

Description

3M™ Scotchlite™ Reflective Material – High Gloss is designed for use on safety garments and when properly used, helps enhance the visibility of the wearer, in daytime, nighttime, or low-light conditions. 3M™ Scotchlite™ Reflective Material – High Gloss Products consist of highly retroreflective microprisms formed on flexible, glossy, and UV-stabilized polymeric film. A flexible vinyl film sealed on the backside of the 3M™ Scotchlite™ Reflective Material – High Gloss Trim, Chevron, and Panel encapsulates the microprisms and protects the reflective product from dirt and moisture penetration. Fluorescent red-orange and fluorescent lime-yellow high gloss colors are conspicuous under daytime conditions, particularly at dawn or dusk or on cloudy days.

3M™ Scotchlite™ Reflective Material							
Product Number	Unsealed Film	Sealed Edges	Trim: Sealing Pattern	Channels For Sewing	Recommended For Occupational Use	Sparkling Feature Visible Day And Night	Polyester Liner
High Gloss Trims							
Series 6100 High Gloss Trim		X	X	X	X		
Series 6100R* High Gloss Trim		X	X	X	X		
Series 6300 High Gloss Smooth Trim		X					
Series 7100** High Gloss Trim		X	X	X	X		
High Gloss Films							
Series 6200 High Gloss Film	X						X
Series 6500 High Gloss Sparkle Film	X					X	X
High Gloss Panel and Chevron							
Series 6600 High Gloss Panel		X		X	X		
Series 6600R* High Gloss Chevron		X		X	X		

* 3M™ Scotchlite™ Reflective Material – Series 6100R High Gloss Trim and 3M™ Scotchlite™ Reflective Material – Series 6600R High Gloss Chevron incorporate a clear polyurethane coating to resist dye migration for applications requiring this protection.

** 3M™ Scotchlite™ Reflective Material – Series 7100 High Gloss Trim incorporates a dye resistant coating along with premium seal strength for durable applications that require superior water holdout.



Retroreflective Performance

The coefficient of retroreflection (R_A , in cd/lux/m^2) is measured by methods traceable to either of the following retroreflective intensity testing procedures:

ASTM E809 and E810 (R_A)
CIE 54: 1982 (R')

The R_A values were measured at the listed specific entrances and observations angles. All typical R_A values were measured using unsealed film.

The R_A values are averages of readings taken from orientation angles that are 90 degrees apart unless stated differently. The 0° orientation angle is to be taken as the downweb direction of 3M supplied rolls. This 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					
Product Number	Daytime Color	Reflected Color	Entrance/Observation Angles	Typical R_A	Minimum R_A
High Gloss Trims					
6160R 6360 7160	White	White	-4.0°/0.2° 5.0°/0.33°	700 500	330 250
6187R 6387 7187	Fluorescent lime-yellow	Yellow	-4.0°/0.2° 5.0°/0.33°	700 500	330 250
6183	Orange	Orange	-4.0°/0.2° 5.0°/0.33°	425 300	330 250
6186R 6386 7186	Fluorescent red-orange	Orange	-4.0°/0.2° 5.0°/0.33°	500 370	250 120
6196R 6396 7196	Fluorescent red-orange	Orange	-4.0°/0.2° 5.0°/0.33°	500 370	330 250
6185	Blue	Blue	-4.0°/0.2°	75	30
High Gloss Films					
6260	White	White	-4.0°/0.2°	700	330
6560	White	White	-4.0°/0.2°	200	150
6287	Fluorescent lime-yellow	Yellow	-4.0°/0.2°	700	330
6587	Fluorescent lime-yellow	Yellow	-4.0°/0.2°	200	150
6286	Fluorescent red-orange	Orange	-4.0°/0.2°	500	250
6296	Fluorescent red-orange	Orange	-4.0°/0.2°	500	330
6586	Fluorescent red-orange	Orange	-4.0°/0.2°	NA	NA
6285	Blue	Blue	-4.0°/0.2°	75	30
High Gloss Panel and Chevron					
6660 6660R	White	White	-4.0°/0.2°	700	330
6687 6687R	Fluorescent lime-yellow	Yellow	-4.0°/0.2°	700	330
6686R	Fluorescent red-orange	Orange	-4.0°/0.2°	500	250
6696 6696R	Fluorescent red-orange	Orange	-4.0°/0.2°	500	330

ANSI/ISEA 107-1999 Certified Products

Many 3M™ Scotchlite™ Reflective Material – High Gloss Products are tested by third parties and certified to meet ANSI/ISEA 107-1999 Level 2 or Level 1 retroreflective performance.

The following products have certificates available for the ANSI/ISEA 107-1999 “American National Standard for High-Visibility Safety Apparel”

3M™ Scotchlite™ Reflective Material				
Product Number	Washing Cycles	Reflective Level	Combined Performance	Single Performance
6160R Trim	75	2		X
6260 Film	75	2		X
6360 Smooth Trim	10	2		X
6660 Panel	10	2		X
6606R Chevron	75	2		X
7160 Trim	75	2		X
6183 Trim	75	2		X
6186R Trim	75	1	X	
6386 Smooth Trim	10	1	X	
6686R Chevron	75	1	X	
7186 Trim	75	1	X	
6196R Trim	75	2	X	
6396 Smooth Trim	10	2	X	
6696 Panel	10	2	X	
6696R Chevron	75	2	X	
7196 Trim	75	2	X	
6187R Trim	75	2	X	
6287 Film	75	2	X	
6387 Smooth Trim	10	2	X	
6687 Panel	10	2	X	
6687R Chevron	75	2	X	
7187 Trim	75	2	X	

Please contact your 3M representative or visit our website at <http://www.3M.com/Scotchlite> to view certificates for the above products and for more information on certification to other standards, such as CSA Z-96 and EN 471.

Physical Performance

3M™ Scotchlite™ Reflective Material – High Gloss Products will meet or exceed the following specifications as noted. All R_A values are at 0° orientation, 5° entrance angle and 0.2° observation angle, unless stated differently (see product certificates on our website for third party test Lab and date).

Physical Performance	Approved Products	Test Method
Retroreflectivity: (Initial)	Products listed in the ANSI/ISEA 107-1999 Certified Products Section	ANSI/ISEA 107-1999 Level 1 (Table 4) or Level 2 (Table 5)
Abrasion: $R_A \geq 100$	Products listed in the ANSI/ISEA 107-1999 Certified Products Section	EN 530 Method 2, 5000 cycles
Flexing: $R_A \geq 100$	Products listed in the ANSI/ISEA 107-1999 Certified Products Section	ISO 7854 Method A, 7500 cycles
Cold Fold: $R_A \geq 100$	Products listed in the ANSI/ISEA 107-1999 Certified Products Section	ISO 4675, -15 °C (+5 °F)
Cold Fold: Will not crack	All high gloss products	ISO 4675, -15 °C (+5 °F) when flex over a 3 mm mandrel
Temperature Cycle: $R_A \geq 100$	Products listed in the ANSI/ISEA 107-1999 Certified Products Section	12 hours @ 50 °C (122 °F) 20 hours @ -30 °C (-22 °F)
Heat Resistance: $R_A \geq 75\%$ of initial R_A (@ 0° orientation, -4° entrance angle, 0.2° observation angle)	3M™ Scotchlite™ Reflective Material – Series 6500 High Gloss Sparkle Film	When exposed to 82 °C (180 °F) for 30 minutes
Wash: $R_A \geq 100$	Products listed in the ANSI/ISEA 107-1999 Certified Products Section	ISO 6330 Method 2A, 10 cycles @ 60 °C (140 °F) or 75 cycles @ 60 °C (140 °F)
Wash: $R_A \geq 80\%$ of initial R_A (@ 0° orientation, -4° entrance angle, 0.2° observation angle)	Scotchlite reflective material – series 6500 high gloss sparkle film	ISO 6330 Method 2A, 15 cycles @ 40 °C (104 °F) and tumble-dry @ 38 °C (100 °F)
Wet Reflectivity: $R_A \geq 100$	Products listed in the ANSI/ISEA 107-1999 Certified Products Section	ANSI/ISEA 107-1999 Annex A or EN 471 Annex A

Solvent Resistance: Scotchlite reflective material – high gloss products do not dissolve or pucker when wiped with a soft cloth containing mineral spirits, kerosene, unleaded gasoline, methanol, or VM&P Naphtha.

UV Stability: 3M™ Scotchlite™ Reflective Material – Series 6100R High Gloss Trim, Series 7100 High Gloss Trim and Series 6600R High Gloss Chevron have superior color and brightness retention after UV exposure.

Color Specifications

The initial color for 3M™ Scotchlite™ Reflective Material – High Gloss Film***, Trim, Chevron and Panel, as measured in accordance with ASTM E1164-94 (45/0 or 0/45 geometry, illuminant D65, 2° standard observer) are within the color boxes defined below:

White	β = Not Available****	x	0.303	0.368	0.340	0.274
		y	0.287	0.353	0.380	0.316
Fluorescent lime-yellow	$\beta \geq 0.70$	x	0.387	0.356	0.398	0.460
		y	0.610	0.494	0.452	0.540
Fluorescent red-orange	$\beta \geq 0.40$	x	0.610	0.535	0.570	0.655
		y	0.390	0.375	0.340	0.344
Orange	β = Not Available****	x	0.550	0.630	0.581	0.516
		y	0.360	0.370	0.418	0.394
Blue	β = Not Available****	x	0.144	0.244	0.190	0.066
		y	0.030	0.202	0.247	0.208

*** Color measured with white backing

**** Not a combined-performance color, β not specified

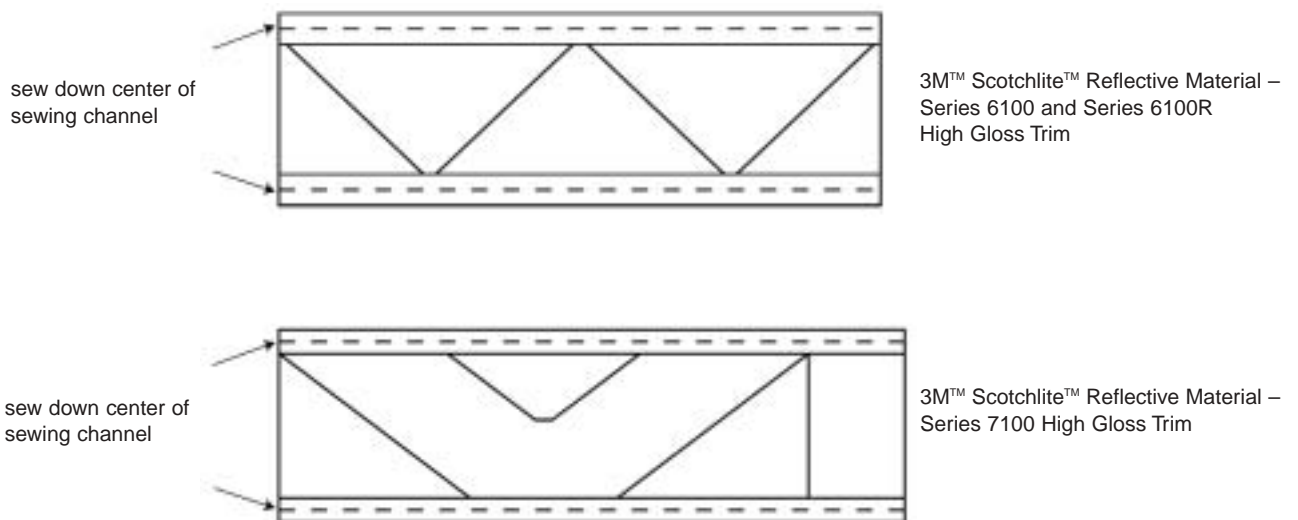
Performance

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

Application Instructions

Whenever two or more pieces Scotchlite reflective material are used together on a single surface or as a set, they should be matched to ensure uniform color and reflectivity. All safety garments should be constructed in accordance with ANSI/ISEA 107-1999.

Sewing to Fabrics: Sew in place with no more than 8 stitches per inch (2.54 cm), and not less than 1/8" (3 mm) from the edge of the material. Thread recommendation: 100% polyester. To reduce sticking, apply a non-stick material (e.g., silicone or nylon) to the bottom of the presser foot. Sewing channels along the edge are provided on 3M™ Scotchlite™ Reflective Material – Series 6100 High Gloss Trim, Series 6100R High Gloss Trim, Series 6600 High Gloss Panel, Series 6600R High Gloss Chevron and Series 7100 High Gloss Trim to protect against water penetration. Sew down the center of the 1/4" wide sewing channels.



Welding to Fabrics: 3M™ Scotchlite™ Reflective Material – High Gloss Products are composed primarily of vinyl materials and will weld suitably to most PVC films with any of the following methods: radio frequency (RF), high frequency (HF), dielectric or ultrasonic. Adhesion to specific films will vary with the lubricants, pigments, plasticizers and fillers used to make the PVC film. It is important to test weld strength with each new lot and new vendor.

RF Sealing: Radio Frequency is a widely used method of sealing vinyl films. It has the advantage of handling patches and trims using a step-and-repeat process. For more information, please refer to our 3M™ Scotchlite™ Reflective Material High Gloss Film Application Guide for Welding.

Screen Printing: Below are inks that can be used for printing on the vinyl surface of Scotchlite reflective material high gloss products. 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 alcohol may help ink adhesion. The Scotchlite reflective material – series 6100R high gloss trim and series 7100 high gloss trim do not require this alcohol cleaning step.

Application Instructions, continued

Ink	Ink Type	Manufacturer
VF Series Flat Vinyl Screen Ink	Opaque	Nazdar 1-800-767-9942 Fax: 1-913-422-2296 International: 1-913-422-1888
3M™ Scotchlite™ Process Color Series 990	Transparent	3M Traffic Safety Systems Division 1-800-553-1380 Fax: 1-880-591-9293 International: 1-651-733-4040

NOTE: 3M™ Scotchlite™ Reflective Material – High Gloss Film is shipped with a polyester liner on top of the vinyl film for easy handling. This polyester liner can be removed either before or after the sealing process and should be removed before sewing or screen printing. The film does not require a sealing film to be retroreflective. However, we do recommend the application of a sealing film to keep out dirt and water that can result in decreased reflectivity.

NOTE: Dyes may migrate when placed in direct contact with vinyl and some fabrics. Prior to application, 3M™ Scotchlite™ Reflective Material – High Gloss Products must be kept separate and should be tested for dye migration. However, 3M™ Scotchlite™ Reflective Material – Series 6100R High Gloss Trim, Series 6600R High Gloss Panel and Series 7100 High Gloss Trim are coated with a special polyurethane coating to resist dye migration.

Care and Maintenance Instructions

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



Wash:
Machine wash,
60 °C (140 °F)



Dry:
Tumble dry medium,
50 °C (122 °F)



Dry-clean:
Do not dry-clean



Bleach:
Do not bleach



Iron:
Do not iron

Product Availability

3M™ Scotchlite™ Reflective Material – High Gloss Film, Trim, Chevron, and Panel are available in rolls and sheets in the following standard widths and lengths:

3M™ Scotchlite™ Reflective Material				
Product Number	Roll Width Unless Noted	Width Tolerance	Splices Allowed	Standard Roll Length
High Gloss Trims				
Series 6100 High Gloss Trim	1", 1 3/8", 1 1/2", 2" (25.4 mm, 34.9 mm, 38.1 mm, 50.8 mm)	+/- 1/32" (+/- 0.8 mm)	2 per roll	100 m
Series 6100R High Gloss Trim	1", 1 3/8", 1 1/2", 2" (25.4 mm, 34.9 mm, 38.1 mm, 50.8 mm)	+/- 1/32" (+/- 0.8 mm)	2 per roll	100 m
Series 6300 High Gloss Smooth Trim	1/2", 1", 1 3/8", 1 1/2", 2", and 4" (12.7 mm, 25.4 mm, 34.9 mm, 38.1 mm, 50.8 mm, and 101.6 mm)	+/- 1/32" (+/- 0.8 mm)	2 per roll	100 m
Series 7100 High Gloss Trim	2" (50.8 mm)	+/- 1/32" (+/- 0.8 mm)	2 per roll	100 m
High Gloss Films				
Series 6200 High Gloss Film	18.0" (457.2 mm)	+ 6.3 mm - 0 mm	None	100 m
Series 6500 High Gloss Sparkle Film	17.0" (431.8 mm) Sheets 17.75" x 18.55"	+ 6.3 mm - 0 mm +/- .5"	None	100 m NA
High Gloss Panel and Chevron				
Series 6600 High Gloss Panel	4" x 17.75"	+/- 1/32" (+/- 0.8 mm)	None	NA
Series 6600R High Gloss Chevron	1.5" x 18" 2" x 18"	+/- 1/32" (+/- 0.8 mm)	None	NA

Order and Product Information

To order 3M™ Scotchlite™ Reflective Material Products contact 3M Personal Safety Products Department Customer Service at 800-328-7098 Ext. 2 (in Canada, 1-800-364-3577).

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 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 OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OTHER WARRANTY 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.



**Personal Safety Products Department
3M Occupational Health and
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