

# 3M™ Scotchlite™ Reflective Material – Product Bulletin

## 5690 series Fire Coat Comfort Trim

### 1. Product Description

3M™ Scotchlite™ Reflective Material – 5690 series Fire Coat Comfort Trim is intended to enhance the visibility of the wearer, when applied to firefighting apparel and flame resistant occupational work wear. It is most appropriate where enhanced visibility of the wearer during day time, and in low-light night time conditions, in combination with heat resistance and wear durability, is required.

The reflective part of the fabric will appear brilliant white when illuminated by vehicle headlights, even when the wearer is situated at the side of the road. When converting/storing the reflective material certain circumstances (see e.g. 6.2) may change the uniform appearance of the reflective material, but will not affect the reflective properties, and therefore, the defined functionality.

### 2. Product Features

#### 2.1 Product Design

3M™ Scotchlite™ Reflective Material – 5690 series Fire Coat Comfort Trim is composed of wide angle, exposed retroreflective lenses bonded to a heat activated adhesive. The trim is 50.8mm (2 inches) or 76.2mm (3") wide and comprised of reflective patterned segments on a clear plastic liner.

#### 2.2 High Performance according to ISO 20471 (High visibility warning clothing)

3M™ Scotchlite™ Reflective Material – 5690 series Fire Coat Comfort Trim

- Exceeds the highest brightness requirements for a separate performance retroreflective material.
- Is non-orientation sensitive.
- Offers 60°C domestic wash durability per ISO 20471, 50 cycles per ISO 6330-6N, depending on substrate.
- Offers good fabric compatibility.

3M™ Scotchlite™ Reflective Material – 5697 series Fire Coat Comfort Trim

- Meets the requirements for fluorescent yellow background material when new (clause 5.1), after Xenon (clause 5.2) and after being subjected to convective heat test at 180°C for 5 minutes for the fluorescent lime-yellow parts.
- Meets the requirements for fluorescent yellow background material (clause 5.1) after being subjected to 50 cycles washing at 60°C per ISO 20471.

#### 2.3 High Performance according to EN 469 (Protective clothing for firefighters)

3M™ Scotchlite™ Reflective Material – 5690 series Fire Coat Comfort Trim

- Meets the performance requirements regarding brightness according to EN 469 Annex B, B.3.
- Exceeds the minimum retroreflective performance requirements of ISO 20471 after exposure to heat resistance according to EN 469 Annex B, B3.1.
- Meets the performance requirements for heat resistance according to EN 469 Annex B, B.3.1, depending on the substrate.
- Offers excellent resistance to heat with high retroreflective performance retention after exposure to 260°C for 5 minutes, depending on the substrate.
- Meets requirement for flame spread according to EN 469 Annex B, B3.2, depending on the substrate.
- Meets requirement for limited flame spread index 3 according to ISO 14116, even after 50 wash cycles per ISO 6330 method 6N depending on the substrate.

#### 2.4 Special Features

To ensure consistency of performance, 3M™ Scotchlite™ Reflective Materials are manufactured within an ISO 9001 controlled manufacturing environment.

The 3M™ Scotchlite™ Reflective Material – 5690 series Fire Coat Comfort Trim shows an enhanced water vapor transmission value Ret.

### 3. General Safety Information

Read 3M™ Scotchlite™ Reflective Material – 5690 series Fire Coat Comfort Trim Product Bulletin carefully. The wearer is ultimately responsible for his/her own safety.

- Verify the suitability of 3M™ Scotchlite™ Reflective Material – 5690 series Fire Coat Comfort Trim for the intended use of the PPE (EC Directive 89/656/EEC Art. 4 and Art. 5; EC Communication 89/C328/EEC Annex §7).
- No reflective material can guarantee absolute visibility.
- Various factors (e.g. environmental) can influence visibility. For further details see chapter 9 “Specific Safety Information”.
- Field test the finished garment to verify its suitability for intended use and to select appropriate care conditions.

### 4. Product Application

Retroreflective materials are important in applications where being visible can reduce the risk of an accident. Example of environments where high-visibility garments should be worn include applications of vehicular hazard such as motorways, rural and urban roads, railway environments, airports and docks.

3M™ Scotchlite™ Reflective Material – 5690 series Fire Coat Comfort Trim is a high durable material recommended for garments subjected to domestic wash care procedures.

#### Occupational Application

Firefighting clothing and flame resistant occupational workwear, where flame and heat resistance as well as wear durability is required, such as: fire coats, turnout coats, trousers, coveralls, coats, jackets, waistcoats and trousers, uniforms, rainwear.

#### Accessories

Head-, arm-, leg bands, belts and gloves.

### 5. Product Converting

#### 5.1 Cutting

3M™ Scotchlite™ Reflective Material – 5690 series Fire Coat Comfort Trim can be hand cut or guillotined.

**Note:** Use very sharp cutting knives only and cut from the reflective side.

#### 5.2 Heat Lamination

- Work on a flat surface where uniform heat and pressure can be applied. Avoid applying film over seams and stitches.
- Place transfer film on fabric substrate with the adhesive side down and apply heat and pressure as described in table below. Use a non-stick slip sheet to protect the reflective surface.
- The lamination temperature, time and pressure listed below should be used as a guide. Each substrate and reflective film combination should be tested to determine the best set of conditions that will meet customer requirements.
- Other lamination methods, such as roll to roll, heat- fusing and HF welding can also be used. The proper temperature, time and pressure conditions must be tested for each fabric to ensure adequate adhesion and physical performance

**Note:** Whenever two or more pieces of reflective fabric are used together on a single surface or as a set, they should be matched to ensure uniform day time color appearance. Production dependent color deviations of new retroreflective material do not affect the suitability of 3M™ Scotchlite™ Reflective Material according to the performance requirements laid down in ISO 20471 for retroreflective material.

Substrate	Temperature	Dwell Time	Line Pressure
3M™ Scotchlite™ Reflective Material – 5690 series Fire Coat Comfort Trim	165°C	15 seconds	Firm 2 bar

**Note:** The optimal application temperature and pressure will vary depending on substrate and equipment. **Manufacturers should carry out tests to determine appropriate conditions for each and every application.**

### 6. Handling and Storage

#### 6.1 Product Storage

In order to preserve performance, store in a cool, dry area and use within one year 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.

## 6.2 Handling and Storage Precautions

This product 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 27°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.”

## 7. Product Cleaning and Maintenance

Reflective fabrics and films naturally age. Ageing depends upon material type, conditions of use, environment and maintenance procedures.

The retroreflective performance of all reflective materials is affected by soiling. Any kind of dirt, liquid chemicals, grease and alike will reduce brightness in the area of contamination. Aggressive chemicals (e.g. hydrochloric acid) might attack the central silver reflective stripe.

**Important:** Test each application according to appropriate care instructions required for the finished product. Actual life of 3M™ Scotchlite™ Reflective Material – 5690 series Fire Coat Comfort Trim depends on cleaning methods and wear conditions. Care label recommendations:



### 7.1 Caution

**Washing/cleaning conditions harsher than those recommended below could diminish the brilliance of the fabric and shorten the product's lifetime significantly. The following instructions therefore must be strictly followed.**

- No presoaking.
- No application of high alkaline products (e.g. heavy duty products or stain removal products).
- No application of solvated detergents or micro emulsions.
- No additional bleaches.
- Do not overdry.

**Before use, the suitability of the intended care process for 3M™ Scotchlite™ Reflective Material – 5690 series Fire Coat Comfort Trim must be determined. Test duration should mirror the anticipated maximum number of care cycles in use**



## 7.2 Homewash

### 7.2.1 Washing Conditions

A colored clothing wash program without pre-wash should be used.

#### **Recommendation:**

Wash temperature range: 30 °C to 60 °C

Max. wash time at highest wash temperature: 12 minutes

Max. program time: 50 minutes

**Detergent:** Brand powdered household detergents should be used. Recommended are detergents for delicate or colored laundry. Refer to the detergent manufacturers recommendations for dosage in areas of high water hardness and for various degrees of garment soiling.

**Use of temperatures lower than 60°C will increase the lifetime of the reflective fabric.**

Actual lifetime will be dependent upon the detergent system and its dosage level. Load factor higher than 65% might lead to enhanced abrasion of the centered silver reflective stripe.



### 7.2.2 Do not use additional bleach.

- No chlorine bleach.
- No bleaches on oxygene basis (e.g. sodium perborate bleaches).
- Do not store a wash batch even in a low concentration of bleach.



### 7.2.3 Drying conditions

**Tumble Dryer:** Tumble drying should be performed in a commercially available household dryer using the medium dry setting.

Do **not** overdry. Damp dry only.

**Air Drying:** Line drying is recommended where possible.



### 7.3 Ironing Conditions

- Use medium setting, use press cloth.
- Do not apply steam.

## 8. Product Maintenance

### 8.1 Maintenance Misuse

3M™ Scotchlite™ Reflective Material – 5690 series Fire Coat Comfort Trim is an optical system. Coating of the fabric with material of high refractive index, such as oil, will greatly diminish reflective performance of the central silver stripe.

- No harsh mechanical treatment, e.g. abrasion with wire brushes or sand paper.
- No uniform coating or spraying of oils, protective waxes, inks or paint.
- No application of products such as leather spray or shoe shine.

### 8.2 Inspection

High-visibility warning clothing should be maintained in good condition and inspected regularly for signs of damage or deterioration. Where frequent care cycles are performed, inspection should be pursued after every cleaning cycle. Records of test results should be kept for reference. Replacement of the reflective material should be considered, if the retroreflective performance of the central silver reflective stripe falls below  $R' = 100 \text{ cd/lx/m}^2$  (refer to ISO 20471).

**For specific guidance contact your local 3M representative.**

### 8.3 Product Disposal

Product can be recycled attached to the garment. The product can be incinerated in a commercial or industrial facility or disposed in a sanitary landfill. Before recycling, the compatibility shall be determined with the intended recycling process.

## 9. Specific Safety Information

### Visibility Limits see chapter 3 “General Safety Information”

Various environmental factors like line of sight, rain, fog, smoke, dust and visual noise can influence visibility. Recognition of the wearer can also be significantly reduced, if the reflective material is covered, e.g. by simultaneously wearing other personal protective equipment or by obstacles in the working zone.

### In such instances the wearer should be aware of these limitations.

The brightness of 3M™ Scotchlite™ Reflective Material – 5690 series Fire Coat Comfort Trim can also be diminished in extreme weather conditions.

Test results show, that of 3M™ Scotchlite™ Reflective Material – 5690 series Fire Coat Comfort Trim exceeds the retroreflective performance requirements for combined performance material in rainfall conditions as defined in ISO 20471. Initial brightness levels return as the material dries.

- Fog, mist, smoke and dust can scatter the light from headlights. The wearer must be aware that detection distances will be severely reduced.
- Visual noise (contrast variations in the visual field) decreases the contrast of the reflective material with the background and affects the visibility in low-light

#### Important Notice to Purchaser / Converter / Wearer:

All statements, technical information and recommendations herein are based on tests we believe to be reliable, but the accuracy or completeness thereof is not guaranteed. We shall not be liable and no warranty shall apply for products not applied according to our published information folder. Before using / converting, the user / converter must determine the suitability of the product for its intended use / converting, and the user / converter assumes all risk and liability whatsoever in connection therewith. All questions of warranty and liability relating to this product are governed by the terms of the sale subject where applicable to the prevailing law. No statement or recommendation not contained herein shall have any force or effect unless in an agreement signed by officers of us.

