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Personal eye protectors

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Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee, as the result of proposal for revision of Japanese Industrial Standard submitted by Japan Safety Appliances Association (JSAA)/Japanese Standards Association (JSA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14. Consequently **JIS T 8147 : 1994** is replaced with this Standard.

In order to conform to the International Standards, this revision has been prepared based on **ISO 4007 : 1977** *Personal eye-protectors—Vocabulary*, **ISO 4849 : 1981** *Personal eye-protectors—Specifications*, **ISO 4854 : 1981** *Personal eye-protectors—Optical test methods* and **ISO 4855 : 1981** *Personal eye-protectors—Non-optical test methods*.

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In the event of any doubts arising as to the contents,
the original JIS is to be the final authority.

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Personal eye protectors

Introduction This Japanese Industrial Standard has been prepared based on the International Standards shown in Remarks 2 of clause 1 Scope with some modifications of the technical contents.

In addition, the portions with sidelines or dotted underlines in this Standard are matters which are specified by altering the original International Standards. A list of modifications with their explanations is shown in Annex (informative).

1 Scope This Standard specifies the personal eye-protectors (hereafter referred to as “eye-protectors”) to protect the eyes of workers from airborne dust, chemical droplets, flying objects, etc. and the replacement lens and eyepiece.

Remarks 1 Personal eye-protectors for shading and refraction correction shall not apply.

2 The corresponding International Standards to this Standard are as follows:

In addition, symbols which denote the degree of correspondence in the contents between the relevant International Standards and JIS are IDT (identical), MOD (modified), and NEQ (not equivalent) according to **ISO/IEC Guide 21**.

ISO 4007 : 1977 *Personal eye-protectors—Vocabulary* (MOD)

ISO 4849 : 1981 *Personal eye-protectors—Specifications* (MOD)

ISO 4854 : 1981 *Personal eye-protectors—Optical test methods* (MOD)

ISO 4855 : 1981 *Personal eye-protectors—Non-optical test methods* (MOD)

2 Normative references The following standards contain provisions which, through reference in this Standard, constitute provisions of this Standard. If the indication of the year of coming into effect is given to these normative references, only the edition of indicated year constitutes the provision of this Standard, but the revision and amendment made thereafter do not apply. The normative references without the indication of the year of coming into effect apply limiting only to the most recent edition (including amendments).

JIS B 1501 : 1988 *Steel balls for ball bearings*

JIS B 7183 : 1995 *Lens-meters*

JIS B 7538 : 1992 *Autocollimators*

JIS G 3452 : 1997 *Carbon steel pipes for ordinary piping*

JIS G 3505 : 1996 *Low carbon steel wire rods*

JIS K 6380 : 1999 *Rubber packing material*

JIS R 6111 : 2002 *Artificial abrasives*

JIS Z 8720 : 2000 *Standard illuminants and sources for colorimetry*

JIS Z 8801-1 : 2000 *Test sieves—Part 1 : Test sieves of metal wire cloth*

3 Definitions For the purposes of this Standard, the following definitions shall apply:

- a) **ocular** A generic name of the part of the eye-protector through which the wearer sees (for example, lens, plate, etc.).
- b) **spectacle type** An eye-protector of which the oculars are mounted in a spectacle-type frame (with or without side shields).
- c) **front type** A type having construction capable of being fixed in front of the spectacle type.
- d) **goggle type** An eye-protector fitted with a single or two separate oculars designed to enclose the orbital area (these types are usually held in position by a headband).
- e) **eyepiece** An ocular used for goggle type.
- f) **replacement lens and eyepiece** A replacement lens and eyepiece complying with this Standard, and used for eye-protectors designated by the manufacturer.
- g) **frame** A frame holding lens and eyepiece.
- h) **headband** An elasticated band for fixing a goggle on the face stably.
- i) **prismatic power** Hundred times the ratio of the apparent displacement of an object by an optical system to the distance of the object.
Information : Formerly, prismatic power was expressed in “prism diopetre” or “prism diopter (ΔD)”.
1 diopter = 1 cm/m
- j) **refractive power** The reciprocal of the focal length of an optical system. It is expressed in reciprocal metres (m^{-1}).
Information : Formerly, this unit was called “diopetre” or “diopter (D)”.
- k) **astigmatic power** The maximum refractive power difference between two meridians perpendicular to each other and to the sighting axis. It is expressed in reciprocal metres (m^{-1}).
- l) **luminous transmittance** The ratio of the luminous flux transmitted by the filter to the incident luminous flux. In order to calculate this, the spectral luminous efficiency $V(\lambda)$ must be introduced.

$$T_V = \frac{\int_{380\text{ nm}}^{780\text{ nm}} P_{e\lambda} T(\lambda) V(\lambda) d\lambda}{\int_{380\text{ nm}}^{780\text{ nm}} P_{e\lambda} V(\lambda) d\lambda}$$

- m) **standard illuminant A** Standard illuminant A specified in JIS Z 8720.

4 Kind, type and symbol The kind, type and symbol of eye-protectors shall be as shown in Table 1 (see Fig. 1).

Table 1 Kind, type and symbol of eye-protectors

Finished product			Replacement lens and eyepiece
Kind	Type	Symbol	Symbol
Spectacle type	Single lens type	HA-1	HAK-1
	Twin lens type	HA-2	HAK-2
Front type	Single lens type	HB-1	HBK-1
	Twin lens type	HB-2	HBK-2
Goggle type	Single lens type	HC-1	HCK-1
	Twin lens type	HC-2	HCK-2

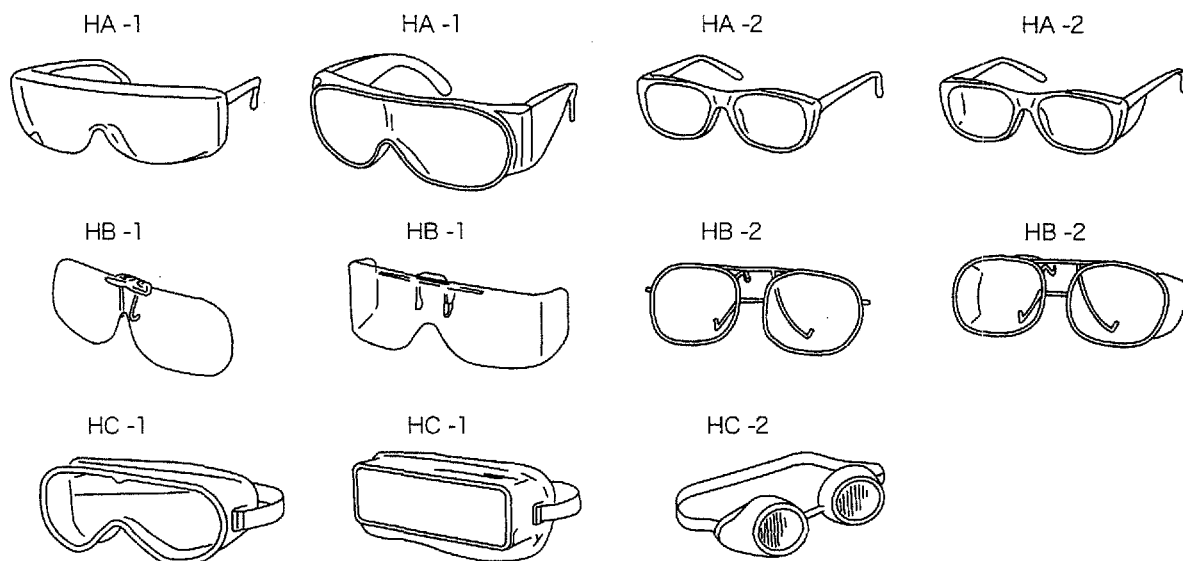
Remarks : The symbols in Table 1 shall be as follows.

H: Brevity code for eye-protector

A, B, C: Brevity code for kind

1: Brevity code for single lens

2: Brevity code for twin lens

**Fig. 1 Kind and type of eye-protectors (example)**

5 Quality

5.1 Lens and eyepiece

- a) **Appearance** Abnormalities shall not be observed when the test for appearance is performed in accordance with the method specified in 8.1 a).
- b) **Optical properties** Optical properties shall be as follows:
 - 1) **Prismatic power** The prismatic power shall be not more than 0.16 cm/m when the test is performed in accordance with the method specified in 8.1 b) 1).

- 2) **Refractive power** The refractive power shall be $0 \text{ m}^{-1} \pm 0.12 \text{ m}^{-1}$ at any meridian when the test is performed in accordance with the method specified in 8.1 b) 2).
- 3) **Astigmatic power** The refractive power shall be measured in at least four points (randomly chosen, one point of which is the centre) of the surrounding range of 40 mm in diameter about the geometric centre. The difference of refractive power shall be not more than 0.12 m^{-1} between any two meridians.
- c) **Luminous transmittance** The luminous transmittance shall be not less than 85 % when the test is performed in accordance with the method specified in 8.1 c).
- d) **Shock resistance** The steel ball shall not pass through the filter lens or cause the lens to crack into two or more pieces when the test is performed in accordance with the method specified in 8.1 d).
- e) **Surface friction resistance** The surface friction resistance of plastic lens shall be not more than 8 % when the test is performed in accordance with the method specified in 8.1 e).
- f) **Stability at elevated temperature** Apparent deformation shall not be observed when the test is performed in accordance with the method specified in 8.1 f). After the test, optical properties shall conform to the requirement specified in 5.1 b).

5.2 Resistance to corrosion A metal section shall have no corrosion when the test is performed in accordance with the method specified in 8.2.

5.3 Ignition Parts of each section of an eye-protector shall not continue to burn in flames when the test is performed in accordance with the method specified in 8.3. However, a cushion portion used for the face seal section of a goggle type shall be excluded.

5.4 Finished product

- a) **Appearance** Eye-protectors shall have no flaws, cracks, soiling, etc. which are detrimental to use, and each section shall be perfectly assembled when the test is performed in accordance with the method specified in 8.4 a).
- b) **Shock resistance** Edges of lens or of eyepiece shall not get chipped or detached from a frame when the test is performed in accordance with the method specified in 8.4 b).
- c) **Holding characteristics of spectacle type eye-protectors** A lens shall not slip off from a frame trench due to deflection of a frame when the test is performed in accordance with the method specified in 8.4 c).
- d) **Strength of headband attached section** For the goggle type eye-protectors, no fissure, breakage, detachment, etc. shall be observed when the test is performed in accordance with the method specified in 8.4 d).

- e) **Suitability for disinfection** All parts of eye-protectors shall be capable of withstanding disinfection without visible damage when the test is performed in accordance with the method specified in 8.4 e) or the manufacturer's method.

6 Construction The construction of eye-protectors shall meet each of the following requirements:

- a) Eye-protectors shall be easily handled and shall not be damaged easily.
- b) When wearing, particular discomfort shall not be experienced.
- c) A wearer's action shall not be notably obstructed.
- d) There shall be no acute angle or any unevenness that could cause a cut or graze when being worn.
- e) Each section of eye-protectors shall be easily exchangeable.

7 Material The material used for each section of eye-protectors shall satisfy the following conditions except for a lens and a eyepiece.

- a) The material used for the portion in contact with the skin shall not have harmful effects on the skin.
- b) Strength, elasticity, etc. shall be suitable for use.

8 Test

8.1 Test for lens and eyepiece For the lens and eyepiece, the following test shall be performed.

- a) **Test for appearance** Except for a marginal area 5 mm wide, filters for eye-protectors shall be free from any significant defects likely to impair vision in use, such as bubbles, scratches, dull spots, striae, inclusions, holes, mould marks, scoring or other defects originating from the manufacturing process when the test is performed by a visual inspection.

b) **Optical properties**

- 1) **Test for prismatic power** The prismatic power shall be examined by any method of an autocollimator system, a radian system or a telescope method.

- 1.1) **Telescope method 1** Perform the measurement using a telescope with the lens under test located just before the object lens so as to be at right angles with the optical axis (see Fig. 2).

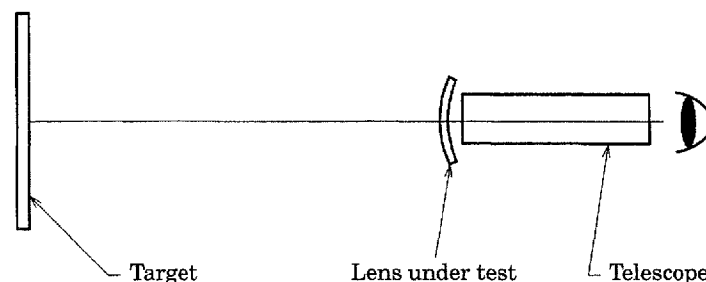


Fig. 2 Telescope method 1 (example)