



**AMERICAN TRAFFIC SAFETY MATERIALS, INC.™**  
**6000 Series**  
**Engineer Grade (Type I) Retroreflective Sheeting**

**INTRODUCTION:**

**American Traffic Safety Materials, Inc.'s™** brand Engineering Grade retroreflective sheeting is a beaded plastic material that renders high retroreflectivity at night. It is designed for use mainly on traffic signs and is highly resistant against the extremes of hot, cold, dry, and humid weathering conditions. **American Traffic Safety Materials, Inc.'s™** brand Engineer Grade is available in two different top coatings to meet your every need. Our acrylic top coating is for signs that are being silk-screened, or can be used for sheeting aluminum blanks. The acrylic coat is specifically designed for screened ink adhesion. Our polyester top coating (PET) is for use in electronic cutting machines (plotters), and for vehicle graphics, logos, striping, and may be used for sheeting blanks. The polyester top coating allows for more flexibility of the reflective material when weeding lettering and applying to vehicles. The polyester top coating is not printable or for use in the silk-screening process. Traffic signs sheeted with **American Traffic Safety Materials, Inc.'s™** brand Engineer Grade reflective and transparent process colors are attractive in appearance and highly visible during both day and night, and contribute greatly to driving safety. Acrylic top coated Engineer Grade reflective is available in 7 colors. Polyester (PET) top coated Engineer Grade reflective is available in 8 colors.

**COLORS:**

**American Traffic Safety Materials, Inc.'s™** sheeting is available in the standard colors as listed on the Tables below and will conform to practically all specifications of traffic control signs and devices throughout the world.

## AMERICAN TRAFFIC SAFETY MATERIALS, INC.™ 6000 Series Engineer Grade Reflective

### REFLECTIVE INTENSITY

#### MINIMUM COEFFICIENT OF RETROREFLECTION: Type I – Engineer Grade reflective

Candelas per Ft. Candle per Sq. Ft. Orange shall be warranted to retain 50% of its minimum specified coefficient of retroreflection for a period of five (5) years from date of fabrication.

O.A.	E.A.	White 152	Yellow 155	Red 151	Blue 153	Orange 156	Green 154	Brown 157
0.2°	-4°	70	50	14.0	4.0	25.0	9.0	1.0
0.2°	30°	30	22	6.0	1.7	7.0	3.5	.3
0.5°	-4°	30	25	7.5	2.0	13.0	4.5	.3
0.5°	30°	15	13	3.0	0.8	4.0	2.2	.3

Note: O.A. = Observation Angle and E.A. = Entrance Angle.

NOTE: #P158 - Black Engineer Grade reflective is not tested or reported in the ASTM D4956 specification. The warranty and retroreflectivity is limited.

## AMERICAN TRAFFIC SAFETY MATERIALS, INC.™ 6000 Series Engineer Grade Reflective

### TECHNICAL DATA

#### A. PHYSICAL PROPERTIES OF American Traffic Safety Materials, Inc.'s™ ENGINEER GRADE SHEETING

PROPERTY	TEST METHOD	RESULTS
Average thickness	Micrometer	0.175 mm
Average gloss	Glossmeter 85	96
Tensile Strength	T-Strography at 30cm (12")/minute	5.0 kg (11lb)
Elongation	T-Strography at 30cm (12")/minute	24%

**B. PHYSICAL PROPERTIES** When Bonded to Aluminum Panels

The data below is based on tests conducted on EG sheeting applied to acid-etched aluminum panels and

conditioned for 48 hours or more at a room temperature of 74° F (23° C).

<b>PROPERTY</b>	<b>TEST METHOD</b>	<b>RESULTS</b>
Humidity Resistance	100% humidity at 27°C (81°F) for 72 hours.	No effect
Cold Resistance	72 hours at -56.6°C(-70°F)	No effect
Heat Resistance	72 hours at -71.1°C(160°F)	0.3 mm (0.012" maximum shrinkage from edge of panel
Adhesion	180° pullback at 30cm (12")/minute at 23°C(74°F)	Minimum 2 kg/2.5 cm (4.4ppi) pulling strength at 23°C (74°F)
90° Peeling Test	0.8Kg (1.8lbs) weight suspended for 5 minutes	3 mm (0.12") maximum peeling
Accelerated Weathering	Sunshine Weather-0-Meter for 2,200 hours, Orange: 600 hours	*No visible cracks, bubbles peeling or puckering  *Less than 0.2mm (0.008") shrinkage  *Reflectivity up to 50% greater than minimum required of all known specifications  *No significant color change
Salt Spray Effects	3% concentration at 25°C (95°F) for 500 hours	*No effect

**DURABILITY**

The most important properties of retroreflective sheeting are reflectivity, color, and durability. Of these, durability may be the most important, so special attention was directed toward the selections and use of raw material and production technology that would render maximum durability. Continuous efforts are being made to attain even greater durability for all **American Traffic Safety Materials, Inc.'s™** products. From countless tests conducted, it has been determined that **American Traffic Safety Materials, Inc.'s™** EG sheeting, applied as recommended, can be expected to meet the durability standards given below without any clear coating. Under certain weathering conditions, small hair cracks may appear in the sheeting, but such cracks do not significantly reduce the day or night performance of the signs.

**Engineer Grade (Type I) Retroreflective Sheeting**

<b>Engineer Grade Color Numbers</b>	<b>Warranty</b>
152 – white	7 years
151 – red	7 years
153 – blue	7 years
154 – green	7 years
155 – yellow	7 years
156 – orange	7 years
157 – brown	7 years
158 – black – (P158 only)	Exception – see item B

Please call **American Traffic Safety Materials, Inc.™** at 1.877.872.2876 with questions on various punching options and material availability.

### **STORAGE AND SHELF LIFE**

All **American Traffic Safety Materials, Inc.'s™** sheeting must be stored in a cool, dry, and clean area. Avoid exposure to direct sunlight and storage in excessively humid areas. The shelf life of the sheeting is 12 months from date of invoice stored under 73°F and 50% relative humidity.

### **RELIABILITY OF INFORMATION**

All recommendations and technical information contained herein is based on experiences and tests which the manufacturer believes to be reliable, but their accuracy and completeness are not warranted. The user is cautioned to test his materials to determine the fitness of a particular product for the intended application.

### **WARRANTY:**

**American Traffic Safety Materials, Inc.'s™** warrants to the Purchaser that the material identified hereunder will meet the stated minimum conditions subject to all limitations contained within this document.

#### **1. PRODUCTS**

This warranty shall be applied to White, Yellow, Red, Blue, Orange, Green, and Brown, **American Traffic Safety Materials, Inc.'s™** brand Engineering Grade (EG), enclosed lens retroreflective sheeting used on standard traffic signs. The warranty set forth herein is in lieu of any and all other warranties express or implied. The Purchaser acknowledges that no other representations were made or relied upon by it with respect to the Product. No warranty, express or implied, shall apply when the Product is used for purposes other than on standard traffic signs unless prior written confirmation from **American Traffic Safety Materials, Inc.™** is given.

#### **2. RETENTION OF MINIMUM RETROREFLECTIVITY**

When the Product is cleaned in accordance to **American Traffic Safety Materials, Inc.'s™** recommendations and its retroreflectivity is measured as specified by ASTM D4956, the minimum retroreflectivity retention shall be the values in the table below for 7 years, except orange is three (3) years. Black

### COEFFICIENT OF RETROREFLECTION

Candelas per Ft. Candle per Sq. Ft. Orange shall be warranted to retain 50% of its minimum specified coefficient of retroreflection for a period of **five (5) years from date of fabrication.**

O.A.	E.A.	White 152	Yellow 155	Red 151	Blue 153	Orange 156	Green 154	Brown 157
0.2°	-4°	70	50	14.5	4.0	25.0	9.0	2.0
0.2°	30°	30	22	6.0	1.7	7.0	3.5	1.0
0.5°	-4°	30	25	7.5	2.0	13.5	4.5	1.0
0.5°	30°	15	13	3.0	0.8	4.0	2.2	0.5

Note: O.A. = Observation Angle and E.A. = Entrance Angle.

### 3. CONDITIONS

- a. The substrate and the method by which the Product is applied must be in accordance with **American Traffic Safety Materials, Inc.'s™** recommendations.
- b. The failure of the product must result solely from defects in the sheeting or adhesive thereon and not from any other causes including, but not limited to: improper fabrication, handling, storage, shipping, maintenance, improper cleaning procedures using harmful chemicals, installation, defective substrates, excessive foreign matter left on the sheeting, or extremely abnormal weather or environmental conditions. Snow must not be allowed to accumulate against the sign surfaces for more than three continuous months.

### 4. STANDARD FOR FAILURE OF PRODUCT

Failure of product shall be deemed to have occurred only when:

- a. Retroreflectivity of the product is less than the specified values in the table in paragraph 2 above.
- b. The Product has deteriorated to the extent that it becomes ineffective for its intended purpose.

### 5. LIMITATION OF WARRANTY

If such failure occurs under the above conditions as stated herein during the 7 year period after the date of fabrication of the Product, **American Traffic Safety Materials, Inc.™** shall supply the quantity of engineer grade sheeting required to restore the sign surface made with the product to its original effectiveness. Black is not included in this warranty.

If such failure occurs under the conditions stated herein, to the replacement product, **American Traffic Safety Materials, Inc.™** shall compensate the Purchaser by replacing the replacement product on the basis of the remaining warranted life of the product originally supplied.

### 6. AGREEMENT FROM THE PURCHASER

To obtain replacement as provided herein, the Purchaser must provide all information regarding the material, including the invoice number, date, material lot numbers, date of sign installation. listed and cooperate with **American Traffic Safety**

**Materials, Inc.'s™** Customer Service Department to verify the cause(s) and extent of failure.

#### **7. AGREEMENT FROM THE PURCHASER**

The sign fabricator must place on the back of all signs the date of application of the Product to the substrate, the lot number of the Product, the date of the sign installation, and the brand and type of inks screened on the Product. All restored or replacement signs must comply with all conditions stated herein, with the additional requirement that such signs will include the statement "REPLACEMENT SIGN".

**American Traffic Safety Materials, Inc.™** reserves the right to physically verify that all signs are labeled in accordance with all conditions stated herein. Failure to mark the signs in the manner provided herein will void any warranty.

**American Traffic Safety Materials, Inc.™** shall be required to replace materials for only those signs which are physically verified by **American Traffic Safety Materials, Inc.™** to have failed as defined herein.

#### **LIMITATIONS OF LIABILITY**

**American Traffic Safety Materials, Inc.'s™** liability under this warranty is limited solely to replacement as provided herein. **American Traffic Safety Materials, Inc.™** assumes no liability and shall not be liable under any circumstances for any indirect, incidental, consequential, or special expenses, losses, or damages. No replacement will be made for any material that has been in use for more than the seven (7) year period cited, for any material that has been chemically, negligently, or willfully damaged, or has been damaged by third party acts or by acts of God. This warranty is given in lieu of all other warranties, whether express or implied.