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	100% polyester printed with 3M trademarks	X			X
8910 Silver Fabric	65% polyester / 35% cotton printed with 3M trademarks	X			X
8912 Silver Fabric	65% polyester / 35% cotton printed with 3M trademarks	X			X
8925 Silver Fabric	65% polyester / 35% cotton	X			X
8932 Silver Flame Resistant Fabric	100% FR treated cotton	X		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
8987 Fluorescent lime-yellow Flame Resistant Fabric	94% polyester / 6% nylon tricot knit			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	X	X		X
9920 Silver Industrial Wash Fabric	100% polyester	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 107-2015 American National Standard for High Visibility Safety Apparel And Accessories; or NFPA 1971 Standard for Protective Clothing and Equipment for Structural Fire Fighting and Proximity Fire Fighting, 2013 Edition; or CAN/CSA Z96.2 High Visibility Safety Apparel. Customers should contact 3M Technical Service regarding certifications to specific standards.

3M™ Scotchlite™ Reflective Material

Retroreflective Performance

The coefficient of retroreflection (R_A, in cd/lux/m^2) of 3M™ Scotchlite™ Reflective Material 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')

Reflected color of 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 107-2015 and CAN/CSA Z96-15

The following 3M™ Scotchlite™ Reflective Material – Fabrics have certificates available for the ANSI/ISEA 107-2015 American National Standard for High-Visibility Safety Apparel And Accessories and meet the requirements for CAN/CSA Z96-015 High Visibility Safety Apparel for Level 2 retroreflective performance.

3M™ Scotchlite™ Reflective Material					
Product Number	Daytime Color	Initial Average R_A[3]	Minimum R_A[4]	Washing Cycles[5]	Dry-Cleaning Cycles[6]
8906 Silver Fabric Trim	Silver	500	330	30	0
8910 Silver Fabric	Silver	500	330	50	20
8912 Silver Fabric	Silver	500	330	50	0
8925 Silver Fabric	Silver	500	330	75	25
8932 Silver Flame Resistant Fabric	Silver	500	330	50	15
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	50	50

3. Measured by 3M on new product at +5.0° entrance and 0.2° observation angles.
4. ANSI/ISEA 107-2015 minimum coefficient of retroreflection at +5.0° entrance and 0.2° observation angles.
5. ISO 6330 Method 6N at 60 °C (140 °F) and $R_A \geq 100$ cd/lux/m^2 (home wash).
6. ISO 3175-2 Method 9.1 and $R_A \geq 100$ cd/lux/m^2.

NFPA and CAN/CGSB

The following 3M™ Scotchlite™ Reflective Material – Fabrics are flame resistant and are certified to the current edition of one or more of the following NFPA and CAN/CGSB standards as components for firefighting and technical rescue clothing and equipment:

- NFPA 1971 Standard on Protective Clothing and Equipment for Structural Fire Fighting and Proximity Fire Fighting
- NFPA 1977 Standard on Protective Clothing and Equipment for Wildland Fire Fighting
- NFPA 1951 Standard on Protective Ensembles for Technical Rescue Incidents
- NFPA 2112: Standard on Flame-Resistant Garments for Protection of Industrial Personnel Against Flash Fire
- CAN/CGSB 155.20 Workwear for Protection Against Hydrocarbon Flash Fire
- CAN/CGSB 155.22 Fireline Workwear for Forest Firefighters

3M™ Scotchlite™ Reflective Material

See the Physical Performance section for specific test methods used to evaluate heat and flame resistance. Please see the NFPA Certificate of Compliance at Scotchlite.com for the complete list of certifications.

3M™ Scotchlite™ Reflective Material				
Product Number	Daytime Color	Initial Average R_A[3]	NFPA 1971 Minimum R_A	Fluorescent NFPA 1971 Sec. 8.46.4.2
8932 Silver Flame Resistant Fabric	Silver	500	NA	No
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

3. 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 US 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[3]
8965 White Fabric	White	175
8986 Fluorescent red-orange Flame Resistant Fabric	Fluorescent red-orange	175
8987 Fluorescent lime-yellow Flame Resistant Fabric	Fluorescent lime-yellow	175

3. 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 3M.com/Scotchlite for more information on certification to other high visibility and flame resistant standards such as ISO 20471, and AS/NZS 1906.

3M™ Scotchlite™ Reflective Material – Fabrics are not certified for marine safety applications requiring IMO type approval. 3M™ Scotchlite™ Reflective Materials – 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 107-2015 (Table 5)	Listed under Product Certification−ANSI/ISEA 107-2015
Abrasion: $R_A \geq 100$	EN 530 Method 2, 5000 cycles	Listed under Product Certification−ANSI/ISEA 107-2015
Flexing: $R_A \geq 100$	ISO 7854 Method A, 7500 cycles	Listed under Product Certification−ANSI/ISEA 107-2015
Cold Fold: $R_A \geq 100$	ISO 4675, -20 °C (-4 °F)	Listed under Product Certification−ANSI/ISEA 107-2015

3M™ Scotchlite™ Reflective Material

3M™ Scotchlite™ Reflective Material		
Physical Performance	**Test Method**	**Approved Products**
Temperature Cycle: R_A ≥ 100	12 hours @ 50 °C (122 °F) 20 hours @ -30 °C (-22 °F)	Listed under Product Certification–ANSI/ISEA 107-2015
Wash: R_A ≥ 100	ISO 6330 Method 6N, @ 60 °C (140 °F) number of cycles listed	Listed under Product Certification–ANSI/ISEA 107-2015
Dry Clean: R_A ≥ 100	ISO 3175-2 Method 9.1, number of cycles listed	Listed under Product Certification–ANSI/ISEA 107-2015
Wet Reflectivity: R_A ≥ 100	ANSI/ISEA 107-2015, Appendix A; NFPA 1971; 2007 (EN 471, Annex D)	Listed under Product Certification–ANSI/ISEA 107-2015 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: Cannot melt, drip, separate or ignite after 5 minutes @ 260 °C (500 °F)	ISO 17493, 5 minutes @ 260 °C (500 °F)	Listed under Product Certification–NFPA
Convection Heat: R_A ≥ 100	10 minutes @ 140 °C (285 °F)	Listed under Product Certification–NFPA

Performance

While use of 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 which includes maintaining lot/roll identification throughout the garment production process. 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 Personal Safety Division 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 inch (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

3M™ Scotchlite™ Reflective Material	
Recommended for Light to Medium Weight Fabrics	**Recommended for Medium and Heavy Weight Fabrics**
8906 Silver Fabric Trim	8932 Silver Flame Resistant Fabric
8910 Silver Fabric	8935 Silver Industrial Wash Flame Resistant Fabric
8912 Silver Fabric	8940 Silver Industrial Wash Flame Resistant Fabric
8925 Silver Fabric	8986 Fluorescent red-orange Flame Resistant Fabric
8965 White Fabric	8987 Fluorescent lime-yellow Flame Resistant 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 some 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 Personal Safety Division 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, 3M™ Scotchlite™ Reflective Material – 8912 Silver Fabric and 3M™ Scotchlite™ Reflective Material – 8906 Silver Fabric Trim may discolor fabrics containing an acidic dye. Every substrate should be tested for compatibility to these products.

4. Most substrates are suitable for the application of reflective materials. There are designs that should be avoided to prevent premature abrasion. For example, when using seam sealing tapes on reflective trim, disproportionate flexing will occur on the reflective material located between the sealing tapes. This may result in increased abrasion of the unsupported center section. To eliminate this, re-enforce the middle section by adding a stiffer

Care and Maintenance Instructions

(i) **IMPORTANT NOTE**

Test each application according to appropriate care instructions required for the finished product. Actual life of 3M™ Scotchlite™ Reflective Material depends on cleaning methods, wear conditions, exposure conditions, and maintenance. High-visibility warning clothing made with reflective material should be maintained in good condition and inspected regularly for damage or deterioration.

3M™ Scotchlite™ Reflective Material

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.

If bleach is needed, only non-chlorine bleach should be used. High alkaline treatments such as stain removal products should not be used. Garment care label guidelines need to consider the garment fabric as well as the recommendations for garment components such as retroreflective trim. Washing or dry cleaning products listed as "Do Not Wash" or "Do Not Dry Clean" may result in significant decrease in reflectivity.

Care label recommendations for Scotchlite reflective material – fabrics are below unless noted otherwise:

(P) Dry-clean, normal cycle   Non-chlorine bleach when needed

3M™ Scotchlite™ Reflective Material						
Product		**Maximum Wash Temp**		**Dry**		**Iron**
8906 Silver Fabric Trim 8912 Silver Fabric	40C	Machine wash warm, 40° C (105° F) Do not dry-clean	⊙	Tumble dry low		Cool iron, 110° C (230° F)
8910 Silver Fabric	40C	Machine wash warm, 40° C (105° F)	⊙	Tumble dry low		Medium iron, 150 °C (300 ° F)
8925 Silver Fabric 8932 Silver Flame Resistant Fabric 8965 White Fabric	60C	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	60C	If applied to a home wash garment Machine wash hot, 60 °C (140 °F)	⊙	Tumble dry low		Medium iron, 150 °C (300 ° F)
8986 NFPA Fluorescent red-orange Flame Resistant Fabric 8987 NFPA Fluorescent lime-yellow Flame Resistant Fabric	40C	Do not presoak Machine wash warm, 40° C (105° F)	⊙	Tumble dry low		Cool iron, 110° C (230° F)
8986 Fluorescent red-orange Flame Resistant Fabric 8987 Fluorescent lime-yellow Flame Resistant Fabric		Do not dry-clean Do not wash				

3M™ Scotchlite™ Reflective Material

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. High-visibility warning clothing made with reflective material should be maintained in good condition and inspected regularly for damage or deterioration.

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 8940 Silver Industrial Wash Flame Resistant Fabric 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

3M™ Scotchlite™ Reflective Material – Fabrics are available in rolls with the following standard width and lengths:

3M™ Scotchlite™ Reflective Material			
Product Number	**Roll Width**	**Standard Roll Length**	**Additional Information**
8906 Silver Fabric Trim	50.8 mm (2 in.)	200 m (218 yd)	Minimum order quantity 1 pallet (276 rolls)
All Others	50.8 mm (2 in.)	100 m (109 yd) 200 m (218 yd)	
	150 mm ≤ w < 900 mm (6 in. ≤ w < 36 in.)	50 m (55 yd) 100 m (109 yd)	
	≥ 900 mm (≥ 36 in.)	50 m (55 yd) 100 m (109 yd)	

Order and Product Information

To order 3M™ Scotchlite™ Reflective Material Products contact 3M Personal Safety Division Customer Service at 800-328-7098.

Storage and Shelf Life

Store in a cool (4 to 32 °C, 40 to 90 °F), dry area (less than 70% relative humidity) and use within two years after date of receipt. Store rolls in original shipping cartons. Ensure that the lot/roll identification remains with product rolls. Return partially used rolls to the carton or suspend horizontally through the core. Cut pieces should be stored flat.

Important Notice to User

LIMITED WARRANTY: In the event any 3M™ 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.