



# Technical Data Sheet January 2016

## 3M™ Scotchlite™ Reflective Material Series 9100 Industrial Wash Flame Resistant Trim

### Description

3M™ Scotchlite™ Reflective Material – Series 9100 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 lowlight conditions for both daytime and nighttime when illuminated by a light source such as headlights by returning 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  $cd/lux/m^2$ ) 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 Initial Average $R_A$
+5.0°	0.2°	450

### Color

3M™ Scotchlite™ Reflective Material – Series 9100 Industrial Wash Flame Resistant Trim		
Product Number	Daytime Color	Reflected Color
9186	Fluorescent red-orange with silver stripe	White
9187	Fluorescent lime-yellow with silver stripe	White

### Product Certification

#### NFPA and CAN/CGSB

Scotchlite reflective material – series 9100 industrial wash flame resistant trim are flame resistant and certified to the following NFPA and CAN/CGSB standards as components. See the Physical Performance section for specific test methods used to evaluate heat and flame resistance.

**NFPA 2112-2012** Standard on Flame-Resistant Garments for Protection of Industrial Personnel Against Flash Fire

**CGSB 155.20-2000** Workwear for Protection Against Hydrocarbon Flash Fire

**NOTE:** Scotchlite reflective material – series 9100 industrial wash flame resistant trim is not certified for use on structural fire fighting garments.

### Performance

While the 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. Users should test reflective material to satisfy conformance to their own requirements.

## Physical Performance

3M™ Scotchlite™ Reflective Material – Series 9100 Industrial Wash Flame Resistant Trim meet or exceed the following performance specifications per the current edition of the listed standards and test methods:

3M™ Scotchlite™ Reflective Material	
Minimum Physical Performance	Test Method
Retroreflectivity <sup>1</sup> : R <sub>A</sub> > 100	NFPA 2112, 2012 Edition
Fluorescence	NFPA 2112, 2012 Edition
Abrasion: R <sub>A</sub> ≥ 100	EN 530 Method 2, 5000 cycles
Flexing: R <sub>A</sub> ≥ 100	ISO 7854 Method A, 7500 cycles
Cold Fold: R <sub>A</sub> ≥ 100	ISO 4675, -20° C (-4° F)
Temperature Cycle: R <sub>A</sub> ≥ 100	12 hours @ 50° C (122° F) 20 hours @ -30° C (-22° F)
Wash: R <sub>A</sub> ≥ 100	ISO 6330 Method 2A, 50 cycles @ 60° C (140° F)
Dry Clean: R <sub>A</sub> ≥ 100	ISO 3175 Method 9.1, 30 cycles
Flame Resistance:	ASTM D6413, 4" char length, 2 second after flame
Heat Resistance:	ISO 17493, 5 minutes @ 260° C
Arc Thermal Performance Value	ATPV > 5cal/cm <sup>2</sup>

1. Brightness measured at 0.2° observation angle and 5.0° entrance angle.

## Application Instructions

Whenever two or more pieces of Scotchlite reflective material – series 9100 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 – series 9100 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:** Scotchlite reflective material – series 9100 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:** 3M™ Scotchlite™ Reflective Material – Series 9100 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), pH between 6 and 10.5



**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	
<b>Washing</b>	
<b>Special Instructions</b>	Stain treatment wash processing may reduce life of 3M™ Scotchlite™ Reflective Material.
<b>Wash chemistry</b>	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. <b>Do not</b> use solvenated surfactants. <b>Do not</b> use chlorine or perborate bleach. <b>Do not</b> use detergents that contain free sodium hydroxide or potassium hydroxide.
<b>Maximum wash temperature</b>	75° C (165° F)
<b>Break/suds cycles</b>	Less than 15 minutes total
<b>Drying</b>	
<b>Tunnel dry</b>	Maximum inlet temperature of 120° C (250° F)
<b>Tumble dry</b>	Maximum exhaust temperature 90° C (195° F)
<b>Ironing</b>	Do not exceed 150° C (300° F)

## Product Availability

3M™ Scotchlite™ Reflective Material – Series 9100  
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 Customer Service Customer Service at  
800-328-7098 (CANADA), 800-328-7098 (US)

## 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 3M™ Scotchlite™ Reflective Material is found to be defective in material, workmanship, or not in conformance 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 the 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, the user should contact 3M or visit [Scotchlite.com](http://Scotchlite.com) for latest information before specifying the product.



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