

Transportation Safety Division

# **3M™ High Definition Reflective License Plate Sheeting Series 6750 With Removable Top Liner**

**With Optional Dynamic Security Script Technology for Use on  
Multi-Year License Plates**

**Product Bulletin Series 6750  
October 2022**

**Replaces Product Bulletins 6700 Dated March 2020**

## **1 Description**

3M™ High Definition License Plate Sheeting Series 6750 (“Sheeting”) is a durable, all-weather, retroreflective sheeting consisting of micro-replicated optical elements protected by a durable top film. The Sheeting has been designed for use in the fabrication of multi-year reflective license plates that help enhance the nighttime visibility and legibility of the vehicle identification system. Sheeting appears similar during the day and at night (when viewed by reflected light) and is highly reflective when viewed both head-on and at entrance angles important for safety and legibility. The backside of the reflective sheeting is pre-coated with a pressure sensitive adhesive, protected by a removable liner, for application to license plate substrates. The topside of the reflective sheeting is protected by a removable liner that must be removed prior to digitally printing. Additional stretch and registry control equipment is required to process graphic printed sheetings.

When printed with the 3M™ Precision Plate System, 3M™ Precision Plate System Series 1510UV inks will be used with Sheeting to print background graphics and variable plate messages. 3M™ Digital License Plate Clear Protective Film 9097 must be applied after printing. Plates may optionally be rim embossed or debossed.

## 2 Dynamic Security Script Technology

Sheeting with Dynamic Security Script Technology can include a range of very secure, tamper-resistant retroreflective security marks that can help defend against counterfeiting, provide production traceability, and help authorities assure authenticity. Under retroreflection, some elements of the security mark will appear slightly brighter than the background Sheeting while other elements will appear slightly darker than the background Sheeting. This property remains but shows a reversal of contrast under daylight viewing conditions. This contrast property also allows security marks to be seen from long distances (greater than 20 ft.) using a standard light source (i.e. headlights or flashlights).

Dynamic Security Script Technology is a unique feature that is very difficult to duplicate. The marks are integral to the reflective layer of the Sheeting, can only be introduced at the time of Sheeting manufacture, and cannot be modified without damaging the Sheeting.

Sheeting can be provided with no mark, a standard mark, or a mark that has been designed with specific customer input. Dynamic Security Script Technology marks will have a repeat pattern in the roll direction.

## 3 Performance Considerations

The Sheeting has been designed for multi-year applications. Experience indicates that finished plates, processed and applied as recommended, will perform without appreciable fading, cracking, blistering, or peeling for the period specified in Section 11.

### 3.1 Retroreflectivity

The typical minimum coefficients of retroreflection of White Sheeting are shown in Table 1. The Coefficients of Retroreflection of Gold, Orange, Blue, Yellow, Green, and Red are available upon request.

**Table 1.** Typical Minimum Coefficient of Retroreflection  $R_A$  [cd/lux/m<sup>2</sup>] (Average of 0° and 90° values)

Observation Angle <sup>a</sup>	Entrance Angle <sup>b</sup>	White	
		Min	Max
0.2°	-4°	150	400
	30°	26	
0.5°	-4°	45	
	30°	13	
1.0°	-4°	20	
	30°	7	

a. Observation Angle - The angle between the illumination axis and the observation axis.

b. Entrance Angle - The angle from the illumination axis to the retroreflector axis. The retroreflector axis is an axis perpendicular to the retroreflective surface.

All measurements shall be conducted in accordance with ASTM E810, "Standard Test Method for Coefficient of Retroreflection of Retroreflective Sheeting."

Finished license plates fabricated per 3M recommendations ([3M Information Folder 9.8](#)) shall meet the minimum retroreflectivity requirements of ISO 7591.

### 3.2 Daytime Color (x,y,Y)

After the top protective liner has been removed, the chromaticity coordinates and total luminance factors of the Sheeting conform to the limits presented in Table 2.

**Table 2.** CIE daytime chromaticity coordinate limits<sup>a</sup> and total luminance factor minimum.

Color	1		2		3		4		Daytime Luminance Limit (Y%)
	x	y	x	y	x	y	x	y	Min.
White	0.355	0.355	0.305	0.305	0.285	0.325	0.335	0.375	55

a. The four pairs of chromaticity coordinates define the acceptable color limits for CIE D65 illumination in terms of the CIE 1931 Standard Colorimetric System, when measured using a 2-monochromator spectrophotometer employing an annular 45/0 illuminating and viewing geometry.

### 3.3 Adhesive

The Sheeting is provided with a pressure sensitive adhesive and an easy to remove liner that protects the adhesive until it can be laminated to the license plate substrate.

## 4 Fabrication of Reflective License Plates

For recommended license plate manufacturing procedures, refer to [3M Information Folder 9.8](#).

### 4.1 Substrates

The pre-coated adhesive will form a permanent bond to the surfaces of clean, chemically treated or conversion coated aluminum substrates normally used in the manufacture of license plates and as recommended by 3M.

### 4.2 Application

The Sheeting has been designed for application to clean, flat coil or sheet stock by continuous squeeze roll application.

Sheeting should be stretched to a maximum of 1% during application to the substrate.

### 4.3 Embossing and Debossing

The Sheeting, as applied to flat metal, is sufficiently flexible to satisfy the rim embossing and debossing requirements of most 3M™ Precision Plate System printed flat license plate designs.

### 4.4 Printer Ink Compatibility

The Sheeting is compatible with 3M™ Precision Plate System Series 1510UV inks when applied using a Precision Plate System digital printer per 3M recommendations.

### 4.5 Digital Printing

The Sheeting's protective top liner must be removed prior to printing on the 3M Precision Plate System. Sheeting must be printed on within 7 days of removal of the protective top liner to ensure acceptable print quality.

## 5 Cleaning

For maximum service life, do not use harsh, abrasive, or chemically concentrated cleaners. Clean license plates using the same care taken when cleaning the paint surface of the vehicle. The license plate surface can be cleaned of normal use dirt accumulation by washing it with a mild detergent and water using a soft bristle brush or cloth.

To remove tar, oil, or road dirt, cautious use of mild solvents such as mineral spirits, turpentine, or kerosene may be employed. Use of aromatic solvents and ketones, or solvent mixtures containing either should be avoided. Following cleaning, rinse plates thoroughly with water.

## 6 Storage

The Sheeting must be stored in its original package in a dry area, at a temperature of  $73 \pm 9^\circ\text{F}$  ( $23 \pm 5^\circ\text{C}$ ), and used within one year of date of receipt.

## 7 General Characteristics and Packaging

As supplied, Sheeting shall be of good appearance, free from ragged edges and cracks, and packaged according to commercial standards. Rolls of Sheeting contain splices for continuous roll application. Additional Sheeting is supplied to compensate for splices.

## 8 Specifications

The information contained herein concerning the Sheeting is considered to describe typical minimum requirements for an effective reflective license plate material. As such, the information may be incorporated into a product purchase specification to be used in conjunction with a specification for finished retroreflective license plates. For detailed product specifications, contact your 3M application engineer.

## 9 Fabrication Lines

The manufacturing process for the Sheeting results in periodic lines in the product. Fabrication lines may be noticeable in shop light but do not impact license plate functionality on the road, either in daylight or at night, under typical use conditions.

## 10 Health and Safety Information

Read all health hazard, precautionary, and first aid statements found in the Safety Data Sheets, and product labels for all chemical products prior to handling or use.

The Sheeting does not require a Safety Data Sheet, however, an Article Information Letter is available upon request.

## 11 Warranty Information

### 11.1 3M Warranty

3M warrants ("3M Warranty") that Sheeting imaged as recommended by 3M in this product bulletin will:

- o Remain legible by resisting excessive fading, cracking, blistering, or peeling and
- o The unprinted areas of Sheeting (those without preprinted graphics or customer-printed graphics) on a license plate ("Plate") will retain a coefficient of retroreflection for the number of years ("Warranty Period") as given in Table 3, measured from the Plate fabrication date ("Fabrication Date").

**Table 3.** Warranty period for Sheeting, by color.

Base Sheeting Color	Retained Coefficient of Retroreflection <sup>a</sup> [cd/m <sup>2</sup> /lux]	Warranty Period (Years)
White	18	5

- a. All measurements taken at 2° observation angle and -4° degrees entrance angle. All measurements shall be made after cleaning the Plate according to 3M recommendations and in accordance with ASTM E810 "Standard Test Method of Coefficient of Retroreflective Sheeting," except that the coefficient of luminous intensity shall be determined in accordance with ASTM E808-01 Para. 3.2.2 and ASTM E809-02 Para. 12.3.

### 11.2 Warranty Terms and Conditions

- o A failure to meet the 3M Warranty must be solely the result of design or manufacturing defects in the Sheeting and not of (a) outside causes including improper fabrication, handling, maintenance, or installation; (b) use of roll coat pastes, overlay films, or sheetings not listed herein; (c) Plate exposure to temperatures beyond 3M's recommendations; (d) use of a reflective Sheeting applicator, stretch control

mechanism, brake table, or corresponding registry feed controls not provided and installed by 3M; (e) failure of Plate substrate; (f) exposure to chemicals, abrasion, or damage from fasteners used to mount the Plate; (g) collisions, vandalism, or malicious mischief; or (h) an act of God.

- o Claims made under this warranty will be honored only if the Plates have been marked with a Dynamic Security Script mark that includes the month/year date that the material originated from 3M or there is a clear record of the Fabrication Date either on the Plate or in an auditable records database; records must be maintained showing that the profile settings and procedures used in the production of the Plates conform to 3M recommendations.
- o Sheeting must be stored, applied, installed, processed, and used in accordance with all 3M application procedures found in 3M's product bulletins, information folders, manufacturing manuals, Digital License Plate System User Manual, and technical memos (which will be furnished upon request), including the appropriate use of components listed in Section 13 of this product bulletin and recommended application equipment.
- o Claims made under this warranty will be honored only if 3M is notified of a failure within 30 days, reasonable information requested by 3M is provided, and 3M is permitted to verify the cause of the failure.

### 11.3 Exclusive Limited Remedy

If the Sheeting on a Plate is shown to not meet the 3M Warranty during the Warranty Period, 3M's sole and exclusive remedy is, at 3M's option, to replace the Plate, or reimburse the Plate's issuing agency ("Agency") at a rate of no more than \$5.00 per Plate. Reimbursement to the Agency will be in dollars and/or materials, as determined by the needs of the Agency. Replacement Sheeting will carry the unexpired warranty period of the Sheeting it replaces.

### 11.4 Disclaimer

THE 3M WARRANTY IS MADE IN LIEU OF ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY, OR FITNESS FOR A PARTICULAR PURPOSE, OR ANY IMPLIED WARRANTY ARISING OUT OF A COURSE OF DEALING OR OF PERFORMANCE, CUSTOM, OR USAGE OF TRADE.

### 11.5 Limitation of Liability

Except for the limited remedy stated above, and except where prohibited by law, 3M will not be liable for any loss or damage arising from the Signs or any 3M product, whether direct, indirect, special, incidental, or consequential damages (including but not limited to lost profits, business, or revenue in any way), regardless of the legal theory asserted including warranty, contract, negligence, or strict liability.

## 12 Other Product Information

Always confirm that you have the most current version of the applicable product bulletin, information folder, or other product information from 3M's Website at <http://www.3M.com/vehicleregistration>.

## 13 Literature References

<a href="#">3M IF 9.8</a>	Preclear Reflective License Plate Sheeting Recommended Manufacturing Procedures
<a href="#">3M PB 100/HSF200 and DRF 300/400</a>	3M™ Dry Roller Coat Foil Series HSF 100/200 and DRF 300/400
<a href="#">3M PB 1510UV</a>	3M™ Precision Plate System Series 1510 UV Ink Jet Inks for 3M Precision Plate System Printer
<a href="#">3M PB 4850/4950</a>	Roll Coat Inks Series 4850/4950
<a href="#">3M PB 9097</a>	3M™ Digital License Plate Clear Protective Film 9097 for Use on Multi-Year License Plates
<a href="#">3M PB PPS</a>	3M™ Precision Plate System Digital License Plate Printing System

ASTM Test Methods are available from ASTM International, West Conshohocken, PA.

## **For Information or Assistance**

**Call: 1-800-553-1380**

**In Canada Call:**

**1-800-3M HELPS (1-800-364-3577)**

## **Internet:**

**<http://www.3M.com/vehicleregistration>**

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