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TEST REPORT

Date: Aug 19th, 2013 **Report:** 908772
Issue: 1

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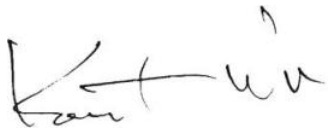
Test: ANSI Z87.1-2010 Section 5~7 (General, Impact Protector & Optical Radiation Protector Requirements)

Models:
Sample A (SG-12C) – Slate Gray frame/temples, with Clear-HC lens
Sample B (SG-12G) – Slate Gray frame/temples, with Gray-HC lens
Sample C (SG-12A) – Slate Gray frame/temples, with Amber-HC lens
Sample D (SG-12 I/O) – Slate Gray frame/temples, with I/O Mirror –UV400 lens
Sample E (SG-12M) – Slate Gray frame/temples, with Silver Mirror-HC lens
Sample F (SG-12C-AF) – Slate Gray frame/temples, with Clear-AF lens
Sample G (SG-12G-AF) – Slate Gray frame/temples, with Gray-AF lens

Respectfully submitted,



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5.1.1Optical Quality

When tested in accordance with Section 9.1, protector lenses shall be free of striae, bubbles, waves, and other visible defects which would impair their optical quality.

PASS

5.1.2 Luminous Transmission

When tested in accordance with Section 9.2, clear lenses shall have a luminous transmission of not less than 85%.

	A	B	C	D	E	F	G	Result
Left eye	88.0%	21.3%	85.4%	52.5%	23.2%	88.7%	21.6%	PASS
Right eye	88.4%	21.9%	85.1%	51.9%	23.8%	88.9%	21.5%	PASS

5.1.3Haze

When tested in accordance with Section 9.3, Clear plano lenses shall not exhibit more than 3% haze.

	A	Result
Left eye	0.33%	PASS
Right eye	0.29%	PASS

5.1.4
Refractive Power

When tested in accordance with section 9.4, the tolerance on refractive power, astigmatism and resolving power shall be as indicated in any meridian, shall not exceed +/- 0.06 D. The maximum astigmatism (the absolute difference in power measured in the two extreme meridians) shall not exceed 0.06D.

When tested in accordance with Section 9.4, the tolerance on refractive power, astigmatism and resolving power shall be as indicated in Table 1.Filter lenses of shade 9 or higher are exempt from this testing. When tested in accordance with Section 9.5, the tolerance on prism and prism imbalance shall be as indicated in Table 2.

	A	B	C	D	E	F	G	Result
Refractive Left	0.01	0	0.01	0	0	0	0	PASS
Refractive Right	0	0	0	0	0	0	0	PASS
Max Astigmatism Left	0	0	0	0	0	0	0	PASS
Max Astigmatism Right	0	0	0	0	0	0	0	PASS

Resolving Power

Lens shall be tested for resolving power in accordance with section 9.4, all lines in both orientations of NBS Pattern 20 shall be clearly resolved.

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	A	B	C	D	E	F	G	Result
Left	20	20	20	20	20	20	20	PASS
Right	20	20	20	20	20	20	20	PASS

Prism and Prism Imbalance

Complete devices shall be tested in accordance with section 9.5, the prismatic power shall not exceed 0.50 △ in any direction. Vertical prism imbalance shall not exceed 0.25 △, and horizontal prism imbalance shall not exceed 0.25 △ "Base In" or 0.50 △ "Base Out".

	A	B	C	D	E	F	G	Result
Complete Prism	0.15	0.10	0.05	0.10	0.05	0.10	0.10	PASS
Vertical Imbalance	0.05	0	0	0	0.02	0.10	0	PASS
Horizontal Imbalance In/Out	0.05 out	0.02 out	0	0	0.07	0.05	0.05 out	PASS

5.2 Physical Requirements

Protectors shall be free from projections, sharp edges or other defects which are likely to cause discomfort or injury during use.

PASS

5.2.1Drop Ball Impact Resistance

When tested in accordance with Section 9.6, protector lenses shall not fracture when impacted by a 25.4 mm (1 in.) steel ball when dropped from a height of 127 cm (50 in.). Glass welding filter lenses shall be tested and used in conjunction with a safety plate in order to comply with the impact performance criteria.

Left eye sample A1, B1, C1, D1, E1, F1, G1	PASS
Left eye sample A2, B2, C2, D2, E2, F2, G2	PASS
Right eye sample A3, B3, C3, D3, E3, F3, G3	PASS
Right eye sample A4, B4, C4, D4, E4, F4, G4	PASS

5.2.3Ignition

When tested in accordance with section 9.7, protectors shall not ignite or continue to glow once the rod is removed. Each externally exposed material (exclusive of textiles or elastic bands) shall be tested.

PASS

5.2.4 Corrosion Resistance of Metal Components

When tested in accordance with Section 9.8, metal components used in protectors shall be corrosion resistant to the degree that the function of the protector shall not be impaired by the corrosion. Lenses and electrical components are excluded from these requirements.

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PASS

5.2.5 Minimum Coverage Area

The eyewire and lens shall cover in plane view an area of not less than 40 mm (1.57 in.) in width and 33 mm (1.30 in.) in height (elliptical) in front of each eye, centered on the geometrical center of the lens.Frames designed for small head sizes shall cover in plane view an area of not less than 34 mm (1.34 in.) in width and 28 mm (1.10 in.) in height (elliptical), centered on the geometrical center of the lens.Frames designed for small head sizes shall be tested on the 54 mm (2.13 in.) PD headform and are permitted to have an eye size, including eyewire thickness, as small as 34 x 28mm (1.34 x 1.10 in.). Frames that are tested using the small headform shall be marked on the frame with the letter "H."

PASS

5.4 Marking Requirements

All protectors shall bear the permanent markings in specified locations as shown in Table 4a. Markings shall follow the sequence shown in Table 4b. Markings for lens type and use application shall be required only when claims for protection against the hazard or indicated use are made by the manufacturer.

In addition, the components of frames that are intended for prescription protector use shall be marked for size in accordance with the system described in ANSI Z80.5-2004. Fronts shall be marked with the A-dimension (eye size) and DBL (distance between lenses). Temples shall be marked with their overall length.

Lens	Clear-HC:	Z87+ U6	PASS
	Smoke-HC:	Z87+ U6 L2.5	PASS
	Amber-HC:	Z87+ U6	PASS
	I/O Mirror-UV400:	Z87+ U6 L1.7	PASS
	Silver Mirror-HC:	Z87+ U6 L2.5	PASS
	Clear-AF:	Z87+ U6 AF	PASS
	Gray-AF:	Z87+ U6 L2.5 AF	PASS
Front		Z87+	PASS
Right Temple		Z87+ Vo	PASS
Left Temple		SG-12 EN166-F CE	PASS

6.1.3 Lateral (Side) Coverage

When tested in accordance with Section 9.10, impact rated protectors shall provide continuous lateral coverage (i.e. no openings greater than 1.5 mm (0.06 in.) in diameter) from the vertical plane of the lenses tangential to a point not less than 10 mm (0.394 in.) posterior to the corneal plane and not less than 10 mm (0.394 in.) in height (or 8 mm (0.315

in) for the smaller headform) above and not less than 10 mm (0.394 in.) in height (or 8 mm (0.315 in) for the smaller headform) below the horizontal plane centered on the eyes of the headform. The probe shall not contact the headform within the defined coverage area. (See Annex D).

PASS

6.2 Impact Requirements

6.2.2 High Mass Impact

When tested in accordance with Section 9.11, the complete device shall be capable of resisting an impact from a pointed projectile weighing 500 g (17.6 oz) dropped from a height of 127 cm (50.0 in).

Left eye sample A1, B1, C1, D1, E1, F1, G1	PASS
Left eye sample A2, B2, C2, D2, E2, F2, G2	PASS
Right eye sample A3, B3, C3, D3, E3, F3, G3	PASS
Right eye sample A4, B4, C4, D4, E4, F4,G4	PASS

6.2.3 High Velocity Impact

When tested in accordance with Section 9.12, the complete device shall be capable of resisting impact from a 6.35 mm (0.25 in) diameter steel ball traveling at a velocity of 45.7 m/s (150 ft/s). No contact with the eye of the headform is permitted as a result of impact.

Velocity (ft/s)

Impact Location	A	B	C	D	E	F	G	Result
Left eye 0° nasal	158	159	156	153	157	159	155	PASS
Left eye 30° temporal	154	158	155	156	156	158	158	PASS
Left eye 90° temporal +10 mm	156	159	----	----	157	----	----	PASS
Left eye 90° temporal -10 mm	----	----		155	----	158	157	PASS
Right eye 0° nasal	157	155	157	157	155	155	156	PASS
Right eye 30° temporal	156	158	154	156	155	157	155	PASS
Right eye 90° temporal +10 mm	----	----	152	156	----	156	158	PASS
Right eye 90° temporal -10 mm	159	157	----	-----	157	-----	-----	PASS

6.2.4 Penetration Test (lenses only)

When tested in accordance with Section 9.13, lenses for all complete devices shall be capable of resisting penetration by a weighted needle with a total weight of 44.2 gm (1.56 oz) dropped from a height of 127 cm (50.0 in).

PASS

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