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Laboratory #: 842636-20
Report Date: September 1, 2020
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Customer P.O. #: P0027286

Attention: Bradley Gavan
Specimen: #1. Medical Face Shield

TEST REPORT

One specimen protector was submitted for physical and optical requirements, droplet and splash hazards and measurement of adequate coverage to determine conformance with ANSI/ISEA Z87.1-2020 and CSA Z94.3-2020 standards.

PHYSICAL REQUIREMENTS - DROP-BALL & HIGH-MASS IMPACT

The specimen protector was tested for drop-ball impact resistance and high-mass impact in accordance with ANSI/ISEA Z87.1-2015, sections 9.6 and 9.11 respectively. Four specimens of the protector were tested by freely dropping both the 68-gram 1" diameter steel ball and the 500-gram 1" diameter projectile with conical tip from 50-inches, onto the left and right viewing areas of the face shields that were mounted to a medium sized EN 168 headform.

Requirement

As per ANSI/ISEA Z87.1-2020, section 5.2.1 and 7.1.4.1

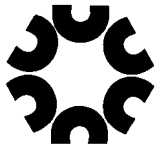
RESULTS

Drop-Ball Impact Resistance

Specimen #	Steel Ball Diameter (in)	Steel Ball Weight (g)	Drop Height (in)	Viewing Area	Fracture (Yes / No)	Detached /Rupture (Yes / No)	Projectile Penetration (Yes / No)	Lens Not Retained (Yes / No)	RESULT (Pass / Fail)
1-1	1.0	68	50	Left	No	No	No	No	Pass
1-2					No	No	No	No	
1-3				Right	No	No	No	No	
1-4					No	No	No	No	

When tested for drop-ball the protector was found to be free form projections or other defects likely to cause discomfort or injury during use.

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RESULTS (Continued)

High-Mass Impact

Specimen #	Steel Projectile Diameter (in)	Steel Projectile Weight (g)	Drop Height (in)	Viewing Area	Fracture (Yes / No)	Detached /Rupture (Yes / No)	Projectile Penetration (Yes / No)	Lens Not Retained (Yes / No)	RESULT (Pass / Fail)
1-5	1.0	500	50	Left	No	Yes	No	No	Fail
1-6					No	Yes	Yes	No	
1-7				Right	No	No	Yes	No	
1-8					No	No	No	No	

When tested for high-mass impact the protector was found to be free from projections, sharp edges or other defects likely to cause discomfort or injury during use.

PHYSICAL REQUIREMENTS - IGNITION

The specimen was tested for ignition resistance in accordance with ANSI/ISEA Z87.1-2020, sections 9.7. One material "Clear Protector Sheet" was tested by pressing a heated 6mm steel rod over 50mm of the material to a temperature of 650+/- 20°C for 5.0+/- .05 second.

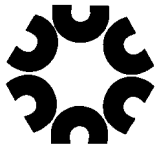
Requirement

As per ANSI/ISEA Z87.1-2020, section 5.2.2, no ignite or continue to glow once rod is removed.

RESULTS

Ignition

Specimen #	Ignite (Yes / No)	Continue to Glow (Yes / No)	RESULT (Pass / Fail)
1-13	No	No	Pass



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OPTICAL REQUIREMENTS – HAZE AND LUMINOUS TRANSMITTANCE

The submitted sample was tested to determine the total luminous transmittance in accordance with ANSI/ISEA Z87.1-2020, Section 9.2, the regular luminous transmittance in accordance with CSA Z94.3:20, Section 12.8.5 and the haze in accordance with ANSI/ISEA Z87.1-2020, Section 9.3 and CSA Z94.3:20, Section 12.7. All testing was also performed in accordance with ASTM D1003-13 Procedure B.

Transmittance haze was measured using CIE XYZ colour scale, 2° observer angle and Illuminant A. The geometry used was diffuse illumination with unidirectional viewing. The sample had a nominal thickness of 0.53 mm. The specimens were conditioned for a minimum of 40 hours at 23 ± 2°C and 50 ± 10% R.H. prior to testing. Testing was performed immediately after removal from the conditioning chamber.

Requirement

ANSI/ISEA Z87.1-2020 Section 5.1.2 Requirement: When tested in accordance with Section 9.2, clear lenses shall have a luminous transmittance of not less than 85%.

CSA Z94.3:20, Section 6.4.6 Requirement: The luminous transmittance of clear zero-power lenses shall be not less than 85% when tested in accordance with clause 12.8.5.

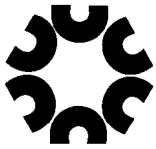
ANSI/ISEA Z87.1-2020 Section 5.1.3 Requirement: When tested in accordance with Section 9.3, clear plano lenses shall not exhibit more than 3% haze.

CSA Z94.3:20, Section 6.4.5.2 Requirement: At the primary line of sight a new clear zero-power lens intended for use in a Class 6 protector, the haze shall not exceed 3% when tested in accordance with clause 12.7.

RESULTS

Luminous Transmittance & Haze

Specimen #	Total Luminous Transmittance ANSI/ISEA Z87.1-2020 section 5.1.2 (%)	Regular Luminous Transmittance CSA Z94.3-2020 section 6.4.6 (%)	Haze ANSI/ISEA Z87.1-2020 section 5.1.3 and CSA Z94.3-2020 section 6.4.5.2 (%)
1-9	89.8	89.6	1.2
1-10	89.7	89.5	1.2
1-11	89.8	89.7	1.2
RESULT (Pass / Fail)	Pass	Pass	Pass



DROPLET AND SPLASH HAZARD

The specimen protector was tested in accordance with ANSI/ISEA Z87.1-2020, section 9.17.2 for droplet and splash hazard. The specimens of protector were mounted to a medium sizes EN 168 headform that was fastened to a stage that allows at least 45° rotation about the horizontal axis, and at least 90° rotation left and right around a vertical axis. The protectors were mounted with lower part of headband located 1-inch above the center point of the eye (above the brow). A laser beam was projected at all the accessible points within the eye-region rectangle when the headform was set to the following positions:

1. Headform facing forward and rotated 45°±1° forward about the horizontal axis.
2. Headform facing forward and rotated 45°±1° backward about the horizontal axis.
3. Headform rotated 90°+1° to the left about the vertical axis, and rotated 45°±1° forward about the horizontal axis.
4. Headform rotated 90°+1° to the left about the vertical axis, and rotated 45°±1° backward about the horizontal axis.
5. Headform rotated 90°+1° to the right about the vertical axis, and rotated 45°±1° forward about the horizontal axis.
6. Headform rotated 90°+1° to the right about the vertical axis, and rotated 45°±1° backward about the horizontal axis.

Observations were recorded whether the beam had been intercepted by the face shield before making contact with any point on the eye-region rectangle. A failure was recorded when any location where laser beam contacted the rectangle without first being intercepted by the face shield.

Requirement

ANSI/ISEA Z87.1-2020, section 7.3.2, the laser beam shall not make direct contact with any point on the eye-region rectangle without first being intercepted by the faceshield.

CSA Z94.3-2020, section 10.2.2, the window shall be designed to fit the contour of the window support and to completely cover the eye area from direct exposure.

RESULTS

Specimen #	Position	Intercept with Face shield (Yes / No)	RESULT (Pass / Fail)
1-12	1	Yes	Pass
	2	Yes	
	3	Yes	
	4	Yes	
	5	Yes	
	6	Yes	



ADEQUATE COVERAGE

The specimen protectors were submitted for measurement of adequate coverage to determine conformance with ANSI/ISEA Z87.1-2020, section 5.2.4 and CSA Z94.3-2020, sections 10.2.1, 10.2.2, 10.3 and 10.4.

RESULTS

ANSI/ISEA Z87.1-2020

For section 5.2.4 the window of the specimen cover in plain 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 pupil centers of the test headform.

CSA Z94.3-2020

For section 10.2.1 the window of the specimen covers a trapezoid measuring 150 mm high, 240 mm wide at the top and 220 mm wide at the bottom.

For section 10.2.2 the window of the specimen fit the contour of the window support completely covering the eye area from direct exposure due to the droplet and splash hazard test.

Sections 10.3 and 10.4 do not apply to this specimen.