



VEHICLE EQUIPMENT SAFETY COMMISSION

Regulation VESC-8

**MINIMUM REQUIREMENTS FOR
MOTORCYCLISTS' EYE PROTECTION**

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MINIMUM REQUIREMENTS FOR MOTORCYCLISTS' EYE PROTECTION

1. **PURPOSE** — The purpose of this regulation is to provide state administrators with equipment approval guidelines for motorcyclists' eye protection devices through the development of a regulation to provide a reasonable degree of protection against tearing and against foreign objects striking or lodging in the eye, causing eye irritation or damage, distracting or handicapping the operator, and thereby causing accidents.
2. **SCOPE** — The scope of this regulation shall include requirements for material, lens size, optical properties, strength, field of vision, flammability, cleansing capabilities, labeling, identification, and testing procedures for eye protection devices for drivers and passengers of motorcycles.
 - 2.1 Windshields are the subject of other nationally recognized standards and shall not be included within the scope of this regulation.
 - 2.2 Contact lenses are not acceptable as eye protection devices and shall not be included within the scope of this regulation.

3. DEFINITIONS

- 3.1 **EPD** — Means eye protection device.
- 3.2 **EYE GLASSES** — Shall include devices such as spectacles or sunglasses worn before the eyes having two separately mounted lenses.
- 3.3 **FACE SHIELD** — A device attached to a helmet or head band(s) which covers the wearer's eyes and face at least to a point approximately to the tip of the nose.
- 3.4 **FRAME** — Those parts of the eye glasses or goggles containing the lens housing. Padding may be associated with the frame.
- 3.5 **GOGGLES** — A device worn before the eyes, the predominant function of which shall be to protect the eyes without obstructing peripheral vision. They shall provide protection from the front

and sides and may or may not form a complete seal with the face.

3.6 **HEADBAND** — That part of the device consisting of a supporting band or other structure that either encircles the head or protective helmet, or can be attached thereto.

3.7 **MID-SIGNAL PLANE** — The anteroposterior plane through the longitudinal axis of the body.

4. EYE PROTECTION DEVICES

4.1 To be considered an eye protection device, or EPD, under this regulation, a device must be one of the following:

4.1.1. Goggles

4.1.2 Face Shield

4.1.3 Eye Glasses

(A) Each lens shall have a convex frontal surface.

(B) Each lens shall have a minimum area of 3 square inches. The horizontal diameter (or side-to-side measurement) shall be no less than 2 inches. The vertical diameter (or top-to-bottom measurement) shall be no less than 1½ inches. A diameter shall pass through a point on the lens that is intended to be directly in front of the pupil of the eye when the wearer is looking straight ahead.

4.2 Optical correction of a person's vision, where required or desired, may be provided either by:

4.2.1 An EPD that provides the proper optical correction, or

4.2.2 Personal corrective lenses worn under an EPD that does not disturb the adjustment of those lenses.

(NOTE: It is assumed that EPD's will not be required of motorcycles equipped with approved windshields in those jurisdictions where windshields are accepted in lieu of EPD's.)

5. MATERIALS

5.1 All parts of an EPD shall be free from sharp edges or projections that could cause harm or discomfort to the wearer.

5.2 A headband shall be capable of holding the EPD securely under normal operating conditions. It shall be capable of easy adjustment and replacement.

5.3 Material(s) utilized in any portion of an EPD shall be of durable quality, ie, material characteristics shall not undergo appreciable alterations under the influence of ageing or of the circumstances of use to which the device is normally subjected (exposure to rain, sun, cold, dust, vibrations, contact of the skin, effects of sweat, or of products applied to skin or hair).

5.4 Material(s) commonly known to cause skin irritation or disease shall not be used for those parts of the device which come into contact with the skin.

6. OPTICAL PROPERTIES OF EYE PROTECTION DEVICES

6.1 Lenses of EPD's shall comply with the following requirements:

6.1.1 Lenses shall be made of material suitable for ophthalmic use, and shall be free from striae, waves, bubbles, or any other defects which may impair their optical quality.

6.1.2 The prismatic effect of a non-corrective lens shall not exceed ¼ diopter at any point within the specified minimum field of vision. In the case of eye glasses, each non-corrective lens shall comply with the limitation of prismatic effect.

6.1.3 In any meridian, the refractive power of a non-corrective lens shall not exceed plus or minus ¼ diopter and the difference between the refractive powers in any two meridians shall not exceed ¼ diopter.

6.1.4 The definition afforded by a non-corrective lens shall be such that a line pattern with lines separated not more than 24 seconds of angle shall be clearly distinguishable when viewed through the lens.

6.1.5 The compliance of a lens with the prismatic effects, refractive power, and definition requirements of 6.1.2, 6.1.3, and 6.1.4 hereinabove, shall be determined in accordance with those test methods described in Sections 6.3.4.1.1, 6.3.4.1.2, and 6.3.4.1.3 of the American National Standards Institute Standard Z87.1 1979, "Practice for Occupational and Educational Eye and Face Protection," and explained in Section 10.1 on the National Bureau of Standards Circular 374, "Method for Determining the Resolving Power of Photographic Lenses." In order to maintain consistency in the results of tests conducted by various organizations, the following test requirements must be met:

(A) An 8-power telescope with focusing arrangement to accommodate the refractive effects of both positive (converging) and negative (diverging) lenses placed between the telescope and test chart shall be used. The illuminated target and test chart shall be a central dot and a concentric circle one inch in diameter plus one of the high contrast ("black and white") NBS resolution Test Charts dated 1952 and printed on "Lens Resolution Charts to Accompany NBS Circular 374." The chart shall be perpendicularly aligned 35 feet from the objective lens of the telescope when the telescope is properly focused with no test, sample, or other lens between the objective lens and the chart. The center dot and the periphery of the concentric circle one inch in diameter shall be used when testing for prismatic effect. The test pattern marked "20" shall be used when testing for refractive power and when testing for definition. Standard lenses of plus or minus 1/4 diopter shall be used when testing for refractive power.

(B) Other standard methods of test or examination that are equivalent or superior, as regards to accuracy, quality, and consistency of results, to the above specified National Bureau of Standards methods, may be used to determine compliance only when such methods are approved by the State official to whom such approving authority has been assigned, or delegated, through due process of applicable state law.

6.2 Minimum Horizontal Field of Vision — Except as provided in 6.2.1 below, each EPD shall not obstruct a horizontal field of vision to at least 105 degrees to the right side of the sagittal plane that passes through the pupil of the right eye, and at least 105 degrees to the left side of the sagittal plane that passes through the pupil of the left eye.

6.2.1 The specified minimum horizontal field of vision shall be unobstructed except that the horizontal field provided by spectacles or sunglasses may be obstructed by the frame in a sector no greater than 7½ degrees in horizontal angular width and located between 50 degrees and 80 degrees of the pertinent sagittal plane passing through the eye pupil.

6.2.2 When ascertaining the horizontal field of vision afforded by eye glasses, the pupil of the eye shall be assumed to be located 17 millimeters behind the point on the rear surface of the lens where the horizontal and vertical diameters intersect. When ascertaining the horizontal field of vision of EPD's other than eye glasses, the assumed location of the pupil of the eye relative to the structures of the EPD shall be that location which is most likely to occur when the EPD is attached and worn in accordance with its manufacturer's instructions.

6.2.3 No portion of the minimum horizontal field of vision shall be obstructed by a temple piece, headband, helmet, helmet attaching device, or any other supporting or attaching device.

7. LIGHT TRANSMITTANCE OF EYE PROTECTION DEVICES

7.1 **CLEAR** — A clear EPD is a device which transmits not less than 85% of the incident visible radiation.

7.2 **TINTED** — A tinted EPD is a device which transmits less than 85% of the incident visible radiation but no less than 20%.

7.2.1 A tinted EPD shall not impair the wearer's ability to discern color.

7.2.2 A tinted EPD shall not be used at night.

7.3 Luminous transmittance test

(A) Clear EPD: The standard source of all radiant energy used in the measurements of luminous transmittance shall be a projection-type No. T-8 (or other high-powered gas filled tungsten filament incandescent lamp) operated at the color temperature corresponding to CIE Source A.

(B) Tinted EPD: The standard source of all radiant energy used in the measurement of luminous transmittance for tinted EPD'S shall be CIE source C.

7.4 The luminous transmittance of both clear and tinted EPD's shall be determined by one of the following means and by utilizing the applicable light source:

7.4.1 Photometrically by an observer having normal color vision, as determined by recognized color vision chart tests such as those employing pseudo-isochromatic plates.

7.4.2 With a physical photometer consisting of a thermopile (or other radiometer) and a luminosity solution having a special transmittance curve which coincides closely with the luminous efficiency curve of the average eye.

7.4.3 By measuring the spectral transmittance and calculating the luminous transmittance through the use of published data on the spectral radiant energy of CIE Source A for clear EPD's and CIE Source C for tinted EPD's and the relative luminous efficiency of the average eye.

8. LENS STRENGTH-TESTING PROCEDURE FOR EYE PROTECTION DEVICES

8.1 Helmet mounted face shields shall be tested while attached to a helmet and mounted on a human head form as herein defined. An EPD not designed to be attached to a helmet shall be tested on the same type of head form and shall be located in a position simulating its position in actual use.

8.2 The human head form used for testing both the helmet mounted face shield and the other EPD's herein defined shall be an "Anthropomorphic Head Assembly SA 150 M010" as defined in the National Highway Traffic Safety Administration's Standard

572, "Anthropomorphic Test Dummies." The head form needs to have only those features necessary to test EPD's which shall include size, facial features, and covering material.

8.3 A steel projectile $\frac{3}{8}$ " in diameter, weighing 1.56 ounces, approximately $2\frac{1}{2}$ " long with a conical point of 90° included angle, the point having a spherical radius no greater than .020" and a hardness of 60 (+10) on the Rockwell "C" scale, shall be freely dropped from a height of 14 feet above the EPD. The projectile may be guided, but not restricted, in its vertical fall by dropping it through a tube extending to within approximately 4" of the impact area. The impact area must be on the forward optical surface and within a 1" diameter circle centered over the eye opening. The impact point shall be perpendicular to a plane tangent to the impact area.

8.4 Cracking and piercing of the EPD is permissible provided that the projectile does not pass through or remain lodged in the lens, but is repulsed by the EPD. No lens shall become dislodged nor shall any particles of the EPD break loose from any eyeward surface of the EPD.

8.5 Tests shall be performed at EPD temperatures of 0° and 110°F . Tests shall be performed at 10% and 90% relative humidities for all temperatures in excess of 70°F . The EPD shall be conditioned in the specified environment for a minimum of 4 hours, removed, and tested within 5 seconds.

9. FLAMMABILITY TEST — PLASTICS ONLY

9.1 Where plastic materials are used in an EPD, such materials shall be non-combustible or slow-burning. Such plastic items shall be exposed to a test to determine the flame-propagation rate. The specimen shall be ignited by holding one end of specimen horizontally at the top of a luminous $\frac{3}{4}$ " Bunsen burner flame in a draft-free room. The rate of propagation of burning, after removing the flame from the specimen, determined by a stopwatch, shall be 1" or less per 20 seconds. A faster rate of propagation shall be cause for rejection.

10. CARE AND CLEANSING

10.1 All EPD materials shall be such as to withstand, without visible deterioration, washing in ordinary household detergents and

warm water, and rinsing to remove visible traces of detergents. The manufacturer shall provide with each EPD a notice setting forth proper care and cleansing instructions.

11. IDENTIFICATION AND LABELING

11.1 Eye protection devices, manufactured to comply with the requirements of this regulation, shall be identified and labeled as follows:

11.1.1 The following information shall be permanently marked on the structure and on each lens of the EPD in a manner not to interfere with the vision of the wearer:

(A) That the device meets this regulation, i.e., VESC-8. Where space is limited, V-8 may be used in lieu of VESC-8.

(B) The manufacturer's or distributor's trade name and model name or number, which shall correspond with the name and number under which the device has been approved or certified. On a lens itself, the manufacturer's identifying monogram or symbol shall be sufficient.

(C) On a tinted EPD, the wording "day use only" shall appear.

11.1.2 The information required under 11.1.1 plus the corporate or business name and address of either the actual manufacturer or the marketer assuming the responsibilities of the manufacturer shall be imprinted on the container in which the EPD is packed and on any instruction sheet(s) pertaining to the EPD.

11.2 The following statement shall appear in a prominent location on the container or label accompanying each tinted eye protection device: This tinted eye protection device is for daytime use only. Words of equivalent meaning may be substituted.

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