Test Report: LIB-00798, Issue: 1

ANSI Z87.1-2020

LIBUS PPE

AVIATOR

October 25, 2023

ACCREDITED
Test Laboratory
Certificate # 1612.01

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Authorized By:

Jacob Gary
Director of Operations

Reviewed By:

Dale Payne
Technical Services Manager

Report Summary

Product Description: AVIATOR: Clear Lens and Transparent Grey Frame with Black and White Strap
Date Received: October 02, 2023
Date(s) Tested: October 18, 2023 to October 25, 2023
Standard: ANSI Z87.1-2020
Laboratory Conditions: 23°C, 50% RH

Final Conclusion:

The Goggle Sample: AVIATOR (Clear Lens and Transparent Grey Frame with Black and White Strap) does comply with ANSI Z87.1-2020 for the test(s) included in this report.

Test Name	Result
ANSI Z87.1-2020 Base Model General Requirements	
5.1.1 Optical Quality	**Pass**
5.1.2 Luminous Transmittance	**Pass**
5.1.3 Haze – Clear Lenses Only	**Pass**
5.1.4 Refractive/Resolving Power, Astigmatism	**Pass**
5.1.4 Prism/Prism Imbalance (Goggle)	**Pass**
5.2 Physical Requirements	**Pass**
5.2.2 Ignition	**Pass**
5.2.3 Corrosion Resistance of Metal Components	**N/A**
5.2.4 Minimum Coverage Area	**Pass**
5.3.2 Placement of Markings	**N/A**
5.4.1.1 Direct Ventilation	**N/A**
5.4.1.2 Indirect Ventilation	**Pass**
ANSI Z87.1-2020 Optional Claim (+)	
7.1.3 Lateral (Side) Coverage	**Pass**
7.1.4.2 High Mass Impact	**Pass**
7.1.4.3 High Velocity Impact	**Pass**
7.1.4.4 Penetration Test (lenses only)	**Pass**

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Test Results - LIB-00798-01/AVIATOR Clear Lens and Transparent Grey Frame with Black and White Strap

ANSI Z87.1-2020 Base Model General Requirements

5.1.1 Optical Quality

Test	Specification	Pass
Free of visible defects that impair vision		Pass

5.1.2 Luminous Transmittance

Test	Specification	Pass
Left Eye	Min: 85.00	89.9 (%)
Right Eye	Min: 85.00	89.9 (%)

5.1.3 Haze – Clear Lenses Only

Test	Specification	Pass
Left Eye	Max: 3.00	0.29 (%)
Right Eye	Max: 3.00	0.36 (%)

5.1.4 Refractive/Resolving Power, Astigmatism

Test	Specification	Pass
Refractive Power		Pass
Left Eye	-0.06/0.06	-0.030 (Diopters)
Right Eye	-0.06/0.06	-0.005 (Diopters)
Astigmatism		Pass
Left Eye	-0.06/0.06	0.06 (Diopters)
Right Eye	-0.06/0.06	0.05 (Diopters)
Resolving Power		Pass
Left Eye		Pass
Right Eye		Pass

5.1.4 Prism/Prism Imbalance (Goggle)

Test	Specification	Pass
Complete Prism		Pass
Left Eye	Max: 0.25	0.158 (Diopters)
Right Eye	Max: 0.25	0.180 (Diopters)
Prismatic Imbalance		Pass
Vertical	Max: 0.12	0.05 (Diopters)
Horizontal Base Out	Max: 0.50	0.30 (Diopters)

5.2 Physical Requirements

Test	Specification	Pass
Free of defects which may cause discomfort or injury		Pass

5.2.2 Ignition

Test	Specification	Pass
Lens		Pass
Frame		Pass
Strap Buckle		Pass

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Test Results - LIB-00798-01/AVIATOR Clear Lens and Transparent Grey Frame with Black and White Strap

Other		N/A

5.2.3 Corrosion Resistance of Metal Components

Test	Specification	**N/A**
Function of protector not impaired		N/A

5.2.4 Minimum Coverage Area

Test	Specification	**Pass**
40 x 33 mm (34 x 28 mm - H)		Pass

5.3.2 Placement of Markings

Test	Specification	**N/A**
Markings		N/A

5.4.1.1 Direct Ventilation

Test	Specification	**N/A**
1.5 mm spherical object excluded		N/A

5.4.1.2 Indirect Ventilation

Test	Specification	**Pass**
No direct straight-line passage		Pass

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Test Results - LIB-00798-01/AVIATOR Clear Lens and Transparent Grey Frame with Black and White Strap

ANSI Z87.1-2020 Optional Claim (+)

7.1.3 Lateral (Side) Coverage

Test	Specification	Pass
Lateral (Side) Coverage		Pass

7.1.4.2 High Mass Impact

Test	Specification	Pass
Left Eye Sample 1		Pass
Left Eye Sample 2		Pass
Right Eye Sample 3		Pass
Right Eye Sample 4		Pass

7.1.4.3 High Velocity Impact

Test	Specification	Pass
Left Eye Center	Min: 250.0	250 (fps)
Left Eye Center		Pass
Left Eye 30°	Min: 250.0	255 (fps)
Left Eye 30°		Pass
Right Eye Center	Min: 250.0	254 (fps)
Right Eye Center		Pass
Right Eye 30°	Min: 250.0	257 (fps)
Right Eye 30°		Pass
One Side 90° at 10mm Above (H - 8mm)	Min: 250.0	250 (fps)
One Side 90° at 10mm Above (H - 8mm)		Pass
Opposite Side 90° at 10mm Below (H - 8mm)	Min: 250.0	253 (fps)
Opposite Side 90° at 10mm Below (H - 8mm)		Pass

7.1.4.4 Penetration Test (lenses only)

Test	Specification	Pass
Left Eye Sample 1		Pass
Left Eye Sample 2		Pass
Right Eye Sample 3		Pass
Right Eye Sample 4		Pass

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Test Results - LIB-00798-01/AVIATOR Clear Lens and Transparent Grey Frame with Black and White Strap

Observations:

Test Name		Observation
5.3.2 Placement of Markings	Markings	Not assessed per customer request

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Report Summary

Product Description: AVIATOR: Smoke Lens and Transparent Grey Frame with Black and White Strap
Date Received: October 02, 2023
Date(s) Tested: October 18, 2023 to October 25, 2023
Standard: ANSI Z87.1-2020
Laboratory Conditions: 23°C, 50% RH

Final Conclusion:

The Goggle Sample: AVIATOR (Smoke Lens and Transparent Grey Frame with Black and White Strap) does comply with ANSI Z87.1-2020 for the test(s) included in this report.

Test Name	Result
ANSI Z87.1-2020 Variant General Requirements	
5.1.1 Optical Quality	**Pass**
5.1.4 Refractive/Resolving Power, Astigmatism	**Pass**
5.1.4 Prism/Prism Imbalance (Goggle)	**Pass**
5.2 Physical Requirements	**Pass**
5.2.2 Ignition	**Pass**
5.2.3 Corrosion Resistance of Metal Components	**N/A**
5.2.4 Minimum Coverage Area	**Pass**
5.3.2 Placement of Markings	**N/A**
5.4.1.1 Direct Ventilation	**N/A**
5.4.1.2 Indirect Ventilation	**Pass**
7.2.2.1.1 Special Purpose Filter Lenses - Transmission Requirements	**Pass**
ANSI Z87.1-2020 Optional Claim (+)	
7.1.3 Lateral (Side) Coverage	**Pass**
7.1.4.2 High Mass Impact	**Pass**
7.1.4.3 High Velocity Impact	**Pass**
7.1.4.4 Penetration Test (lenses only)	**Pass**

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Test Results - LIB-00798-02/AVIATOR Smoke Lens and Transparent Grey Frame with Black and White Strap

ANSI Z87.1-2020 Variant General Requirements

5.1.1 Optical Quality

Test	Specification	**Pass**
Free of visible defects that impair vision		Pass

5.1.4 Refractive/Resolving Power, Astigmatism

Test	Specification	**Pass**
Refractive Power		Pass
Left Eye	-0.06/0.06	-0.015 (Diopters)
Right Eye	-0.06/0.06	-0.015 (Diopters)
Astigmatism		Pass
Left Eye	-0.06/0.06	0.05 (Diopters)
Right Eye	-0.06/0.06	0.05 (Diopters)
Resolving Power		Pass
Left Eye		Pass
Right Eye		Pass

5.1.4 Prism/Prism Imbalance (Goggle)

Test	Specification	**Pass**
Complete Prism		Pass
Left Eye	Max: 0.25	0.112 (Diopters)
Right Eye	Max: 0.25	0.158 (Diopters)
Prismatic Imbalance		Pass
Vertical	Max: 0.12	0.00 (Diopters)
Horizontal Base Out	Max: 0.50	0.25 (Diopters)

5.2 Physical Requirements

Test	Specification	**Pass**
Free of defects which may cause discomfort or injury		Pass

5.2.2 Ignition

Test	Specification	**Pass**
Lens		Pass
Frame		Pass
Strap Buckle		Pass
Other		N/A

5.2.3 Corrosion Resistance of Metal Components

Test	Specification	**N/A**
Function of protector not impaired		N/A

5.2.4 Minimum Coverage Area

Test	Specification	**Pass**

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Test Results - LIB-00798-02/AVIATOR Smoke Lens and Transparent Grey Frame with Black and White Strap

40 x 33 mm (34 x 28 mm - H)		Pass

5.3.2 Placement of Markings

Test	Specification	**N/A**
Markings		N/A

5.4.1.1 Direct Ventilation

Test	Specification	**N/A**
1.5 mm spherical object excluded		N/A

5.4.1.2 Indirect Ventilation

Test	Specification	**Pass**
No direct straight-line passage		Pass

7.2.2.1.1 Special Purpose Filter Lenses - Transmission Requirements

Test	Specification	**Pass**
Tinted Lenses		Pass
Left Eye	8.00/99.99	22.2 (%)
Right Eye	8.00/99.99	22.3 (%)
Ratio	0.900/1.100	0.996

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Test Results - LIB-00798-02/AVIATOR Smoke Lens and Transparent Grey Frame with Black and White Strap

ANSI Z87.1-2020 Optional Claim (+)

7.1.3 Lateral (Side) Coverage

Test	Specification	Pass
Lateral (Side) Coverage		Pass

7.1.4.2 High Mass Impact

Test	Specification	Pass
Left Eye Sample 1		Pass
Left Eye Sample 2		Pass
Right Eye Sample 3		Pass
Right Eye Sample 4		Pass

7.1.4.3 High Velocity Impact

Test	Specification	Pass
Left Eye Center	Min: 250.0	254 (fps)
Left Eye Center		Pass
Left Eye 30°	Min: 250.0	252 (fps)
Left Eye 30°		Pass
Right Eye Center	Min: 250.0	252 (fps)
Right Eye Center		Pass
Right Eye 30°	Min: 250.0	258 (fps)
Right Eye 30°		Pass
One Side 90° at 10mm Above (H - 8mm)	Min: 250.0	250 (fps)
One Side 90° at 10mm Above (H - 8mm)		Pass
Opposite Side 90° at 10mm Below (H - 8mm)	Min: 250.0	258 (fps)
Opposite Side 90° at 10mm Below (H - 8mm)		Pass

7.1.4.4 Penetration Test (lenses only)

Test	Specification	Pass
Left Eye Sample 1		Pass
Left Eye Sample 2		Pass
Right Eye Sample 3		Pass
Right Eye Sample 4		Pass

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Test Results - LIB-00798-02/AVIATOR Smoke Lens and Transparent Grey Frame with Black and White Strap

Observations:

Test Name		Observation
5.3.2 Placement of Markings	Markings	Not assessed per customer request

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APPENDIX 1

ANSI Z87.1 - 2020 Measurement Uncertainty Values

Section	Requirement	Uncertainty
5.1.2	Luminous Transmittance	0.19%
5.1.3	Haze	0.08%
5.1.4	Refractive Power	0.018D
	Astigmatism	0.018D
	Prism	0.048Δ
5.4.5	Minimum Lens Thickness	0.012 mm
5.5.1	Replaceable Lenses – Goggles	0.17 mm
5.5.2	Replaceable Lenses – Welding Helmets and Handshields	0.17 mm
6.1	Relaxed Optics Level	See 5.1.4
6.2	Anti-Fog Properties	1.79%
7.2.1	Optical Radiation - Clear Lenses	See 5.1.2
7.2.2.1.1	Transmission Requirements	
	Table 7 (Welding Filters)	
	W1.3 – W3.0	See 5.1.2
	W4	0.0018287%
	W5	0.0003283%
	W6	0.0003605%
	W7	0.0000961%
	W8	0.0001944%
	W9	0.0000459%
	W10	0.0000707%
	W11	0.0000163%
	W12	0.0000055%
	W13	0.0000029%
	W14	0.0000017%
	EFUV	0.0000551%
	NUV	0.0000576%
	IR	0.010395%
	Table 8 (UV Filters)	
	EFUV	0.0000551%
	NUV	0.0000576%
	Table 9 (IR Filters)	0.010395%
	Table 10 (VIS Filters)	See 7.2.2.1.1 W1.3 – W10
	Table 11 Tinted	See 5.1.2
	Extra Dark	See 5.1.2
7.2.2.1.2	Visible Light Filters	
	Visible Light (L1.3 - L3)	See 5.1.2
	UVA	See Table 7 NUV
	UVB	See Table 7 EFUV
7.2.2.2	Transmittance of Non-lens Components	See 7.2.2.1.1 Table 7, 8 & 9
7.2.3.1	Automatic Darkening Welding Filter Lenses - Luminous Transmittance	See 7.2.2.1.1 Table 7
7.2.3.2	Automatic Darkening Welding Filter Lenses - UV/IR Transmittance	See 7.2.2.1.1 Table 7
7.2.3.3	Switching Index	0.0192 mSec
7.2.3.5	Angular dependence of luminous transmittance	See 7.2.2.1.1 Table 7