



Designation: D 4280 – 02

Standard Specification for Extended Life Type, Nonplowable, Raised Retroreflective Pavement Markers¹

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1. Scope

1.1 This specification covers nonplowable, retroreflective raised pavement markers for nighttime lane marking and delineation.

1.2 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.3 The following precautionary caveat pertains only to the test methods portion, Section 9, of this specification: *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

- C 184 Test Method for Fineness of Hydraulic Cement by the 150- μm (No. 100) and 75- μm (No. 200) Sieves²
- C 430 Test Method for Fineness of Hydraulic Cement by the 45- μm (No. 325) Sieve²
- D 5 Test Method for Penetration of Bituminous Materials³
- D 36 Test Method for Softening Point of Bitumen (Ring-and-Ball Apparatus)⁴
- D 70 Test Method for Specific Gravity and Density of Semi-Solid Bituminous Materials (Pycnometer Method)³
- D 92 Test Method for Flash and Fire Points by Cleveland Open Cup⁵
- D 1754 Test Method for Effects of Heat and Air on Asphaltic Materials (Thin-Film Oven Test)³
- D 1856 Test Method for Recovery of Asphalt from Solution by Abson Method³
- D 2171 Test Method for Viscosity of Asphalts by Vacuum Capillary Viscometer³

- D 2172 Test Methods for Quantitative Extraction of Bitumen from Bituminous Paving Mixtures³
- D 2669 Test Method for Apparent Viscosity of Petroleum Waxes Compounded with Additives (Hot Melts)⁶
- D 4402 Test Method for Viscosity Determinations of Unfilled Asphalts Using the Brookfield Thermosel Apparatus⁴
- D 5329 Test Methods for Sealants and Fillers, Hot-Applied, for Joints and Cracks in Asphaltic and Portland Cement Concrete Pavements³
- E 284 Terminology of Appearance⁷
- E 808 Practice for Describing Retroreflection⁷
- E 809 Practice for Measuring Photometric Characteristics of Retroreflectors⁷
- E 811 Practice for Measuring Colorimetric Characteristics of Retroreflectors Under Nighttime Conditions⁷
- 2.2 *Federal Specifications:*⁸
 - FF-W-1825A Wool and Gauze, Metallic
 - TT-T-291 Thinner, Paint, Mineral Spirits, Regular and Odorless
- 2.3 *AASHTO Standards:*⁹
 - AASHTO No. M237 Epoxy Resin Adhesive for Bonding Traffic Markers to Hardened Concrete

3. Terminology

3.1 Definitions:

3.1.1 *cleanability*—the ability of a raised retroreflective marker to keep its optical surfaces clean under traffic and environmental conditions.

3.1.2 *coefficient of luminous intensity*, R_l (specific intensity)—the ratio of the luminous intensity (I) of the retroreflector in the direction of observation to the illuminance (E) at the retroreflector on a plane perpendicular to the direction of the incident light, expressed in candelas per lux (cd/lx) (see Practice E 808 and Terminology E 284).

3.1.2.1 *Discussion*—When values are low the coefficient of (retroreflected) luminous intensity may be given in millicandelas per lux. In inch-pound units, R_l is given in candelas per footcandle (cd/ftc). Historically, the term specific intensity and

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² Annual Book of ASTM Standards, Vol 04.01.

³ Annual Book of ASTM Standards, Vol 04.03.

⁴ Annual Book of ASTM Standards, Vol 04.04.

⁵ Annual Book of ASTM Standards, Vol 05.01.

⁶ Annual Book of ASTM Standards, Vol 05.02.

⁷ Annual Book of ASTM Standards, Vol 06.01.

⁸ Available from U.S. Government Printing Office, Washington, DC 20402.

⁹ Available from American Association of State Highway and Transportation Officials, 444 N. Capitol, Washington, DC 20001.