

# 3M™ Scotchlite™ Reflective Material – Product Bulletin

## 9910 Silver Industrial Wash Fabric

### 1. Product Description

3M™ Scotchlite™ Reflective Material – 9910 Silver Industrial Wash Fabric is intended for the application on high-visibility warning clothing such as occupational workwear, consumer garments and accessories to enhance the visibility of the wearer during darkness and low light conditions. 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; the reflective properties – and hence the defined functionality – will not be affected by this.

### 2. Product Features

#### 2.1 Product Design

3M™ Scotchlite™ Reflective Material – 9910 Silver Industrial Wash Fabric consists of exposed high performance glass lenses bonded to a high durable cloth backing (100% polyester).

#### 2.2 High Performance according to ISO 20471

3M™ Scotchlite™ Reflective Material – 9910 Silver Industrial Wash Fabric:

- Exceeds the highest brightness requirements for retroreflective material.
- Is non-orientation sensitive.
- Offers industrial laundering durability per ISO 20471, Annex B, 30 cycles per ISO15797-8 and 5 cycles per ISO15797-2.
- Offers 60°C domestic wash durability per ISO 20471, 100 cycles per ISO 6330 6N.
- Offers good dry cleaning durability, per ISO 20471. 50 cycles per ISO 3175-2, 8.1.
- Offers enhanced resistance against abrasion and chemicals.

#### 2.3 Industrial Launderable Retroreflective Fabric

3M™ Scotchlite™ Reflective Material – 9910 Silver Industrial Wash Fabric has been specially designed to withstand repeated

industrial launderings and will exceed minimum retroreflective performance requirements of ISO 20471 even after extended number of cycles according to the recommended laundering procedure given in the care guideline.

#### 2.4 Special Feature

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

Backside printing of 3M™ Scotchlite™ Reflective Material with the product name and number for easy identification.

### 3. General Safety Information

**Read 3M™ Scotchlite™ Reflective Material – 9910 Silver Industrial Wash Fabric Product Bulletin carefully. The wearer is ultimately responsible for his/her own safety.**

- Verify the suitability of 3M™ Scotchlite™ Reflective Material – 9910 Silver Industrial Wash Fabric 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. Examples 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 – 9910 Silver Industrial Wash Fabric is a highly durable material recommended for garments subjected to industrial wash care procedures.

### Occupational Application

- Clothing for road works, track maintenance, sanitation, ambulance and rescue, utility companies, transportation, postal service, armed forces and police.

### Non-Occupational Application

- Clothing for pedestrians, joggers, cyclists and children.

### Accessories

- Head-, arm-, legbands, gloves, footwear, webbing, piping, belts, back packs, emblems and logos.

## 5. Product Converting

### 5.1 Cutting

3M™ Scotchlite™ Reflective Material – 9910 Silver Industrial Wash Fabric can be handcut, die-cut or guillotined (max. 5cm stack height).

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

### 5.2 Sewing

3M™ Scotchlite™ Reflective Material – 9910 Silver Industrial Wash Fabric can be applied directly to a fabric. It is best suited for polyester/cotton or polyamide/cotton fabrics with a weight of 150 to 280g/m<sup>2</sup>.

The reflective fabric should be sewn with a coated brand circular top needle, using a polyester thread. To minimise edge fraying, sew in place using a lockstitch of 3mm stitch length, placed at least 2mm from the edge of the reflective fabric.

**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 colour appearance. Production dependent colour 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.

### 5.3 Silk Screen Printing

Due to the product construction, durable prints on glass bead products are difficult to obtain. Choice of ink will depend upon usage condition and care procedure. User should make test applications and select the appropriate care instruction for the finished product to ensure adequate adhesion of the ink. It is recommended to test the ink adhesion on the actual batch of 3M™ Scotchlite™ Reflective Material – 9910 Silver Industrial Wash Fabric being used, before production.

When illuminated by e.g. vehicle headlights, opaque silk screen printing inks will appear black and greatly diminishes the brightness in the printed areas, transparent inks will reduce brightness when viewed as retroreflected light at low light conditions.

For more information please refer to 3M Technical Information “**Printing Guidelines for Glass Bead Products**”.

**For further information contact your 3M representative.**

## 6. Handling and Storage

### 6.1 Product Storage

**Store in a cool, dry area and use within 1 year of receipt.**

Rolls should be stored in their original cartons, whilst partially used rolls should be returned to their carton or suspended horizontally from the core via a rod or pipe. Cut sheets should be stored flat.

### 6.2 Handling and Storage Precautions

Aggressive chemicals, e.g. sulphur – or chlorine – containing compounds, perspiration, strong acids or bases may affect the aesthetic appearance of 3M™ Scotchlite™ Silver Reflective Material. When exposed to excessive heat and more than 70% relative humidity conditions, these products have the potential to become stained. These stains do not affect the retroreflective performance of the material and do not indicate that the input product was defective.

Care must be taken by the user when handling 3M™ Scotchlite™ Silver Reflective Materials in hot and humid environments. During application, storage and shipping, ambient conditions should be kept. Measures like cooling, dehumidifying the manufacturing area and specific handling precautions should be taken. Appropriate specific storekeeping is essential.

Knowing the individual situation, the user may **contact 3M for further advice if needed.**

## 7. Product Cleaning

Reflective fabrics and films naturally age. Aging 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.

 **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.**

Therefore, the instructions must be strictly followed.

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

**Before use, the suitability of the intended care process for 3M™ Scotchlite™ Reflective Material – 9910 Silver Industrial Wash Fabric must be determined. Test duration should mirror the anticipated maximum number of care cycles in use.**



**7.2 Industrial Wash**

**7.2.1 Washing Conditions**

Scotchlite 9910 can be used in commercially available industrial wash equipment. The best results so far have been achieved with a front-loading, open pocket washer extractor.

- Brightly coloured clothing should be washed separately from normal coloured work wear.
- The wash process in such a single front-loading wash extractor should be based on a pre- and main-wash followed by a third bath, or a cool down and three rinse cycles with interspin.  
 Extended rinsing is recommended to completely remove all detergent residues.
- Load factor should not exceed 70%, with the liquor ratio for washing in the range of 1:4 to 1:5 and for rinsing in the range of 1:6 to 1:8.

**Wash temperature should not exceed 75°C. Total time of the pre- and main-wash bath should not exceed 20 minutes.**

Detergent: Low- to- medium alkaline, high-surfactant detergents are preferred.

- The detergent should not contain free sodium hydroxide or potassium hydroxide.
- Controlled detergent dosage should give actual wash lye concentration not exceeding those detailed below.

Parameter	Recommended	Maximum
pH- value	10.5 to 11.0	≤ 11.6
Active Alkalinity Na <sub>2</sub> O sodium oxide	≤ 650 mg/l	≤ 1000 mg/l

**Sour:** The wash load should be effectively soured achieving a pH-value of 5.5 - 6.5 in the final rinse.

(Alkalinity titration against phenolphthalein endpoint, without BaCl<sub>2</sub> addition).

Detergent systems with a high alkaline strength, containing organic solvents or free sodium/potassium hydroxide should not be used.

Detergent systems and sour should not contain any oxidising chemicals, (e.g. chlorine bleach). Use of a lower pH and active alkalinity will increase the lifetime of the reflective fabric.

**Use of a lower pH and active alkalinity will increase the lifetime of the reflective fabric. Actual lifetime will be dependent upon the wash equipment, the detergent system and its dosage level.**

For different wash equipment types an equivalent wash process needs to be developed by the user to achieve maximum number of wash cycles. Number of wash cycles may differ from number certified in ISO 15797 wash process in each individual wash process.

 **7.2.2 No chlorine bleach**

Do not pre-soak laundry even in a low concentration of bleach.

**7.2.3 Drying conditions**

**Tumble Dryer**

- Load ratio: 1:25.
- Inlet temperature should be between 120°C and 140°C.
- The drying process must be controlled to ensure that the exhaust temperature does not exceed 90°C.
- The drying process should be continued until the load is damp dry. Maximum drying time should not exceed 20 minutes.

**Tunnel finishing is not recommended.**



### 7.3 Homewash

#### 7.3.1 Washing Conditions

A coloured clothing wash programme 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. programme time:	50 minutes

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

Detergent used at wash temperatures higher than 60°C should not contain oxidising chemicals (e.g. sodium perborate bleach) or organic solvents. The use of bleach or detergents containing organic solvent will result in a reduction in retroreflective performance.

Use of temperatures lower than 95°C will increase the lifetime of the reflective fabric. Actual lifetime will be dependent upon the detergent system and its dosage level.



#### 7.3.2 Do not use additional bleach.

- No chlorine bleach.
- No bleaches on oxygen basis (e.g. sodium perborate bleaches) at temperatures higher than 60°C.

**Do not pre-soak laundry even in a low concentration of bleach.**



#### 7.3.3 Drying conditions

**Tumble Dry:** 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.



#### 7.4 Dry Cleaning Conditions

Cleaning process should be based on a pre- and main-bath only. For P it is recommended to only use **pure** perchloroethylene. Adjust load and solvent level to give a moderate mechanical action.

Max. solvent temperature:	30°C
Recommended drying temperature:	48°C
Max. inlet temperature:	80°C
Max. exhaust temperature:	60°C
Max. drying time:	15 minutes
Max. program time:	60 minutes

If stain removing substances (e.g. surfactant-based cleaning booster) need to be used, their compatibility with the reflective material should be determined prior to the application.



#### 7.5 Ironing Conditions

- Use medium setting.
- Do **not** apply steam.

## 8. Product Maintenance

### 8.1 Maintenance Misuse

3M™ Scotchlite™ Reflective Material – 9910 Silver Industrial Wash Fabric is an optical system. Coating of the fabric with material of high refractive index, such as oil, will greatly diminish reflective performance.

- 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 sprays 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 must be considered, if the retroreflective performance is below  $R' = 100 \text{ cd/lx/m}^2$  (refer to ISO 20471).

**For specific guidance contact your 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 – 9910 Silver Industrial Wash Fabric can also be diminished in extreme weather conditions.

- Test results show, that 3M™ Scotchlite™ Reflective Material – 9910 Silver Industrial Wash Fabric exceeds the retroreflective performance requirements 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 conditions.

#### 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.



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