



Test Report T11573-01-1 Issue 1
ANSI/ISEA Z87.1-2015

EF18 Goggles
24 March 2017



Approved by:

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

Keith E. Whitten
Laboratory Manager

Prepared by:

A handwritten signature in blue ink, reading "Cathy Woloszyn".

Cathy Woloszyn
Lab Administrator

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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

Samples:

EF18 Goggles

Lens	Quantity	Sample ID
Clear	12	3A

Date(s) submitted: 15 March 2017

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).

Prismatic Power, Refractive Power, and Resolving Power are a function of lens geometry, not tint, therefore these tests were performed only on one tint variant of each lens type.

Assessment Summary:

Date(s) tested: 22 through 24 March 2017

Samples as assessed meet the requirements of ANSI/ISEA Z87.1-2015 for Impact Rated Goggles with Indirect Ventilation.

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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		Not applicable	
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		Not assessed	
5.4 Other Requirements			
5.4.1 Vented Goggles			
5.4.1.1 Direct Ventilation		Not applicable	
5.4.1.2 Indirect Ventilation		X	
5.4.2 Screen Windows and Screen Lenses		Not applicable	
5.4.3 Welding Protectors		Not applicable	
5.4.4 Frames for Removable Lenses		Not applicable	
5.4.5 Minimum Lens Thickness for Prescription Spectacles		Not applicable	
5.5 Replaceable Lenses		Not applicable	
5.6 Aftermarket Components and Accessories		Not applicable	
6. Impact-Rated Protector Requirements			
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	

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Results:

5.1.1 Optical Quality; Result: Pass

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

5.1.2 Luminous Transmission (Clear Lenses)

Sample ID	Left (%)	Right (%)	Left/Right	Pass	Fail
3A-2	91.5	91.2	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
3A-2	0.23	0.21	X	
Requirement:	≤ 3			

Illuminate C used instead of Illuminate A.

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

Refractive Power & Astigmatism

Sample ID	Left (m^{-1})		Right (m^{-1})		Pass	Fail
	Refractive Power	Astigmatism	Refractive Power	Astigmatism		
3A-1	-0.02	0.02	-0.03	0.03	X	
Requirement:	+/- 0.06	≤ 0.06	+/- 0.06	≤ 0.06		

Tested in a simulated as worn position using a 19mm aperture.

Resolving Power

Sample ID	Left	Right	Pass	Fail
3A-1	20	20	X	
Requirement:	Pattern 20			

Tested in a simulated as worn position using a 19mm aperture.

Prism and Prism Imbalance

Sample ID	Prismatic Power (cm/m)		Vertical Imbalance(cm/m)	Horizontal Imbalance(cm/m)	Pass	Fail
	Left	Right				
3A-1	0.18	0.13	<0.05	0.21 Base Out	X	
Requirement:	≤ 0.25		≤ 0.125	Base Out ≤ 0.50 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

Protectors meeting the requirements of 6.2 are exempt from drop ball impact testing

5.2.2 Ignition; Result: Pass

Lens, Outtrigger, Strap Adjuster and Housing did not ignite or continue to glow once the rod was 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.

5.4.1.2 Indirect Ventilation; Result: Pass

Ventilation is considered to be indirect and there is no direct, straight-line passage from the exterior to the interior of the goggle.

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 an 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
3A-3	Right	X	
3A-4	Left	X	
3A-5	Right	X	
3A-6	Left	X	

6.2.3 High Velocity Impact

Sample ID	Location	Velocity (ft/sec)	Pass	Fail
3A-7	Right 0°	255	X	
3A-8	Right 30°	255	X	
3A-9	Right 90° ↑ 10mm	255	X	
3A-10	Left 0°	255	X	
3A-11	Left 30°	255	X	
3A-12	Left 90° ↓ 10mm	255	X	

6.2.4 Penetration Test (Lenses Only)

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

Sample Photograph:



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