



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

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MECHANICAL

Valid To: February 25, 2025

Certificate Number: 3661.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following test on automotive, telecommunications, commercial, medical and aerospace components, assemblies and systems:

<u>Test:</u>	<u>Test Method(s)¹:</u>
Vibration (Sine, Random & Combined) ¹ (10 to 3000) Hz 3" stroke 45,000 lbs. Force to 200 g's	MIL-STD-164 A (Method I); MIL-STD-202 E, F, G (Methods 201, 203, 204, 214); MIL-STD-750 C, D, E, F (Method 2046, 2056, 2057); MIL-STD-810 Base A, B, C, D, E, F, G, H (Methods 514, 519, 526); MIL-STD-1344 A (Through Notice 6)(Method 2005); MIL-STD-1540 B, C, D; MIL-STD-1576 (All); RTCA/DO-160 B, C, D, E, F, G (Section 8); SAE/USCAR 24 (Initiator Requirements) June 2004; SAE/USCAR 28 (Initiator Requirements) June 2005; TSC-3000G
Vibration Shock ² (10 to 10,000) Hz 3" stroke 45,000 lbs. Force	MIL-STD-202 E, F, G (Method 213); MIL-STD-810 Base, A, B, C, D, E, F, G, H (Method 516); MIL-STD-1344 A (through Notice 6)(Method 2004); MIL-STD-1576 (All); RTCA/DO-160 B, C, D, E, F, G (Section 7); SAE/USCAR 24 (Inflator Requirements) June 2004; SAE/USCAR 28 (Initiator Requirements) June 2005; TSC-3000G
Mechanical (Drop) Shock ² (6, 12 & up to 50) ft. drop Towers	MIL-STD-810 Base, A, B, C, D, E, F, G, H (Method 516); MIL-STD-202 E, F, G (Method 213); MIL-STD-1344 A (through Notice 6) (Method 2004); MIL-STD-1576 Base (Method 3114); SAE/USCAR 24 (Inflator Requirements) June 2004; TSC-3000G
Pyro Shock ² Live Pyro, Air Cannon, Beam (10 to 10,000) Hz	Mil-STD-810 (All); Mil-STD-1512 (All); MIL-STD-1576 (All); Customer Specifications

<u>Test:</u>	<u>Test Method(s)¹:</u>
Tensile/Compression ² 20,000 lbs	MIL-STD-202 E, F, G (Method 211) (Condition A); UL 514-D Section 5.3.7.1; TSC-3000G; ASTM E8/E8M, ASTM A370, ASTM B557
Acceleration ² r = 34"; g's=110	MIL-STD-202 E, F, G (Method 212); MIL-STD-810 Base, A, B, C, D, E, F, G, H (Method 513); MIL-STD-1344 A (through Notice 6) (Method 2011); RTCA/DO-160 B, C, D, E, F, G (Section 7); SAE/USCAR 28 (Initiator Requirements) June 2005
Push	IEC 60601-1
Drop	IEC 60601-1
Impact	IEC 60601-1
Random Drop/ Tumble	MIL-STD-202 (Method 203C)
Temperature Altitude ² Up to 100,000 Feet (-72 to 150) °C	MIL-STD-202 E, F, G (Method 105); MIL-STD-810 Base, A, B, C, D, E, F, G, H (Method 500); RTCA/DO-160 B, C, D, E, F, G (Section 4); SAE/USCAR 28 (Initiator Requirements) June 2005; ISO 14708-3; TSC-3000G
High Temperature ² 200 °C	MIL-STD-202 E, F, G (Method 108); MIL-STD-810 Base, A, B, C, D, E, F, G, H (Method 501); SAE/USCAR 24 (Inflator Requirements) June 2004; SAE/USCAR 28 (Initiator Requirements) June 2005; IEC 60601-1; TSC-3000G
Low Temperature ² To -176 °C	MIL-STD-810 Base, A, B, C, D, E, F, G, H (Method 502); MIL-STD-1540 (All); IEC 60601-1-11; TSC-3000G
Temperature Shock ² (-176 to 200) °C	MIL-STD-202 E, F, G (Method 107); MIL-STD-810 Base, A, B, C, D, E, F, G, H (Method 503); SAE/USCAR 24 (Inflator Requirements) June 2004; SAE/USCAR 28 (Initiator Requirements) June 2005; TSC-3000G
Explosive Atmosphere	MIL-STD-810 Base, A, B, C, D, E, F, G, H (Method 511); RTCA/DO-160 B, C, D, E, F, G (Section 9); TSC-3000G
Temperature/Humidity ² (5 to 95) %RH	MIL-STD-810 Base, A, B, C, D, E, F, G, H (Method 507); MIL-STD-202 E, F, G (Method 103); MIL-STD-1344 A (through Notice 6) (Method 1002); MIL-STD-1576 (All); RTCA/DO-160 B, C, D, E, F, G (Section 6); SAE/USCAR 24 (Inflator Requirements) June 2004; SAE/USCAR 28 (Initiator Requirements) June 2005; IEC 60601-1-11; TSC-3000G

<u>Test:</u>	<u>Test Method(s)¹:</u>
Explosive/Rapid Decompression	MIL-STD-810 Base, A, B, C, D, E, F, G, H (Method 500); RTCA/DO-160 B, C, D, E, F, G (Section 4)
Positive Pressure (Over Pressure) ² Up to 30,000 psi	MIL-STD-1540 B, C, D (Section 6)
Fluid Susceptibility	MIL-STD-810 F, G, H (Method 504); MIL-STD-1344 A, Method 1016; RTCA/DO-160 B, C, D, E, F, G (Section 11); TSC-3000G
Salt/SO ₂ Fog/Spray	ASTM B117-73, -94, -97, -02, -02, -07, -09, -11; MIL-STD-202 E, F, G (Method 101); MIL-STD-810 Base, A, B, C, D, E, F, G, H (Method 509); MIL-STD-1344 A (through Notice 6) (Method 1001); RTCA/DO-160 B, C, D, E, F, G (Section 14); SAE/USCAR 24 (Inflator Requirements) June 2004; SAE/USCAR 28 (Initiator Requirements) June 2005; TSC-3000G
Rain	MIL-STD-810 Base, A, B, C, D, E, F, G, H (Method 506); RTCA/DO-160 B, C, D, E, F, G (Section 10); TSC-3000G
Freezing Rain	MIL-STD-810 Base, A, B, C, D, E, F, G, H (Method 521); RTCA/DO-160 B, C, D, E, F, G (Section 24); TSC-3000G
Combined Environments (Temperature, Humidity, Vibration)	MIL-STD-810 Base, A, B, C, D, E, F, G, H (Method 520); RTCA/DO-160 B, C, D, E, F, G (Section 4); SAE/USCAR 24 (Inflator Requirements) June 2004; SAE/USCAR 28 (Initiator Requirements) June 2005; TSC-3000G
Temperature Cycling ² (-176 to 200) °C	MIL-STD-810 Base, A, B, C, D, E, F, G, H (Method 520); MIL-STD-1344 A (through Notice 6) (Method 1003); MIL-STD-1576 (All); RTCA/DO-160 B, C, D, E, F, G (Section 5); TSC-3000G
Sand and Dust	MIL-STD-202 E, F, G (Method 110); MIL-STD-810 Base, A, B, C, D, E, F, G, H (Method 510); RTCA/DO-160 B, C, D, E, F, G (Section 12); SAE J1211 (Section 4.5), Nov. 78 (dust only), SAE J1455 (Section 4.7), Aug. 94 (dust only); TSC-3000G
Ingress Protection	IEC 60529; IP 1-6; IPX 1-8
<u>Materials Testing</u>	
Rockwell Hardness (metallic) 15N, 30N, 45N, 15T, 30T, 45T, A, B, C	ASTM E18; ASTM A370

<u>Test:</u>	<u>Test Method(s)¹:</u>
Micro-Indentation Hardness (materials) Knoop (HK 500g, 100g) Vickers (HV 1000g, 500g, 300g)	ASTM E384; ASTM E92
Leeb Hardness	ASTM A956
<u>Metallographic Analysis</u>	
Image Analysis	ASTM E1245; ASTM E562
Grain Size	ASTM E112
Metal and Oxide Coating Thickness	ASTM B487; ASTM B748 (SEM)
Decarb Depth	ASTM E1077
Case Depth (optical and Effective)	GEC SOP MAT-102; SAE J423; ASM HBK Vol. 9 & Vol. 7
Inclusion Evaluation	ASTM E45 (Methods A & D); ASTM E3
IGA Susceptibility	ASTM A262
Immersion Corrosion	ASTM G48 (Methods A, C, & D); SOP MAT-116
<u>Failure Analysis</u>	
SEM/EDS	GEC SOP MAT-111; GEC SOP MAT-112; ASTM E1508
Immersion Corrosion	ASTM G48 (Methods A, C, & D); SOP MAT-116
<u>Electrical</u>	
Resistance	MIL-DTL-38999 J, K, L (w/ amendment 1), (Method 4.5.13); MIL-HDBK-1512 Base (Method 201); MIL-STD-202 E, F, G (Method 303); MIL-STD-1576 Base (Method 2201); SAE/USCAR Initiator Requirements (Para. 4.7.2.1 – 4.7.2.3), June 2005; 98560NDS00 [10], (Section 12-3), 10 (4 Dec. 2007)
Insulation resistance	MIL-DTL-38999 J, K, L (w/ amendment 1), (Method 4.5.9); MIL-STD-202 E, F, G (Method 302); MIL-STD-1344 A (through Notice 6) (Method 3003); MIL-STD-1576 Base (Method 2117); 98560NDS00 [10], (Section 12-4), 10 (4 Dec. 2007)
Electrostatic Discharge 25 kV	RTCA/DO-160 B, C, D, E, F, G (Section 25); SAE J1113 Base; SAE/USCAR Initiator Requirements(Para. 3.2.1.8.1 & 3.2.1.8.2), June 2005; 98560NDS00 [10], (Section 12-5), 10 (4 Dec. 2007)



<u>Test:</u>	<u>Test Method(s) ¹:</u>
Current	SAE/USCAR Initiator Requirements (Para. 4.7.3.11 & 4.7.3.12), June 2005; 98560NDS00 [10], (Section 12-2), 10 (4 Dec. 2007)
Dielectric Withstand Voltage 2.5 kV AC 3.0 kV DC	MIL-DTL-38999 J, K, L (w/ amendment 1), (Method 4.5.10); MIL-PRF-49142 Base, A, B (w/ amendment 1), (Method 4.6.11); MIL-STD-202 E, F, G (Method 301); MIL-STD-1344 A (through Notice 6) (Method 3001)
Magnetic Effects	RTCA/DO-160 B, C, D, E, F, G (Section 15)
Ground/Supply Offset Power Interrupts Load Switch Transients Load Dump	ISO 7637-3; ISO 16750-2; ISO 7637-2
<u>Chemistry</u>	
Optical Emissions Spectroscopy (OES) Al, As, B, Be, Bi, C, Ca, Cd, Ce, Co, Cr, Cu, Fe, Ga, In, Li, Mg, Mn, Mo, N, Na, Nb, Ni, P, Pb, S, Sb, Se, Si, Sn, Sr, Ta, Te, Ti, V, W, Zn, Zr	ASTM E415, E1086, E1251, E3047
Combustion (LECO) Analysis for Carbon & Sulfur C, S	ASTM E1019, E1941; GEC SOP MAT-201
X-Ray Fluorescence (XRF) Ag, Al, Bi, Co, Cr, Cu, Fe, Mn, Mo, Nb, Ni, Pb, Pd, Sb, Se, Sn, Ti, V, W, Zn, Zr	ASTM E1476 (section 7.1); GEC SOP MAT-202

¹ When the date, edition, version, etc. is not identified in the scope of accreditation, laboratories may use the version that immediately precedes the current version for a period of one year from the date of publication of the standard measurement method, per part C., Section 1 of A2LA R101 - General Requirements- Accreditation of ISO-IEC 17025 Laboratories.

² Also using customer specified test methods based on the parameters listed above.



Accredited Laboratory

A2LA has accredited

APPLIED TECHNICAL SERVICES

Tempe, AZ

for technical competence in the field of

Mechanical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).



Presented this 23rd day of February 2023.

A blue ink signature of Mr. Trace McInturff, written in a cursive style.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 3661.01
Valid to February 28, 2025

For the types of tests to which this accreditation applies, please refer to the laboratory's Mechanical Scope of Accreditation.