Designation: F2812 – 12

Standard Specification for Goggle- and Spectacle-Type Eye Protectors for Selected Motor Sports[1]

This standard is issued under the fixed designation F2812; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

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 appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

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.

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.

[1] This test method is under the jurisdiction of ASTM Committee F08 on Sports Equipment and Facilities and is the direct responsibility of Subcommittee F08.57 on Eye Safety for Sports.

Current edition approved July 1, 2012. Published August 2012. DOI: 10.1520/F2812-12.

[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.

3.1.5 *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 hardness, loss of strength or flexibility, or other physical changes as a result of perspiration, oil, sunscreen lotion, or grease from the wearer's skin and hair.

5.1.4 Headbands shall be capable of holding the goggle securely under normal operating conditions and be capable of easy adjustment.

5.2 *Cleanability*—EPDs shall be capable of being cleaned to the degree that, when cleaned in accordance with the method described in Section 10, they shall remain functional in all ways.

5.3 *Construction*—The protector shall be constructed in such a manner as to prevent components of the protector from contact with the eyes of the head form, detachment, or dislodgment when tested in accordance with Section 9.

5.4 *Finish and Coatings*—Finishes and coatings as used on the protector shall not delaminate from the base surface of the protector such that they dislodge, detach, or delaminate when tested in accordance with Section 9.

6. Performance Requirements

6.1 *Optical Requirements:*

6.1.1 *Refractive Tolerances*—When tested in accordance with 8.7, the refractive power in any meridian shall not exceed 0.12 diopters.

6.1.2 *Astigmatic Power*—When tested in accordance with 8.7, the astigmatic power (absolute power difference in extreme meridians) shall not exceed 0.12 diopters.

6.1.3 *Power Imbalance*—When tested in accordance with 8.7, the power imbalances in corresponding meridians of extreme power shall not exceed 0.12 diopters between each eye.

6.1.4 *Prismatic Power*—When tested in accord with 8.6, prismatic power shall not exceed 0.50 Δ.

6.1.5 *Prismatic Imbalance*—When tested in accord with 8.6, prismatic imbalance shall not exceed 0.25-Δ base-in or vertical and 0.75-Δ base-out.

6.1.6 *Ultraviolet Transmittance*—Ultraviolet A (UVA) and ultraviolet B (UVB) transmittance of lenses shall comply with ANSI Z80.3 for both clear and non clear protectors when measured at any point within the central viewing zone.

6.1.7 *Haze*—When tested in accordance with 8.3, forward scattered light (haze) shall not exceed 3 % for both clear and tinted protectors when measured at any point within the central viewing zone.

6.1.8 *Optical Quality*—When tested in accordance with 8.2, striae warpage, surface ripples, lenticulations, or abrupt optical changes that are discernible under the test conditions of 8.2.1 shall constitute a failure.

6.1.9 *Surface and Internal Defects*—Pits, scratches, bubbles, grayness, specks, cracks, and watermarks that are discernible under the test conditions of 8.2.1 shall constitute a failure.

6.2 *Mechanical Requirements:*

6.2.1 *Impact Resistance:*

6.2.1.1 *High-Velocity Impact Resistance:*

(1) When tested in accordance with 9.1, at 45 m/s (148 ft/s) at cold and hot temperatures, displaced fragments, separated delaminations, rupture, or complete fracture of the frame or lenses constitutes a failure. No contact with the eye of the head form shall be permitted by the test projectile, the protector, or its component parts as a result of the impact.

(2) When tested in accordance with 9.1, at 70 m/s (230 ft/s) at standard temperatures, displaced fragments, separated delaminations, rupture, or complete fracture of the frame or lenses constitutes a failure. No contact with the eye of the head form shall be permitted by the test projectile, the protector, or its component parts as a result of the impact.

(3) When tested in accordance with 9.1.1, any displacement or dislodgment of the lens from its original position within the frame of over 25 % constitutes failure.

(4) A protector that is dislodged from the test head form when tested in accordance with 9.1.1 shall not constitute a failure provided all of the above mechanical requirements are met.

6.2.1.2 *High-Mass Impact Resistance:*

(1) When tested in accordance with 9.2, displaced fragments, separated delaminations, or complete fracture of the frame or lenses constitutes a failure. Contact with the eye of the head form is permitted.

(2) When tested in accordance with 9.2, any displacement or dislodgment of the lens greater than 25 % from its original position within the frame constitutes failure.

(3) A protector that is dislodged from the test head form when tested in accordance with 9.2 shall not constitute a failure provided all of the above mechanical requirements are met.

6.3 *UV Stability*—Protectors (one group) shall be conditioned in accord with 9.4. Conditioned samples shall be tested for optical and mechanical performance characteristics in accordance with 6.1.5 and 6.1.6 within 1.0 h of leaving the conditioning atmosphere.

6.4 *Flammability*—When tested in accord with 9.3, the protector shall not ignite.

7. Specimen Preparation

7.1 Only new and complete eye protectors as offered for sale shall be tested.

7.2 *Preconditioning*—Protectors shall be preconditioned at 23 ± 2°C and 50 ± 5 % relative humidity for a minimum period of 48 h before the commencement of any test or further temperature preconditioning.

7.3 *Conditioning*—Protectors shall be conditioned for a minimum of 1 h (each group of 16) at the following specified temperatures before each test. Protectors shall be tested for mechanical performance characteristics within 1 min of leaving the test atmosphere.

7.3.1 *Standard,* +23.0 ± 2.0°C.

7.3.2 *Cold,* –10.0 ± 2.0°C.

7.3.3 *Hot,* +50.0 ± 2.0°C.

TEST METHODS

8. Optical Tests

8.1 *Inspection Procedure*—A high-contrast grid pattern of dark and white lines shall be viewed through the lens, scanning it area by area and moving it about. The grid pattern should be at least 46 by 46 cm (18 by 18 in.) and constructed of high-contrast black lines on a white background (the white separations being equal to the black lines, both being approximately 6.35 mm (¼ in.) wide). The target should be at least 1.8 to 2.4 m (6 to 8 ft) from the observer, and the lens should be held at least 46 to 61 cm (18 to 24 in.) from the eye. Any ripples in the lens detected by this test method should be further examined in accordance with 8.2.1.

8.2 *Optical Quality*—Localized power errors or aberrations that are detected by the visual inspection procedure of 8.1 are permissible if no measurable or gross focimeter or telescope target distortion or blur is found when the localized area is examined in accord with 8.2.1.

8.2.1 The referee method of detecting optical defects and local aberrations or to evaluate further aberrations detected in 8.1 or both is to scan the central viewing zone, especially any areas of suspicion arising from the visual test of 8.1. The lens or shield should be scanned with a precision focimeter or an 8 to 10× telescope using the targets and arrangements described in 8.7. The aperture should be 5 to 7 mm (0.2 to 0.28 in.) for this examination. Areas outside the central viewing zone or within 6 mm of the edge need not be tested. When the central viewing area is scanned, there shall be no sudden jump, doubling, or blurring of the image greater than 0.08-diopters change in power. Gradual variations in the central viewing zone shall be within the power imbalance tolerances. An optical focimeter with electronic readout repeatable to 0.02 diopters is a satisfactory alternate method. These scanning procedures may be made by scanning across the lens surface not necessarily in the "as-worn" mode.

8.3 *Haze:*

8.3.1 Clear lenses shall be measured for percent haze within the central viewing zones with a calibrated photometer system with geometries in accordance with Test Method D1003.

8.3.2 Haze may be determined with a calibrated photometer for clear samples only.

8.3.3 A spectrophotometer with geometry conforming to Test Method D1003 shall be used to measure haze for non-clear lenses and shall serve as the referee test method for clear lenses.

8.4 *Prismatic Effect Measurements:*

8.4.1 *Purpose*—The test presented here is intended to measure the prismatic power and imbalance (angular deviation of light rays as they pass through the lens(es)) of the protector.

8.4.2 *Apparatus*—This apparatus shall consist of the head form determined in 3.1.7.1. The head form shall be placed in an optical system. The telescope lens, L2, shall be located at a distance of 1.0 m (39.4 in.) in front of the image plane, IP. The pinhole aperture plate, p, shall be located approximately 10 m (394 in.) from the collimator lens. L1, and shall be adjusted so that one image is formed on the image plane, IP, when no protector is on the head form. The position of that image shall be marked or noted and will be called Po.

8.4.3 *Test Procedure*—The protector shall be mounted on the head form in the as-worn position. The image(s) on the image plane shall be identified as coming from the right eye, Pr, or the left eye, Pl, by blocking the beams of each eye. The distance in centimetres between the centers of Pl and Po and Pr and Po shall be measured. The prismatic power of the protector in prism diopters (Δ) shall be calculated for the distances between Po and Pl, or Pr, whichever is greater. The horizontal and vertical distances in centimetres between the centers of Pl and Pr shall be measured. The horizontal and vertical prism imbalance of the protector in prism diopters (Δ) shall be calculated as the horizontal and vertical distances, respectively. The base of the horizontal prism imbalance shall be determined by analysis of the right and left ocular images as viewed on the image plane. Diverging images (rays) are base out and converging images (rays) are base in.

8.5 *Refractive Power Measurements:*

8.5.1 *Purpose*—The test method presented here is intended to measure spherical and cylindrical refractive power induced by the EPD.

8.5.2 *Apparatus*—An 8-power telescope with an effective aperture of 19 mm (0.75 in.) shall be used in conjunction with an illuminated target located a distance of 10.67 m (35 ft) from the telescope objective. The focus adjustment of the telescope shall be calibrated.

8.5.3 *Test Procedure:*

8.5.3.1 Adjust the telescope by setting the calibrated focus adjustment to zero power and then adjust the eyepiece so that the test target is clearly resolved without the EPD in front of the telescope. The quality of the telescope and the observer's vision should be such that Pattern 40 of the High Contrast Test Chart of National Institute of Standards and Technology (NIST) Special Publication 374 is clearly resolved.[5]

8.5.3.2 Mount the EPD in front of the telescope in the as-worn position such that the telescope axis passes through either one of the central viewing zones in the principle direction of gaze. The distance between the objective lens of the telescope and the lens of the protector shall not exceed 38 mm (1.5 in.).

8.5.3.3 Focus the telescope in the radial lines of the test target until they appear as sharp as possible. Two possibilities may occur.

8.5.3.4 If all radial lines appear equally well focused (sharp) at the same telescope power setting, the EPD has no measurable astigmatism, and the power reading of the telescope at that position is the spherical refractive power of the lens for that eye.

8.5.4 If lines in only one meridian appear sharpest at a given focus, the telescope shall be focused to determine the maximum meridional power for that meridian. The power reading shall be noted. The telescope shall then be refocused for lines in the meridian that yield the opposite extreme power reading. This value shall be noted. Failure criteria are as provided in 6.1.3 and 6.1.5.

8.6 *Surface Imperfections and Internal Defects:*

8.6.1 Inspect lenses in a lighted room without the aid of magnifying devices.

8.6.2 View lenses against a dark background in the light from an open-shaded 40-W incandescent clear lamp with the lens positioned approximately 305 mm (12 in.) from the light source.

8.6.3 *Visual Function Impairment*—Impairment of the function of the lens may be determined by testing the lens in the "as-worn" position before a trained inspector's eye. Impairment is present if the defects are detected against either light or dark plain backgrounds, with side illumination on the lens for the dark background test.

[5] Francis E. Washer and Irvine C. Gardner, *Method for Determining the Resolving Power of Photographic Lenses*, Special Publication 374, National Institute of Standards and Technology, Washington, DC, 1973.

8.7 *Field of View (Angle of Vision)*—This specification has no requirements for field of view. See Appendix X1 for optional test methods.

9. Mechanical Tests

9.1 *High-Velocity Impact:*

9.1.1 *Test Equipment:*

9.1.1.1 The firing device shall be capable of propelling a 6.35-mm (0.25-in.) steel ball weighing 1.06 ± 0.02 g (0.037 ± 0.0007 oz) reproducibly at a velocities of 45 m/s (148 ft/s) and 70 m/s (230 ft/s) on a horizontal reference plane formed by the center of the eyes of the head form.

9.1.1.2 The velocity of the steel ball shall be determined at a distance not greater than 50 cm (19.6 in.) from the eye of the head form and shall have a standard deviation not exceeding 2 % of the specified test velocity over a test series of 30 shots.

9.1.1.3 Equipment used to measure the speed of the test ball within 1.0 m (39.4 in.) of impact shall be accurate to within ±0.5 m/s (19.7 in.) muzzle velocity. Each impact velocity shall be measured and, if not within the tolerance, that impact is not valid.

9.1.1.4 The test head form shall be selected in accordance with 3.1.25.

9.1.2 *Test Procedure:*

9.1.2.1 Apply a fresh marking paste to each eye, horizontal lid surfaces, and 1.5 mm (0.06 in.) of the vertical lid surfaces of the upper and lower lids of the test head form before each impact.[6]

9.1.2.2 Mount the protector to be tested in the as-worn position on the appropriate the size head form using the following as guidance:

(1) Use a new protector for each impact;

(2) Sample Size—Ten protectors (five impacts at hot and cold temperatures as defined in 7.3); and

(3) Adjust the head form so that the projectile impacts a new sample of the protector at the following points of each lens (area):

(a) On the horizontal plane through the pupil: 0°, 30° temporal, and 60° temporal all at ±5º;

(b) On the horizontal plane 10 mm ± 2 mm (0.4 in. ± 0.08 in.) above the plane of the pupil: 45° temporal; and

(c) On the horizontal plane 10 mm ± 2 mm (0.4 in. ± 0.08 in.) below the plane of the pupil: 45° temporal.

9.1.2.3 The total group size tested is five devices each for hot and cold temperatures as specified in 7.3.

9.2 *High-Mass Impact Test:*

9.2.1 *Test Equipment:*

9.2.1.1 The EN head form used in 9.1.2.2 shall be used to hold the EPD. It shall be rigidly mounted in the horizontal position, face up, on a base that has a mass of 30 kg (66 lb) or greater. A steel projectile 25.4 mm (1.0 in.) in diameter, weighing 500 g (17.6 oz), approximately 165 mm (6½ in.) long with a conical point of 30° ± 1º, this point having a spherical radius of no greater than 1 mm (0.04 in.) and a hardness of 60 ± 10 on the Rockwell C scale, shall be freely dropped from a height of 127 cm +3.8 -0 cm^2 (50 in. +1.5 -0 $in.^2$) above the protector. The projectile may be guided but not restricted in its vertical fall by dropping it through a tube extending to within 10 cm (4 in.) of the impacted area. The impact area shall be within a 25.4-mm (1-in.) diameter centered over the pupil. The impact point shall be perpendicular to a plane through the impact area. Shielding around the head form is required to protect the operator.

9.2.1.2 *Sample Size*—Eight protectors (two impacts on each eye at cold and hot temperatures as defined in 7.3).

9.2.2 *Procedure:*

9.2.2.1 The EPD is placed on the head form as it was designed to be worn. The alignment shall be such that, when the missile is dropped, its point is in line with the center of either of the eyes of the head form.

9.2.2.2 The missile shall be dropped from a height of 127 cm +38 -0 mm^2 (50 in. +1.5 -0 $in.^2$) measured from the conical tip of the missile to the impact point of the protector. Four devices shall be tested, one on the left viewing area and one on the right viewing area, at hot and cold temperatures as specified in 7.3.

9.3 *Flammability Test*—The EPD is to be placed in a laboratory oven stabilized to 200 ± 5°C. The sample shall not exceed 10 % of the unit volume of the oven. The sample shall be subjected to the environment for 15 ± 1 min.

9.4 *UV Stability Test:*

9.4.1 The external/outside surface of the protector shall be exposed to UV radiation from a conditioned (150 h) 450 ± 50 W xenon lamp with a spectral transmittance of at least 30 % (of peak) at 200 nm ± 10 nm.

9.4.2 The lamp current shall be stabilized at 25 ± 0.2 A.

9.4.3 The protector shall be exposed for a minimum duration of 24 h.

10. Cleaning

10.1 Follow the manufacturer's instructions for cleaning. If none are available, clean with a mild soap and warm water solution by soaking the EPD in the soap solution maintained at 60 ± 5ºC (140 ± 9ºF) for 10 ± 1 min. Rinse thoroughly and allow to air dry. Any characteristics of the EPD that would impair the functionality of the protector are cause for rejection.

11. Product Marking

11.1 Each EPD frame shall bear the following permanent markings (may be in code with a key to translate):

11.1.1 Manufacturer's identity and

11.1.2 Eye protector model identity.

11.2 A label or tag bearing the following information shall be securely attached to, or accompany, each eye protector at time of sale:

11.2.1 Designation number of this specification and the protector type as defined per this specification;

11.2.2 The size range and instructions that shall clearly cover proper fit;

11.2.3 A warning stating the cleaning and antifog agents that may be used with eye protectors incorporating clear plastic shields and further stating that the lenses should be replaced when scratches become troublesome or if cracks appear at the edges; and

[6] Zinc oxide ointment has been shown to facilitate this purpose well.

11.2.4 A warning stating that if the eye protector is severely impacted, short of failure, then the degree of protection provided may be reduced and the eye protector must be replaced. Failure to do so may result in permanent injuries to the eye.

12. Keywords

12.1 EPD; eye injury; eye protective device; eye protector; goggles; motor sports; spectacles

APPENDIX

(Nonmandatory Information)

X1. FIELD OF VIEW

X1.1 To gather a database for future revisions of the specification, the relative unobstructed angle visually available to the user should be determined. With the EPD mounted on the standard head form, the pole of the cornea shall be visible to an observer when sighted from the field angles using any sighting method and should be recorded.