

Appendix A3 RETROREFLECTIVE SHEETING IDENTIFICATION GUIDE

A3.1 General

The following information is being provided to inform road authority officials of the various types of retroreflective sheeting, typical applications, and brand names and manufacturers. The information is accurate as of the date of printing and subject to change as new materials are developed.

It is hoped that this information will assist the proper officials in making informed decisions regarding the materials they select for the traffic control devices on their roadways.

This information was obtained from the Standard Specification for Retroreflective Sheeting for Traffic Control, ASTM Designation: D 4956-01, dated January 10, 2001. It has been summarized to provide the basic information regarding retroreflective sheeting types and adhesive backing classes. Technical information regarding the testing procedures that shall be followed to ensure conformance with ASTM specifications are available in the full version of the afore mentioned specification.

A3.2 Definition

Reboundable Sheeting -- retroreflective material intended to be attached to flexible impact resistant plastic devices, such as traffic drumlike channelizing devices

A3.3 Requirements

Retroreflective sheeting shall consist of a white or colored sheeting having a smooth outer surface and that essentially has the property of a retroreflector over its entire surface. There are nine types and five classes of retroreflective sheeting. Types are determined by conformance to the retroreflectance, color, and durability requirements listed in section 6.1 of ASTM 4956-01 and may be of any construction providing that those requirements are met. Type designation is provided as a means for differentiating functional performance. Typical examples of applications are provided for descriptive information only and are not intended to be limitations or recommendations.

A3.4 Typical Applications

The typical applications for the retroreflective sheeting addressed in this specification are:

Type	Typical Application
I	Highway Signing, construction-zone devices, and delineators
II	Highway Signing, construction-zone devices, and delineators
III	Highway Signing, construction-zone devices, and delineators
IV	Highway Signing, construction-zone devices, and delineators
V	Delineators
VI	Temporary roll-up signs, warning signs, traffic cone collars, and post bands
VII	Highway Signing, construction-zone devices, and delineators
VIII	Highway Signing, construction-zone devices, and delineators
IX	Highway Signing, construction-zone devices, and delineators

A3.5 Retroreflective Sheeting Types

Retroreflective sheeting shall be classified as follows:

- Type 1 - A medium-intensity retroreflective sheeting referred to as "engineering grade" and typically enclosed lens glass-bead sheeting. Typical applications include permanent highway signing, construction zone devices, and delineators.
- Type II - A medium-high-intensity retroreflective sheeting sometimes referred to as "super engineer grade" and typically enclosed lens glass-bead sheeting. Typical applications include permanent highway signing, construction zone devices, and delineators.
- Type III - A high-intensity retroreflective sheeting, that is typically encapsulated glass-bead retroreflective material. Typical applications include permanent highway signing, construction zone devices, and delineators,

- Type IV - A high-intensity retroreflective sheeting. This sheeting is typically an unmetallized microprismatic retroreflective element material. Typical applications include permanent highway signing, construction zone devices, and delineators.
- Type V - A super-high-intensity retroreflective sheeting. This sheeting is typically a metallized microprismatic retroreflective element material. This sheeting is typically used for delineators.
- Type VI - An elastomeric high-intensity retroreflective sheeting without adhesive. This sheeting is typically a vinyl microprismatic retroreflective material. Typical applications include orange temporary roll-up warning signs, traffic cone collars, and post bands.
- Type VII - A super-high-intensity retroreflective sheeting having highest retroreflectivity characteristics at long and medium road distances. This sheeting is typically an unmetallized microprismatic retroreflective element material. Typical applications include permanent highway signing, construction zone devices, and delineators.
- Type VIII - A super-high-intensity retroreflective sheeting having highest retroreflectivity characteristics at long and medium road distances. This sheeting is typically an unmetallized microprismatic retroreflective element material. Typical applications include permanent highway signing, construction zone devices, and delineators.
- Type IX - A very-high-intensity retroreflective sheeting having highest retroreflectivity characteristics at short road distances. This sheeting is typically an unmetallized microprismatic retroreflective element material. Typical applications include permanent highway signing, construction zone devices, and delineators.
- Type XI - A super-high-intensity retroreflective sheeting having highest retroreflectivity characteristics at medium road distances and wide angles. This sheeting is typically an unmetallized microprismatic retroreflective element material. Typical applications include permanent highway signing, construction zone devices, and delineators.

NOTE 1 -- All retroreflective sheetings, but especially microprismatic sheetings, may have unique performance characteristics outside of the range of the standard geometries presented in the tables that define the types. Certain applications may require the use of a particular product within a particular type in order to achieve a desired level of retroreflectivity in a given situation. In these cases, information concerning additional performance characteristics must be obtained.

A3.6 Adhesive Backing Classes

The backing required for retroreflective sheeting Types I through IX shall be classified as follows:

- Class 1 - The adhesive backing shall be pressure-sensitive, require no heat, solvent, or other preparation for adhesion to smooth, clean surfaces.
- Class 2 - The adhesive backing shall have an adhesive that shall be activated by applying heat and pressure to the material. The Class 2 material shall be repositionable under normal shop conditions and at substrate temperatures up to 100°F (38°C) and without damage to the material. The Class 2 material may be perforated to facilitate removal of air in heat-vacuum laminators, but the perforations must be of a size and frequency such that they do not cause objectionable blemishes when the sheeting is printed.
- Class 3 - The adhesive backing shall have a positionable low-tack pressure-sensitive adhesive that requires no heat, solvent, or other preparation for adhesion to smooth, clean surfaces. It shall be repositionable up to a temperature of 100°F (38°C) without damage to the material.
- Class 4 - The adhesive backing shall have a low-temperature pressure-sensitive adhesive that permits sheeting applications at temperatures down to +20°F (-7°C) without the aid of heat, solvent, or other preparation for adhesion to smooth, dry, clean surfaces.
- Class 5 - This shall be a nonadhesive backing made of material commercially used for self-supporting products such as traffic cones, temporary roll-up warning signs, and post bands.

2011 Traffic Sign Retroreflective Sheeting Identification Guide



This document is intended to help identify sign sheeting materials for rigid signs and their common specification designations. It is not a qualified product list. FHWA does not endorse or approve sign sheeting materials. Many other sheeting materials not listed here are available for delineation and construction/work zone uses.

Retroreflective Sheeting Materials Made with Glass Beads

Example of Sheeting (Shown to scale)						
ASTM D4956-04	I	II	III	III	III	III
ASTM D4956-09	I	II	III	III	III	III
AASHTO M268-10	(1)	(1)	A	A	A	A
Manufacturer	Several companies	Avery Dennison®	3M™	ATSM, Inc.	Avery Dennison®	Nippon Carbide
Brand Name	Engineer Grade	Super Engr Grade	High Intensity	High Intensity	High Intensity	High Intensity
Series	Several	T-2000	2800 3800	ATSM HI	T-5500	N500
NOTES:	(2)	(3) (4)	(3) (4)	(4)	(4)	(4)
	<p>(1) – Sheeting material does not meet minimum AASHTO classification criteria. (2) – Glass Bead Engineer Grade sheeting is uniform without any patterns or identifying marks. Section 2A.08 of the 2009 MUTCD (http://mutcd.fhwa.dot.gov) does not allow this sheeting type to be used for new yellow or orange signs, or new legends on green signs. (3) – Material no longer sold in the United States as of the date of this publication. (4) – Section 2A.08 of the 2009 MUTCD (http://mutcd.fhwa.dot.gov) does not allow this sheeting type to be used for new legends on green overhead signs.</p>					

- ASTM D4956-04 is referenced in Table 2A-3 of the 2009 MUTCD.
- ASTM D4956-09 is the most current ASTM sign sheeting specification (the 2009 version is designated by “-09”).
- AASHTO M268-10 Types for this Guide are based only on retroreflective properties and not other unique AASHTO requirements such as color.

Manufacturer Contact Information

3M - <http://www.3m.com/tss>
 Avery Dennison - <http://www.reflectives.averydennison.com>
 Oracal - <http://www.oracal.com>

ATSM, Inc. - <http://www.atsminc.com>
 Nippon Carbide - <http://www.nikkalite.com>
 Reflexite - <http://www.reflexite.com>

FHWA Publication Number: FHWA-SA-11-14. For additional copies of this document, please send request to report.center@dot.gov

