



**Scotchlite™**  
Reflective Material

# 3M™ Scotchlite™ Reflective Material – Product Bulletin

## 8712 Silver Transfer Film

### Product Description

3M™ Scotchlite™ Reflective Material – 8712 Silver Transfer Film 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 product will appear brilliant white, when illuminated by vehicle headlights, even when the wearer is situated at the side of the road.

### 2. Product Features

#### 2.1 Product Design

3M™ Scotchlite™ Reflective Material – 8712 Silver Transfer Film consists of exposed high-performance glass lenses bonded to a durable polymer layer, which is coated with a heat activated adhesive.

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

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

3M™ Scotchlite™ Reflective Material – 8712 Silver Transfer Film:

- Exceeds the highest brightness requirements for retroreflective material according to ISO 20471.
- Is non-orientation sensitive.
- Offers 60°C domestic wash durability per ISO 20471, 25 cycles per ISO 6330 6N
- Offers good dry-cleaning durability, per ISO 20471, 10 cycles per ISO 3175-2, 8.1.
- Offers good drape and fabric compatibility.

### 3. General Safety Information

**Read the 3M™ Scotchlite™ Reflective Material – 8712 Silver Transfer Film Product Bulletin carefully. The wearer is ultimately responsible for their own safety.**

- Verify the suitability of 3M™ Scotchlite™ Reflective Material – 8712 Silver Transfer Film 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 suitability for intended use and for the selection of appropriate care conditions.

### 4. Product Application

Retroreflective materials are important in applications where enhanced visibility can reduce the risk of an accident.

Examples are

- High-visibility garments according to ISO 20471 (high visibility standard) and garments according to EN 17353 (medium-risk standard) used for e.g. logistics, transportation clothing for road works, and rescue services, track maintenance
- Reflective design elements

The final garment design is depending on the specific applications and needs to be assessed by the end-user.

### 5. Product Converting

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.

#### 5.1 Cutting

3M™ Scotchlite™ Reflective Material – 8712 Silver Transfer Film can be hand cut, die-cut or guillotined (max. 5 cm stack height). Use very sharp cutting knives only and cut from the reflective side.

## 5.2 Lamination onto substrate

3M™ Scotchlite™ Reflective Material – 8712 Silver Transfer Film can be applied in form of trims, emblems and logos directly to many different types of substrates.

3M™ Scotchlite™ Reflective Material – 8712 Silver Transfer Film can be laminated using the process conditions recommended below. Converters are advised to determine which configuration best suits their lamination process.

### 5.3 Lamination Process – Heat Press

Work with lamination equipment which provides uniform heat and pressure.

The following recommendations are guidelines for heat press lamination. Other lamination methods (roll-to-roll, heat fusing, HF welding, hot air etc.) may also be used. Proper lamination parameters must be determined for each substrate to assure adequate adhesion.

Product	Time (s)	Temperature (°C)	Pressure (bar)
Scotchlite™ 8712	15 - 20	150 - 175	2.0 – 2.8

- Place the transfer film with the adhesive side facing the substrate.
- Apply heat and pressure as described. It is not recommended to apply film over seams and stitches.
- A press-cloth or a siliconized slip-sheet may be used to cover the transfer film and substrate during lamination, preventing the transfer of residues from the heat press to the surface of the reflective film.
- For parameters for other specific machines or substrates, please contact your 3M representative.
- For future references carefully record all application parameters for each substrate and application.
- Following these parameters is essential to avoid variations in quality due to changes of machine set-up.

#### Note:

- In general, 3M™ Scotchlite™ Reflective Material – 8712 Silver Transfer Film is not recommended for polyamide fabrics. The adhesion on polyamides such as Nylon is often not satisfying.
- Lamination onto polyurethane/polyvinylchloride coated substrates or other fabrics with a heat sensitive surface is not recommended.
- High lamination temperatures can damage the substrate and lower temperatures than recommended might result in unsatisfactory adhesion of the transfer film.
- Substrate finishes such as silicone, parafin, fluorocarbon resin or flame retardant coating could

significantly affect the level of adhesion to the substrate.

- To ensure adequate adhesion to substrate, it is strongly recommended to test the application in the intended care procedure for the finished product.

Prior to production, it is essential to test the actual 3M™ Scotchlite™ Reflective Material –8712 Silver Transfer Film on the actual substrate being used.

- Whenever two or more pieces of reflective transfer film are used together on a single surface or as a set, they should be matched to assure 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 or ISO 17353 for retroreflective material.

## 5.4 Silk Screen Printing

3M™ Scotchlite™ Reflective Material – 8712 Silver Transfer Film can be printed directly.

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 – 8712 Silver Transfer Film being used before production.

Opaque silk screen printing inks will appear black, transparent inks will reduce brightness when viewed as retroreflected light under low light conditions.

For more information, please refer to 3M Technical Information “Printing Guidelines for Glass Bead Products” or 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 shipping 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™ Reflective Material.

Care must be taken by the user when handling 3M™ Scotchlite™ Reflective Material in hot and humid environments.

Measures like cooling, dehumidifying the manufacturing area and specific handling precautions should be taken. Appropriate specific storekeeping is essential.

Blemishing of this aluminum layer can occur if the front surface of the product has direct contact from hands during application or handling and is then exposed to hot and humid conditions, greater than 26 °C and greater than 70 % relative humidity, for a period of weeks.

These stains do not affect the retroreflective performance of the material and do not indicate that the input product was defective.

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

## 7. Product Cleaning

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.

### 7.1 Caution



**Washing/cleaning conditions harsher than those recommended below could diminish the brilliance of the material 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
- Per-acetic bleaches are approved by certification. All other bleaches need to be evaluated
- No chlorine bleaches.
- Do not overdry.

**Before use, the suitability of the intended care process for 3M™ Scotchlite™ Reflective Material – 8712 Silver Transfer Film 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.

Parameter	Recommendation
Wash temperature range	30 °C to 60 °C
Max. wash time at highest wash temperature	12 minutes
Max. program time	60 minutes

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

**Wash temperatures higher than 60 °C are not recommended.** The use of bleach or detergents containing organic solvent will result in a reduction in retroreflective performance.

Use of temperatures lower than 60 °C will increase the lifetime of the reflective material. Actual lifetime will be dependent upon the detergent system and its dosage level.

#### 7.2.2 Do not use additional bleach.



- Do not presoak laundry even in a low concentration of any bleach.

#### 7.2.3 Drying conditions



##### Tumble Dryer

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

Exhaust temperature should not exceed 70°C.

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

##### Air Drying

Line drying is recommended where possible.

### 7.3 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.

Parameter	Recommendation
Max. solvent temperature	30 °C
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.

## 7.4 Ironing Conditions

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

## 8. Product Maintenance

### 8.1 Maintenance Misuse

3M™ Scotchlite™ Reflective Material – 8712 Silver Transfer Film is an optical system. Coating of the product with material of a high refractive index, such as oil, will greatly diminish reflective performance.

- No harsh mechanical treatment, e.g. abrasion with wire brushes or sandpaper.
- No uniform coating or spraying of oils, protective waxes, inks or paint.
- No application of products such as leather sprays or shoeshine.

### 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  $R' = 100 \text{ cd} / (\text{lx} \cdot \text{m}^2)$  (refer to ISO 20471).

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

### 8.3 Product Disposal

Product can be discarded attached to the garment. The product can be incinerated in a commercial or industrial facility or disposed in a sanitary landfill.

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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 8712 Silver Graphic Ready Transfer Film can also be diminished in extreme weather conditions.

- Test results show that 3M™ Scotchlite™ Reflective Material – 8712 Silver Transfer Film exceeds the retroreflective performance requirements in rainfall conditions as defined in ISO 20471 or ISO 17353. 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.

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