



# Utility Grade Reflective Sheeting Series 610V

Product Bulletin

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## Description

3M™ Utility Grade Reflective Sheeting Series 610V can meet Grade 5 in China national standard GB/T 18833-2002 《Road Traffic Signs Reflective Sheeting》, reflective sheeting consisting of lens elements enclosed within a transparent resin was produced under mature technology of 3M and severely quality control, designed for use in the fabrication of signs of road of national grade 4 and with limited traffic, also it can be used in non-standard signs, such as advertisement signs, temporary signs, etc.. The sheeting appears similar during the day and at night(when viewed by reflective light) and is highly reflective when viewed at wide entrance angles. The sheeting have excellent printing performance, signs produced have good visibility both at daytime and night. As for other applications, customer should evaluate the feasibility individually.

## Performance Characteristics

### 1 Color

Table A Color and Code of 610V

Color	White	Yellow	Red	Blue	Green
Code	610V-10	610V-11	610V-12	610V-15	610V-17

The reflective sheeting can meet color spec of GB/18833-2002, chromaticity coordinate is shown in Table B

Table B Chromaticity coordinate spec of GB/18833-2002 and JT/T 279-1995

Color	chromaticity coordinate								Y	
	x	y	x	y	x	y	x	y		
White	0.350	0.360	0.300	0.310	0.285	0.325	0.335	0.375	≥0.27	
Yellow	0.545	0.454	0.464	0.534	0.427	0.483	0.487	0.423	0.16	0.40
Red	0.690	0.310	0.658	0.342	0.569	0.341	0.595	0.315	0.03	0.10
Green	0.007	0.703	0.026	0.399	0.177	0.362	0.248	0.409	0.03	0.10
Blue	0.078	0.170	0.137	0.038	0.210	0.160	0.150	0.220	0.01	0.10

### 2 Reflectivity

The minimum reflectivity values of 3M Utility Grade Reflective Sheeting 610V is shown in Table C. If silk screen printing transparent ink onto white color reflective sheeting, the reflectivity in printing area should be no less than 70% of corresponding color reflective sheeting.

Table C Minimum reflectivity values of series 610V(cd/lux/m<sup>2</sup>)

Observation Angle	Entrance Angle	White	Yellow	Red	Green	Blue
0.2°	-4°	50	25	8.0	5.0	3.5

	15°	35	14	6.0	4.0	2.5
	30°	18	10	3.5	2.0	1.0
0.33°	-4°	30	15	5.0	4.0	2.5
	15°	21	11	4.2	3.0	1.8
	30°	10	5.0	2.0	1.5	0.8
1°	-4°	4.0	2.0	0.8	0.5	0.4
	15°	2.5	1.3	0.6	0.4	0.2
	30°	1.5	0.8	0.4	0.2	0.1

### 3 Adhesive

The backside of the reflective sheeting is pre-coated with a pressure sensitive adhesive, protected by a removable liner, Temperature of substrate and film should be keep at 18~28°C when laminating.

## Fabrication of Reflective Signs

### 1 Lamination

The substrate must be keep flat, clean and dry before lamination. We suggest use 3M Scotch-Brite™ Pad dipping with clean water for cleaning and conduct test according water-membrane method. The selected Aluminum board must be flat, no pulverization and other badness, also the Al board should be dried or insulated before lamination. We suggest use Automotive or manual field roller as laminator when laminating big area (beyond 60cm×60cm) and handwork for stick letter and frame. the most suitable application temperature for series of 610V reflective sheeting is 18°C~28°C, so reflective sheeting and substrate should be placed in workshop with temperature no less than 18°C in advance. Please refer “*3M Production handbook of Reflective Signs*” for details.

### 2 Substrate

The pre-coated adhesive will form a permanent bond to the surface of clean, chemically treated or conversion coated aluminum substrates normally used in the manufacture of signs and as recommended by 3M. if you have specific substrate requirement, please contact 3M Technical Engineer for suggestion or evaluate feasibility by yourself

### 3 Silk Screening Print

Series 610V is recommended to be silk screen printed with Series 3M 700 ink, the printing temperature is 16-38°C, relative humidity is 20-50%, we recommend 157 mesh with one pass for printing, Please refer “*3M Production handbook of Reflective Signs*” for details.

### 4 Cutting plotter

The reflective sheeting can be cut manually or mechanically, please confirm the consistency of the daytime and nighttime color when joint two part for application. In order to avoid stress avulsion, the curve angle of letter and cycle should be keep smooth, normally the minimum radius for letter with size of 7.5cm should be 0.3cm.

### 5 Splice

Series 610V sheeting should be butt spliced when more than one piece of sheeting is used on one piece of substrate. The sheeting pieces should not touch each other at the splice and a gap of up to 1.5mm is acceptable. This is to prevent buckling as the sheeting expands in extreme temperature/humidity exposure.

If the visual appearance of the splice is important or a slight gap is undesirable, the following procedures must be followed:

- 1 Overlap the sheeting at least one inch with or without the liner attached.
- 2 Using a straight edge and a sharp utility knife, cut through both layers of reflective sheeting.
- 3 Peel back and remove cut remnants. If liner was left on, remove and roll down remaining sheeting.
- 4 Seal edge with thinned 880 Clear using a fine artist paint brush.

## **6 Cleaning**

For maximum service, do not use abrasive, or chemically concentrated harsh cleaners. Use the same care as is used in cleaning the paint surface, it should be cleaned of normal use dirt accumulation by washing with a mild detergent and water using a soft bristle brush or cloth.

## **Storage**

Series 610V sheeting should be stored in a cool, dry area, preferably at 18-24°C and 30-50% relative humidity and should be applied within one year of purchase.

Rolls should be stored horizontally in the shipping carton. Partially used rolls should be returned to the shipping carton or suspended horizontally from a rod or pipe through the core. Unprocessed sheets should be stored flat. Finished signs and applied blanks should be stored on edge.

Screen processed signs must be protected with SCW 568 slipsheet paper. Place the glossy side of the slipsheeting against the signs face and pad the face with closed cell packaging foam. Double faced signs must have the glossy side of the slipsheet against each face of the signs.

Unmounted screened faces must be stored flat and interleaved with SCW 568 slipsheet, glossy side against the signs face. Packages of finished signs faces must include sufficient nylon washer for mounting.

Avoid banding, crating, or stacking signs. Package for shipment in accordance with commercially accepted standards to prevent movement and chafing. Store signs packages indoors on edges.

Panels or finished signs must remain dry during shipment and storage. If packages signs become wet, unpack immediately and allow signs to dry.

## **General Performance Consideration**

The durability of Series 610V reflective sheeting will depend upon substrate selection and preparation, compliance with recommended application procedures, geographic area, exposure conditions, and maintenance.

Maximum durability of the sheeting can be expected in applications subject to vertical exposure on stationary objects when processed and applied to properly prepared aluminum according to 3M recommendations provided above.

The user must determine the suitability of any nonmetallic signs backing or its intended use. Application to unprimed, excessively rough or non-weather-resistant surfaces, or exposure to severe or unusual conditions can shorten the performance of such applications. Signs in mountainous areas that are covered by snow for prolonged periods may also have reduced durability.

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