3M™ Scotchlite™ Reflective Material – Product Bulletin

8787 Fluorescent lime-yellow Transfer Film

1. Product Description

3M™ Scotchlite™ Reflective Material – 8787 Fluorescent lime-yellow 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 day time and night time. The product 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 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 – 8787 Fluorescent limeyellow Transfer Film consists of exposed high performance glass lenses bonded to a durable polymer layer, which is coated with a heat-activated adhesive.

2.2 High Performance according to ISO 20471

3M™ Scotchlite™ Reflective Material – 8787 Fluorescent limeyellow Transfer Film:

- Exceeds the highest brightness requirements for combined performance material
- Is non-orientation sensitive.

2.3 Special Feature

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

3. General Safety Information

Read 3M™ Scotchlite™ Reflective Material – 8787 Fluorescent lime-yellow Transfer Film Product Bulletin carefully. The wearer is ultimately responsible for his/her own safety.

- Verify the suitability of 3M™ Scotchlite™ Reflective Material – 8787 Fluorescent lime-yellow 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 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 – 8787 Fluorescent limeyellow Transfer Film is recommended for garments not suffering from harsh wear impact and being subjected to domestic wash care procedures.

Occupational Application
Clothing for road works, track maintenance, sanitation, transportation, postal service, armed forces and police.

Non-Occupational Application
Clothing for pedestrians, joggers, cyclists and children.

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

5. Product Converting

5.1 Cutting
3M™ Scotchlite™ Reflective Material – 8787 Fluorescent limeyellow Transfer Film can be handcut, die-cut or guillotined.

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

5.1.1 Lamination of plotter or kiss-cut material
Plotter-, kiss-cut transfers require special procedures for lamination.

Typical procedures are:
a) 2-step lamination
b) lamination with application tape

For detailed info please refer to Technical Guideline “Plotter-Cutting of reflective material”.

5.2 Lamination onto substrates
3M™ Scotchlite™ Reflective Material – 8787 Fluorescent limeyellow Transfer Film can be applied in form of trims, emblems and logos directly to many different types of substrates.

3M™ Scotchlite™ Reflective Material – 8787 Fluorescent lime-yellow Transfer Film can be laminated using the process conditions recommended below. Convertors are advised to determine, which configuration best suits their lamination process.

5.3 Lamination Process
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, etc.) can also be used. Proper lamination parameters must be determined for each substrate to assure adequate adhesion.

Substrate	Time (sec)	Temperature (°C)	Pressure (kg/cm$^{2)}$
100% Cotton	15	175	1.5
Polyester/Cotton	15	175	1.5
Vinyl or PU	10	150	1.5
Knitted PES	15	175	1.5
2-ply or 3-ply PU/PES	15	165	1.5
3-ply PTFE/PES	15	175	1.5
Aramid fi bres	20	175	1.5

- Preheat the press.
- Place the transfer film with 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 siliconised slip-sheet for delicate or coated substrates may be used to cover the transfer film and substrate during lamination.
- Allow the paper liner to cool to room temperature before stripping. To remove the paper liner, lift the liner from one corner and pull gently with a single motion while holding the substrate flat.

Note:
- In general 3M™ Scotchlite™ Reflective Material – 8787 Fluorescent lime-yellow Transfer Film is not recommended for polyamide fabrics. The adhesion on polyamides such as Nylon is often not satisfying.
- Lamination on coated substrates might require reduced lamination temperature and time to prevent surface damage. Appropriate lamination parameters have to be determined accordingly. Air blisters have to be avoided.
- Substrate finishes such as silicone, parafin, fluorocarbon resin or flame retardant coating might strongly influence 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™ 8787 Fluorescent lime-yellow 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 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.

5.4 Silk Screen Printing
3M™ Scotchlite™ Reflective Material – 8787 Fluorescent lime-yellow Transfer Film should not be silk screen printed before application.

Note: It is the responsibility of the converter to ensure the compatibility of ink with the reflective material and the suitability of the printing process.
For more information please refer to 3M Technical Information **"Printing Guidelines for Glass Bead Products".**

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.

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 the 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. Reflective material temperature should not exceed 70°C at any time during drying.

Before use, the suitability of the intended care process for 3M™ Scotchlite™ Reflective Material – 8786 Fluorescent red-orange and 8787 Fluorescent lime-yellow 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.

Recommendation:

Wash temperature range:	up to 40°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 coloured 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 40°C and industrial laundering processes are not recommended.

The use of bleach or detergents containing organic solvent will result in a reduction in retroreflective performance.

Actual lifetime will be dependent upon the detergent system and its dosage level.

7.2.2 Do not use additional bleach.
- No chlorine bleach.
- Do not pre-soak laundry 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 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.

Note: High number of dry cleaning cycles may stiffen the product and thus lead to increased abrasion.

7.4 Ironing Conditions

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

8. Product Maintenance

8.1 Maintenance Misuse

3M™ Scotchlite™ Reflective Material – 8787 Fluorescent limeyellow Transfer Film is an optical system. Coating of the product 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 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 must be considered, if the retroreflective performance is below R´ = 35 cd/lx/m² (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 – 8787 Fluorescent lime-yellow Transfer Film can also be diminished in extreme weather conditions.

- Test results show, that 3M™ Scotchlite™ Reflective Material – 8787 Fluorescent lime-yellow Transfer Film 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. 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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