



Test Report T14398-01-1 Issue 1
ANSI/ISEA Z87.1-2015

CF614 (Clear PC Windows with and without Aluminum Frame)
and Mesh Visors on C1 Crowns
12 March 2020



Approved by:

A handwritten signature in blue ink, reading "Keith E. Whitten".

Keith E. Whitten
Laboratory Manager

Prepared by:

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Cathy Wołoszyn
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Objective:

Contract testing to ANSI/ISEA Z87.1-2015 “American National Standard for Occupational and Educational Personal Eye and Face Protection Devices”.

Clause(s): 5. General Requirements
-excluding Markings
6. Impact Protector Requirements - *Clear PC Windows Only*

Samples:

Faceshields

Part Number	Description	Quantity	Sample ID
CF612	Clear PC Window with Aluminum Frame	12	8A
CF612	Clear PC Window	10	8B
C1	Crown	33	-
-	Mesh Visors	10	8C

Date(s) submitted: 25 February 2020

Procedures:

Testing protocols in accord with good laboratory practice were employed for all tests.

All tests were conducted in a standard laboratory atmosphere unless otherwise specified.

Samples were randomly selected from the quantity provided and tested in the as-received condition unless otherwise stated.

Testing procedures as specified within Section 9 of ANSI/ISEA Z87.1-2015 were followed unless noted in results.

When applicable, samples were assessed on medium headform (64mm PD).

Assessment Summary:

Date(s) tested: 09 through 10 March 2020

Mesh Visor samples as assessed meet the requirements of ANSI/ISEA Z87.1-2015 for Standard (Non-Impact Rated) Faceshields.

Clear PC Window samples as assessed meet the requirements of ANSI/ISEA Z87.1-2015 for an Impact Rated Faceshields.

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Assessment Summary (Continued):

ANSI/ISEA Z87.1-2015 Requirements	Compliant	Non-Compliant
5. General Requirements		
5.1 Optical Requirements		
5.1.1 Optical Quality	X	
5.1.2 Luminous Transmission (Clear Lenses)	X	
5.1.3 Haze - Clear Lenses Only	X	
5.1.4 Refractive Power, Astigmatism, Resolving Power, Prism and Prism Imbalance for Plano Protectors	X	
5.1.5 Refractive Power, Astigmatism, Prism and Prism Imbalance for Prescription Protectors and Magnifiers	Not applicable	
5.2 Physical Requirements	X	
5.2.1 Drop Ball Impact Resistance - <i>Mesh Visor</i>	X	
5.2.2 Ignition	X	
5.2.3 Corrosion Resistance of Metal Components	Not applicable	
5.2.4 Minimum Coverage Area	X	
5.3 Markings	Excluded	
5.4 Other Requirements	Not applicable	
5.5 Replaceable Lenses	Not applicable	
5.6 Aftermarket Components and Accessories	Not applicable	
6. Impact-Rated Protector Requirements - <i>PC Windows</i>		
6.1 General		
6.1.1 Protectors Marked for Impact Protection		
6.1.2 Frames and Shells	See 6.2.2 and 6.2.3	
6.1.3 Lateral (Side) Coverage	X	
6.2 Impact Requirements		
6.2.1 Protector Acceptance Criteria		
6.2.2 High Mass Impact	X	
6.2.3 High Velocity Impact	X	
6.2.4 Penetration Test (Lens Only)	X	
6.2.5 Prescription Lens Material Qualification	Not applicable	
6.2.6 Prescription Lens Mounting Qualification	Not applicable	
6.2.7 Devices with Lift Fronts	Not applicable	

Results:

5.1.1 Optical Quality; Result: Pass

PC Windows are free of striae, bubbles, waves and other visible defects which would impair their optical quality.

5.1.2 Luminous Transmittance (T_v) - ILLA (Clear Lenses)

Sample ID	Left (%)	Right (%)	Left/Right	Pass	Fail
8A-2	91.0	90.7	1.003	X	
Requirement:	$100 \geq T_L \geq 85$		N/A		

5.1.3 Haze - Clear Lens Only

Sample ID	Left (%)	Right (%)	Pass	Fail
8A-2	0.19	0.27	X	
Requirement:	≤ 3			

Measured relative to Illuminate A.

5.1.4 Refractive Power, Astigmatism, Resolving Power, Prism and Prism Imbalance for Plano Protectors

Refractive Power & Astigmatism - Faceshields are exempt

Resolving Power

Sample ID	Pattern Resolved (Yes/No)		Pass	Fail
	Left	Right		
8A-1	Yes	Yes	X	
Requirement:	Resolve Pattern 20			

Tested in a simulated as worn position using a 7mm aperture.

Prism and Prism Imbalance

Fish and Fish Imbalance						
Sample ID	Prismatic Power (cm/m)		Vertical Imbalance(cm/m)	Horizontal Imbalance(cm/m)	Pass	Fail
	Left	Right				
PC Window with Aluminum Frame						
8A-1	0.10	0.07	<0.05	0.23 Base Out	X	
PC Window						
8B-1	0.14	0.13	<0.05	0.23 Base Out	X	
Requirement:	≤ 0.37		≤ 0.37	Base Out ≤ 0.75 Base In ≤ 0.125		

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5.2 **Physical Requirements; Results: Pass**

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

5.2.1 **Drop Ball Impact Resistance**

-Mesh Visor

Sample ID	Location	Pass	Fail
8C-7	Left	X	
8C-8	Right	X	
8C-9	Left	X	
8C-10	Right	X	
Protector shall fail if any of the following occur:			
• lens (lens only) fractures • piece fully detached from the inner surface • projectile penetrates the inner surface • lens not retained			

-PC Windows

Exempt; protectors meeting the requirements of 6.2 are exempt from drop ball impact testing

5.2.2 **Ignition; Results: Pass**

Components tested (PC Windows, Mesh Visor and Frame, Headgear (Knob, Ratchet Knob, Ratchet Housing), Sweatband and Crown) did not ignite or continue to glow once the rod is removed.

5.2.4 **Minimum Coverage Area; Result: Pass**

The frames, lens housings or carriers and lens(es) 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.

6.1.1 Protectors Marked for Impact Protection

Protectors and replaceable components marked for impact protection in accordance with Table 3 shall meet applicable requirements of Section 6.

6.1.2 Frames and Shells

Frames and shells shall meet the requirements for high mass impact and high velocity impact in order to be impact-rated. These components shall be tested as a complete device. For frames and shells to be used with prescription lenses, they shall be fitted with representative test lenses having a nominal plano power and the minimum lens thickness to be used by the manufacturer, in no case less than 2.0mm (0.079in). Frames and shells are exempt from the penetration requirement.

6.1.3 Lateral (Side) Coverage; Result: Pass

When mounted on the medium headform protectors provide continuous lateral coverage (i.e. no openings greater than 1.5mm (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 above and not less than 10 mm (0.394in.) in height below the horizontal plane centered on the eyes of the headform. The probe does not contact the headform within the defined coverage area.

6.2.1 Protector Acceptance Criteria

When each type test is conducted as indicated in Sections 6.2.2, 6.2.3 and 6.2.4 and, as applicable Section 6.2.6, a complete device shall fail if any of the following occurs:

- any part, fragment or material visible to the unaided eye becomes detached from the inner surface of any complete device, as determined by inspection of the device or of the contact paste;
- fracture;
- penetration of the inner surface either by the projectile passing completely through the lens, frame or housing component, or by rupture of the inner lens surface;
- lens not retained;
- for the high-velocity test, the unaided eye observes any piece adhering to the contact paste, or observes contact paste on the projectile or complete device.

In the case of plano protectors with a prescription lens carrier, contact of the prescription lens carrier with the headform does not constitute a failure.

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6.2.2 High Mass Impact

Sample ID	Location	Pass	Fail
PC Window with Aluminum Frame			
8A-3	Right	X	
8A-4	Left	X	
8A-5	Right	X	
8A-6	Left	X	
PC Window			
8B-2	Right	X	
8B-3	Left	X	
8B-4	Right	X	
8B-5	Left	X	

6.2.3 High Velocity Impact

Sample ID	Location	Velocity (ft/sec)	Pass	Fail
PC Window with Aluminum Frame				
8A-7	Right 0°	303.0	X	
8A-8	Right 30°	302.4	X	
8A-9	Right 90° ↑ 10mm	303.0	X	
8A-10	Left 0°	303.0	X	
8A-11	Left 30°	302.8	X	
8A-12	Left 90° ↓ 10mm	303.2	X	
PC Window				
8B-6	Right 0°	300.6	X	
8B-7	Right 30°	302.4	X	
8B-8	Right 90° ↑ 10mm	302.5	X	
8B-9	Left 0°	303.2	X	
8B-10	Left 30°	302.8	X	
8B-11	Left 90° ↓ 10mm	302.9	X	

6.2.4 Penetration Test (Lenses Only)

Sample ID	Location	Pass	Fail
8A-3	Left	X	
8A-4	Right	X	
8A-5	Left	X	
8A-6	Right	X	

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Sample Photographs:



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