**Standard Method of Test for** 

## Instrumental Photometric Measurements of Retroreflective Materials and Retroreflective Devices

AASHTO Designation: T 257-96 (2018)

**Technical Subcommittee: 4d, Safety Devices** 

Release: Group 2 (June)



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# SCOPE This standard covers procedures for instrumental determinations of photometric characteristics of retroreflective materials and retroreflective devices. The values stated in SI units are to be regarded as the standard. REFERENCED DOCUMENTS

#### 2.1. *ASTM Standards*:

- E184, Standard Practice for Effects of High-Energy Neutron Radiation on the Mechanical Properties of Metallic Materials, E706 (IB) (withdrawn 2002)
- E308, Standard Practice for Computing the Colors of Objects by Using the CIE System
- E809, Standard Practice for Measuring Photometric Characteristics of Retroreflectors
- E810, Standard Test Method for Coefficient of Retroreflection of Retroreflective Sheeting Utilizing the Coplanar Geometry

#### 3. SIGNIFICANCE AND USE

3.1. This method describes procedures used to measure photometric quantities that relate to the visual perception of retroreflected light. The most significant usage is in the relation of the nighttime vehicle headlamps, retroreflector, and driver's eye geometry. For this reason, the CIE Standard Source A is used to represent a tungsten vehicle headlamp and the receptor has the photopic spectral responsivity at the presentation angle,  $V(\lambda)$ , corresponding to the light-adapted human eye (see Section 4.2.10). Although the geometry must be specified by the user, it will, in general, correspond to the relation between the vehicle headlamp, the retroreflectometer, and the driver's eye position.

#### 4. TERMINOLOGY

#### 4.1. *Retroreflective Terms*:

- 4.1.1. *retroreflector*—a surface or device that reflects and returns a relatively high proportion of light in a direction close to the direction from which it came. This characteristic is maintained over a wide variation of the angle made by the incident light ray and the normal to the retroreflective surface.
- 4.1.2. *retroreflective element*—one optical unit that by refraction and/or reflection produces the phenomenon of retroreflection.
- 4.1.3. *retroreflective device*—a complete device, ready for use, consisting of one or more retroreflective elements (for example, a device containing cats' eyes, a cube corner device, or a safety retroreflective device).
- 4.1.4. *retroreflective material*—a retroreflective material that consists of a thin continuous layer of small retroreflective elements on or very near the exposed surface (for example, retroreflective sheeting, beaded paint, highway sign surfaces, or pavement striping).
- 4.1.4.1. *retroreflective sheeting*—a retroreflective material preassembled as a thin film ready for use.
- 4.2. geometric terms—(Figures 1 through 3).



Cat's Eye Element



Spherical Element



Cube Corner Element

Figure 1—Geometry of Retroreflective Elements

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