.** Exception: 3M™ Scotchlite™ Reflective Material – 8906 Silver Fabric Trim should not be dry-cleaned and non-chlorine bleach should not be used. 3M™ Scotchlite™ Reflective Material – 8912 Silver Fabric should not be dry-cleaned. Garment care label guidelines need to consider the garment fabric as well as the recommendations for garment components such as retroreflective trim.

Care label recommendations for Scotchlite reflective material – fabrics are:

Ⓟ Dry-clean, normal cycle

Non-chlorine bleach when needed

3M™ Scotchlite™ Reflective Material			
Product	**Maximum Wash Temp**	**Dry**	**Iron**
8906 Silver Fabric Trim	Machine wash warm, 40 °C (105 °F) Do not bleach Do not dry-clean	Tumble dry low	Cool iron, 110 °C (230 °F)
8910 Silver Fabric	Machine wash warm, 40 °C (105 °F)	Tumble dry low	Medium iron, 150 °C (300 °F)
8912 Silver Fabric	Machine wash warm, 40 °C (105 °F) Do not dry-clean	Tumble dry low	Medium iron, 150 °C (300 °F)
8925 Silver Fabric 8965 White Fabric	Machine wash hot, 60 °C (140 °F)	Tumble dry low	Medium iron, 150 °C (300 °F)
8935 Silver Industrial Wash Flame Resistant Fabric 8940 Silver Industrial Wash Flame Resistant Fabric 9910 Silver Industrial Wash Fabric 9920 Silver Industrial Wash Fabric	If applied to a home wash garment Machine wash hot, 60 °C (140 °F)	Tumble dry low	Medium iron, 150 °C (300 °F)
8986 Fluorescent red-orange Flame Resistant Fabric 8987 Fluorescent lime-yellow Flame Resistant Fabric 8986 NFPA Fluorescent red-orange Flame Resistant Fabric 8987 NFPA Fluorescent lime-yellow Flame Resistant Fabric	**Do not presoak** Machine wash warm, 40 °C (105 °F)	Tumble dry low	Cool iron, 110 °C (230 °F)

Industrial Wash Guidelines

Industrial laundering means regularly washing large amounts of clothing in a relatively short amount of time, with large machines (> 25 kg loads), aggressive detergent chemistry (pH 10.5 – 12), and high wash temperatures (up to 85 °C, 185 °F). Garment finishing (tumble dry or tunnel finish) can limit garment life and should be considered as part of the cleaning process. Using harsher cleaning conditions than those recommended may significantly reduce product performance.

Industrial wash guidelines for 3M™ Scotchlite™ Reflective Material – Fabrics are:

3M™ Scotchlite™ Reflective Material			
Special Instructions: Stain treatment wash processing may reduce life of Scotchlite reflective material. **Wash chemistry:** Lower pH (more towards neutral) and lower active alkalinity will increase the lifetime performance of the retroreflective material. Actual lifetime will be dependent upon the detergent system and dosage level. **Do not** use solvenated surfactants. **Do not** use chlorine or perborate bleach.			
Product	**Washing**	**Drying**	**Pressing**
8935 Silver Industrial Wash Flame Resistant Fabric	**Wash chemistry: Do not** use detergents that contain free sodium hydroxide or potassium hydroxide **Maximum wash temperature:** 75 °C (165 °F) **Break/suds cycles:** Less than 15 minutes total.	**Tunnel dry:** Maximum inlet temperature 120 °C (250 °F) **Tumble dry:** Maximum exhaust temperature 90 °C (195 °F)	Do not exceed 150 °C (300 °F)
8940 Silver Industrial Wash Flame Resistant Fabric	**Wash chemistry: Do not** use detergents that contain free sodium hydroxide or potassium hydroxide **Maximum wash temperature:** 75 °C (165 °F) **Break/suds cycles:** Less than 15 minutes total.	**Tunnel dry:** Maximum inlet temperature 120 °C (250 °F) **Tumble dry:** Maximum exhaust temperature 90 °C (195 °F)	Do not exceed 150 °C (300 °F)
9910 Silver Industrial Wash Fabric	**Wash chemistry: Do not** use detergents that contain free sodium hydroxide or potassium hydroxide **Maximum wash temperature:** 75 °C (165 °F) **Break/suds cycles:** Less than 15 minutes total.	**Tunnel dry:** Maximum inlet temperature 120 °C (250 °F) **Tumble dry:** Maximum exhaust temperature 90 °C (195 °F)	Do not exceed 150 °C (300 °F)
9920 Silver Industrial Wash Fabric	**Wash chemistry: Do not** use detergents that contain free sodium hydroxide or potassium hydroxide **Maximum wash temperature:** 75 °C (165 °F) **Break/suds cycles:** Less than 20 minutes total.	**Tunnel dry:** Maximum inlet temperature 160 °C (320 °F). Drying time not to exceed 7 minutes. Fabric temperature not to exceed 135 °C (275 °F). **Tumble dry:** Maximum exhaust temperature 90 °C (195 °F)	Do not exceed 150 °C (300 °F)

Product Availability

Scotchlite reflective material – fabrics are available in rolls with the following standard width and lengths:

3M™ Scotchlite™ Reflective Material – Fabrics				
Product Number	**Roll Width**	**Width Tolerance**	**Standard Roll Length**	**Additional Information**
8906 Silver Fabric Trim	50.8 mm (2 in.)	± 0.5 mm (± 0.02 in.)	200 m (218 yd)	Minimum order quantity 1 pallet (276 rolls)
All others	< 150 mm (< 6 in.)	Standard ± 0.8 mm (± 0.04 in.) Special ± 0.5 mm (± 0.02 in.)	100 m (109 yd) 200 m (218 yd)	
	150 mm ≤ w < 900 mm (6 in. ≤ w < 36 in.)	0 mm to + 4 mm (0 in. to 0.16 in.)	50 m (55 yd) 100 m (109 yd)	
	≥ 900 mm (≥ 36 in.)	+ 3 mm to + 7 mm (+ 0.12 in. to + 0.28 in.)	50 m (55 yd) 100 m (109 yd)	

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Technical Data Sheet

3M™ Scotchlite™ Reflective Material

9187 Industrial Wash Flame Resistant Trim

Description

3M™ Scotchlite™ Reflective Material – 9187 Industrial Wash Flame Resistant Trim is designed for use on flame resistant safety garments. When properly used, the combination of fluorescent and silver trim enhances the visibility of the wearer in low light conditions for both daytime and nighttime when illuminated by a light source such as headlights by returning the light back toward the original source. The reflective surface is composed of wide angle, exposed retroreflective lenses integrally centered on a fluorescent background color and bonded with a special polymer to a flame resistant, durable aramid backing. The fabric backing is printed with the product number and 3M trademarks for easy identification.

Retroreflective Performance

The coefficient of retroreflection (R_A, in cd/lux/m²) is measured by methods based on either of the following retroreflective intensity testing procedures:

ASTM E809-02 and E810-03 (R_A)
CIE 54.2:2001 (R')

The R_A values were measured at the listed specific entrance and observation angles. Retroreflective performance data was generated by 3M and is based on testing new product. Use, wear, laundering, and environmental conditions will affect performance. Please contact your 3M representative for proposed product specifications.

3M™ Scotchlite™ Reflective Material			
Entrance Angle	**Observation Angle**	**Reflective Stripe Average R_A**	**Minimum R_A[1]**
+5.0°	0.2°	450	330

[1]ANSI/ISEA 107-2004 and CAN/CSA Z96-02 minimum coefficient of retroreflection (cd/lux/m²) for Level 2 retroreflective material.

Color

3M™ Scotchlite™ Reflective Material		
Product Number	**Daytime Color**	**Reflected Color**
9187	Fluorescent lime-yellow with silver stripe	White

Performance

While the use of 3M™ Scotchlite™ Reflective Material enhances visibility, no reflective material can guarantee absolute visibility, particularly in adverse weather conditions. Performance will vary depending upon actual use, exposure conditions, and maintenance. Users should test reflective material to satisfy conformance to their own requirements.

Note: 3M™ Scotchlite™ Reflective Material – 9187 Industrial Wash Flame Resistant Trim is not certified for use on structural fire fighting garments.

Physical Performance

Scotchlite reflective material – 9187 industrial wash flame resistant trim is certified and will meet or exceed the following performance specifications[2]:

3M™ Scotchlite™ Reflective Material	
Physical Performance	**Test Method, Certification**
Retroreflectivity[2]: (Initial)	ANSI/ISEA 107-2004, Level 2 CAN/CSA Z96-02 Level 2
Fluorescence:	ANSI/ISEA 107-2004, Table 3, ASTM E1164-02 CAN/CSA Z96-02
Abrasion: $R_A \geq 100$	EN 530 Method 2, 5000 cycles
Flexing: $R_A \geq 100$	ISO 7854 Method A, 7500 cycles
Cold Fold: $R_A \geq 100$	ISO 4675, -20 °C (-4 °F)
Temperature Cycle: $R_A \geq 100$	12 hours @ 50 °C (122 °F); 20 hours @ -30 °C (-22 °F)
Wash: $R_A \geq 100$	ISO 6330 Method 2A, 50 cycles @ 60 °C (140 °F)
Dry Clean: $R_A \geq 100$	ISO 3175 Method 9.1 30 cycles
Wet Reflectivity: $R_A \geq 100$	ANSI/ISEA 107-2004, Appendix A CAN/CSA Z96-02
Flame Resistance:	ASTM D6413, 4" Char length, 2 second after flame NFPA 2112
Heat Resistance:	CGSB 155.20-2000 NFPA 2112
Arc Thermal Performance Value:	ASTM F1959/F1959M-2004 and F 1891-02b

[2]Measured at 0.2° observation angle and 5.0° entrance angle.

Application Instructions

Whenever two or more pieces of Scotchlite reflective material – 9187 industrial wash flame resistant trim are used together on a single surface or as a set, they should be matched to ensure uniform daytime color and nighttime or low light reflectivity. All high visibility safety garments should be constructed in accordance with the appropriate standard.

Cutting: Scotchlite reflective material – 9187 industrial wash flame resistant trim can be die-cut, hand-cut or guillotined.

Sewing: For the best results, sew in place using a lockstitch and with no more than 12 stitches per inch (2.54 cm) and not less than 5/64" (2 mm) from the edge of the reflective trim. Use appropriate thread for flame resistant applications.

Handling Precautions: 3M™ Scotchlite™ Reflective Material – 9187 Industrial Wash Flame Resistant Trim contains an aluminum layer as part of the construction. Blemishing of this aluminum layer can occur if the front surface of the product has direct contact from hands during application and is then exposed to hot and humid conditions, greater than 26.7 °C (80 °F) and greater than 70% humidity, for a period of weeks. These blemishes do not affect performance of the product. Please refer to 3M Technical Bulletin "Care Guidelines to Reduce Staining on 3M™ Scotchlite™ Reflective Material."

Care and Maintenance Instructions

Important: Test each application according to appropriate care instructions required for the finished product. Actual life of the Scotchlite reflective material depends on cleaning methods and wear conditions.

Home Wash Guidelines

Scotchlite reflective material – 9187 industrial wash flame resistant trim may be home washed. Dry cleaning may also be used. If bleach is needed, only non-chlorine bleach should be used. Garment care label guidelines need to consider the garment fabric as well as the recommendations for garment components such as retroreflective trim. Please note that lower wash temperatures may extend the life of retroreflective trim.

Do not presoak

Wash: Machine wash hot, 60 °C (140 °F)

Bleach: Do not bleach

Dry: Tumble dry low

Iron: Use cool iron, 110 °C (230 °F)

Dry-clean: Dry-clean, perchloroethylene, normal cycle

Industrial Wash Guidelines

Industrial laundering means regularly washing large amounts of clothing in a relatively short amount of time, with large machines (>25kg loads), aggressive detergent chemistry (pH 10.5 – pH 12) and higher wash temperatures than home wash. Garment finishing (tumble dry or tunnel finish) can limit garment life and should be considered as part of the cleaning process. Using harsher cleaning conditions than those recommended may significantly reduce product performance.

3M™ Scotchlite™ Reflective Material	
Washing	
Special instructions:	Stain treatment wash processing may reduce life of 3M™ Scotchlite™ Reflective Material.
Wash chemistry:	Lower pH and lower active alkalinity will increase the lifetime performance of the retroreflective material. Actual lifetime will be dependent upon the detergent system and dosage level. Low to medium alkaline, high surfactant detergents are preferred. **Do not** use solvenated surfactants. **Do not** use chlorine or perborate bleach. **Do not** use detergents that contain free sodium hydroxide or potassium hydroxide.
Maximum wash temperature:	75 °C (165 °F)
Break/suds cycles:	Less than 15 minutes total
Drying	
Tunnel dry:	Maximum inlet temperature of 120 °C (250 °F)
Tumble dry:	Maximum exhaust temperature 90 °C (195 °F)
Ironing:	Do not exceed 150 °C (300 °F)

Product Availability

3M™ Scotchlite™ Reflective Material – 9187 Industrial Wash Flame Resistant Trim is available in rolls with the following standard widths and roll lengths:

3M™ Scotchlite™ Reflective Material			
Trim Width	**Reflective Strip Width**	**Centering Tolerance**	**Standard Roll Length**
50.8 mm ± 0.8 mm (2.0 ± 0.03 in.)	19 mm (0.75 in.)	± 1.6 mm (± 0.0625 in.)	100 m (109.4 yd.)

Order and Product Information

To order 3M™ Scotchlite™ Reflective Material Products, contact 3M Visibility and Insulation Solutions Customer Service at 800-328-7098 (US), 800-410-6880 (CANADA).

Storage and Shelf Life

Store in a cool, dry area and use within two years after date of receipt. Store rolls in original shipping cartons. Return partially used rolls to the carton or suspend horizontally through the core. Cut sheets should be stored flat.

Important Notice to User

LIMITED WARRANTY: In the event any Scotchlite reflective material is found to be defective in material, workmanship, or not in conformation with any express warranty, 3M's only obligation and your exclusive remedy shall be to replace or refund the purchase price, at 3M's option, of such product upon timely notification thereof and substantiation that the product has been stored, maintained and used in accordance with 3M's written instructions.

EXCLUSIONS TO WARRANTY: THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OTHER WARRANTY OR CONDITION OF QUALITY, EXCEPT OF TITLE AND AGAINST PATENT INFRINGEMENT.

LIMITATION OF LIABILITY: Except as provided above, 3M shall not be liable in contract or tort for any loss or damage, whether direct, indirect, incidental, special or consequential, (including, without limitation, lost profits, goodwill and business opportunity) arising out of the sale, use or misuse of the product, or the user's inability to use the product. **THE REMEDIES SET FORTH HEREIN ARE EXCLUSIVE.**

Because of the unlimited variety of potential applications for these products, BEFORE production use, the user (which may be a product designer, product specifier, converter or end product manufacturer or others) must determine that the Products are suitable for the intended use and are compatible with other component materials. User is solely responsible for determining the proper amount and placement of Products. While reflective products enhance visibility, no reflective product can ensure visibility or safety under all possible conditions.

3M may change the product, specifications and availability of the product as improvements are made; therefore, user should contact 3M for latest information before specifying the product.

3M

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