



Standard Specification for Goggle- and Spectacle-Type Eye Protectors for Selected Motor Sports¹

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1. Scope

1.1 This specification covers eye protectors, exclusive of helmet-mounted visors, designed for use by riders of motorcycles, mopeds, and snowmobiles for off road use that minimize or significantly reduce injury to the eye and adnexa as a result of impact and penetration by objects that may be kicked up from the road, track, trail, or snow surfaces and made airborne and, as such, likely to cause eye discomfort or injury. This specification does not address shield-type eye protectors such as are connected to, integral to, and/or supported by protective helmets. Protective eyewear offers protection only to the eyes and does not protect other parts of the head, face, or neck.

1.2 Protectors are divided into two types, goggles or spectacles, depending on their design characteristics.

1.3 This specification does not apply to prescription eyewear. (**Warning**—Impact-resistant prescription spectacles that conform to the standard specifications of ANSI Z87.1 should be used if spectacles are to be worn under goggle-type eyewear as covered by this specification.)

1.4 In this specification, the use of the word “shall” indicates a mandatory requirement. The word “should” indicates a recommendation.

1.5 *Units*—The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only. Metric units of measure in this specification are in accordance with the International System of Units (SI). If a value for measurement as given in this specification is followed by an equivalent value in other units, the first stated is to be regarded as the requirement. A given equivalent value may be approximate.

1.6 *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 appro-*

priate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.

1.7 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:²

D1003 Test Method for Haze and Luminous Transmittance of Transparent Plastics

2.2 ANSI Standards:³

ANSI Z80.3 Ophthalmics—Nonprescription Sunglasses and Fashion Eyewear—Requirements

ANSI Z87.1 Occupational and Educational Eye and Face Protection Devices

2.3 CEN Standard:⁴

EN 168 Personal Eye Protection—Non-Optical Test Methods

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *astigmatism, n*—condition in a lens that creates two axially separated line foci of each object point, the lines being mutually perpendicular.

3.1.1.1 *Discussion*—In other words, the lens has two different refractive powers in meridians that are 90° apart.

3.1.2 *base-down, adv*—refers to the type of prism that causes a horizontal beam of light to bend down causing objects to appear higher than their true position.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

⁴ Available from the European Committee for Standardization, Avenue Marnix 17, B-1000 Brussels, Belgium.

3.1.3 *base-in, adv*—relating to the type of prism imbalance that tends to cause parallel rays of light passing through a protector, spaced apart by the interpupillary distance, to converge.

3.1.4 *base-out, adv*—relating to the type of prism imbalance that tends to cause parallel rays of light passing through a protector, spaced apart by the interpupillary distance, to diverge.

3.1.5 *base-up, adv*—refers to the type of prism that causes a horizontal beam of light to bend upward causing objects to appear lower than their true position.

3.1.6 *binocular, adv*—relating to the field of view that is shared by both eyes simultaneously; also, any simultaneous activity of the two eyes.

3.1.7 *central viewing zone, n*—that part of the eye of a protector that has its center in line with the wearer's normal line of sight.

3.1.7.1 *Discussion*—The zone is circular and 40 mm in diameter. The center of the central viewing zone shall be the point of intersection of the line of sight with the lens as mounted on the EN head form per the current EN 168.

3.1.8 *cleanable, adv*—ability of an EPD to be made readily free of dirt or grime without being damaged with a cleaning process, such as the use of soap and water.

3.1.9 *coverage, n*—characteristic of an eye protective device (EPD) that obstructs straight line paths that are coincident with the wearer's eyes.

3.1.10 *eye, n*—relating to the eye of a test head form, the eye of a person wearing a protector, or that part of an EPD through which a wearer's eye would normally look.

3.1.11 *eye of the head form, n*—all structures contained within the orbital rim of the head form.

3.1.12 *eye protective device (or protector), n*—device that provides protection to the wearer's eye against specific hazards encountered in selected motor sports.

3.1.13 *fracture, n*—separation, as a result of impact, of a lens or frame into two or more separate pieces.

3.1.14 *haze, n*—fraction of the total transmitted light from a normal incident beam that is not transmitted in a focused condition but scattered by inclusions or surface defects.

3.1.14.1 *Discussion*—Excessive haze will reduce contrast and visibility.

3.1.15 *horizontal imbalance, n*—difference in the prismatic deviation of incident parallel light beams on the two eyes of an EPD in the horizontal meridian (see base-in and base-out).

3.1.16 *impact resistance, n*—ability of an EPD to afford protection from impact as required by this specification.

3.1.17 *lens, n*—transparent part or parts of a EPD through which the wearer normally looks through.

3.1.18 *luminous transmittance, n*—luminous transmittance is a function of the spectral transmittance of the lens weighted by the corresponding ordinates of the photopic luminous efficiency distribution of the International Commission on Illumination (CIE) current standard colorimetric observer and

the spectral intensity of standard Illuminant C (see ANSI Z80.3, Paragraph 3.9.1).

3.1.19 *normal lines of sight, n*—straight ahead horizontal lines that intersect the center of the eyes of the appropriate head form.

3.1.20 *penetration resistance, n*—ability of a device to afford protection from moving objects as required by this specification.

3.1.21 *power imbalance, n*—relates to the condition in which the refractive power of the lens or lenses of a protector is different as presented to the two eyes.

3.1.22 *prism, prismatic effect, n*—prism bends a beam of light as a result of the lack of parallelism of the two surfaces of a lens through which the beam of light traverses and the amount of bending is a function of the curvatures, thickness, index of refraction of the material, and the angle of approach of the line of sight to the optical surface.

3.1.22.1 *Discussion*—In this specification, the word prism refers to the amount of bending that is imposed upon the line of sight of a wearer of an eye protector for the standard viewing position. Prism is expressed in diopters. The deviation of the line of sight by 1 cm/m is 1 prism diopter.

3.1.23 *refractive power, n*—focusing effect of a lens expressed in diopters.

3.1.24 *spherical power, n*—average of the maximum meridional astigmatic power and the minimum meridional astigmatic power of a lens.

3.1.25 *test head form, n*—for the purpose of this specification, the reference head forms shall be to EN 168.

3.1.25.1 *Discussion*—The two head forms are medium size, which approximates a 50th percentile adult male, and small size, which approximates a 60th percentile 12-year-old child, and both should be of the polyurethane-covered version.

3.1.26 *vertical imbalance, n*—difference in prismatic deviation between parallel light beams incident on the two eyes of an EPD in the vertical meridian.

4. Classification

4.1 Eye protectors as covered under this specification are classified into the following types:

4.1.1 *Spectacle*—A protector with a lens or lenses, supported by frame temples or straps or both, that does not form a tight seal with the face over most of the perimeter of the protector.

4.1.2 *Goggle*—A protector with a lens or lenses, supported by frame temples or straps or both, that forms a seal with the face over most of the perimeter of the protector.

5. General Requirements

5.1 Materials of Construction:

5.1.1 The manufacturer's choice of material shall be in accordance with 5.1.2 and 5.1.3.

5.1.2 Materials coming into contact with the wearer's face shall not be of a type known to cause skin irritation.

5.1.3 Materials coming into contact with the wearer's face shall not undergo significant change of color, texture, or