



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

GRAY'S ENGINEERING AND CONSULTING, INC.

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MECHANICAL

Valid To: November 30, 2020

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:

PARAMETER	RANGE	TEST METHOD(S)
Vibration (Sine, Random & Combined) ¹	(10 to 3000) Hz 3" stroke 29,000 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, (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 ¹	(10 to 10,000) Hz 3" stroke 29,000 lbs. Force	MIL-STD-202 E, F, G (Method 213); MIL-STD-810 Base, A, B, C, D, E, F, G (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

PARAMETER	RANGE	TEST METHOD(S)
Mechanical (Drop) Shock ¹	(6, 12 & up to 50) ft. drop Towers	MIL-STD-810 Base, A, B, C, D, E, F, G (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 ¹	Live Pyro, Air Cannon, Beam (10 to 10,000) Hz	Mil-STD-810 (All); Mil-STD-1512 (All); MIL-STD-1576 (All); Customer Specifications
Tensile/Compression ¹	10,000 lbs	MIL-STD-202 E, F, G (Method 211), (Condition A); UL 514-D Section 5.3.7.1; TSC-3000G
Acceleration ¹	r = 34"; g's=110	MIL-STD-202 E, F, G (Method 212); MIL-STD-810 Base, A, B, C, D, E, F, G (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 ¹	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 (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 ¹	200 °C	MIL-STD-202 E, F, G (Method 108); MIL-STD-810 Base, A, B, C, D, E, F, G (Method 501); SAE/USCAR 24 (Inflator Requirements), June 2004; SAE/USCAR 28 (Initiator Requirements), June 2005; IEC 60601-1; TSC-3000G

PARAMETER	RANGE	TEST METHOD(S)
Low Temperature ¹	To -176 °C	MIL-STD-810 Base, A, B, C, D, E, F, G (Method 502); MIL-STD-1540 (All); IEC 60601-1-11; TSC-3000G
Temperature Shock ¹	(-176 to 200) °C	MIL-STD-202 E, F, G (Method 107); MIL-STD-810 Base, A, B, C, D, E, F, G (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 (Method 511); RTCA/DO-160 B, C, D, E, F, G (Section 9); TSC-3000G
Temperature/ Humidity ¹	(5 to 95) %RH	MIL-STD-810 Base, A, B, C, D, E, F, G (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
Explosive/Rapid Decompression		MIL-STD-810 Base, A, B, C, D, E, F, G (Method 500); RTCA/DO-160 B, C, D, E, F, G (Section 4)
Positive Pressure (Over Pressure) ¹	Up to 30,000 psi	MIL-STD-1540 B, C, D (Section 6)
Fluid Susceptibility		MIL-STD-810 F, G (Method 504); MIL-STD-1344 A, Method 1016; RTCA/DO-160 B, C, D, E, F, G (Section 11); TSC-3000G
Solar Radiation/ Sunshine		MIL-STD-810 Base, A, B, C, D, E, F, G (Method 505); TSC-3000G

PARAMETER	RANGE	TEST METHOD(S)
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 (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 (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 (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 (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 ¹	(-176 to 200) °C	MIL-STD-810 Base, A, B, C, D, E, F, G (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 (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

Electrical

PARAMETER	RANGE	TEST METHOD(S)
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)
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
Thermal Vacuum	1x10 ⁻⁵ Torr (-125 to 125) °C	MIL-STD-1540; MIL-STD-8106; MIL-STD-1576

¹Also using customer specified test methods based on the parameters listed above.



Accredited Laboratory

A2LA has accredited

GRAY'S ENGINEERING AND CONSULTING, INC.

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 31st day of January 2019.

A blue ink signature of the Vice President of Accreditation Services.

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 3661.01
Valid to November 30, 2020

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