



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

CARMEL - ENVIRONMENTAL TESTS LTD.

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MECHANICAL

Valid To: May 31, 2024

Certificate Number: 2881.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following tests on aircraft, military, and commercial products:

Environmental Simulation Tests:

<u>Test Type</u>	<u>Test Methods⁴:</u>
Altitude; Temperature & Altitude / Pressure; Temperature, Humidity and Altitude/Pressure	AECTP-300 Method 312 – Low Pressure - Procedure I Procedure II and Procedure III ABD0100.1.2 (Airbus); ASTM D4169; ASTM D6653/D6653M; ASTM D7386; ATPD 2404B; DEF STAN 00-35, Part 3, Issue 4, Section 3, Chapters 9, 11-13, 15, 20; DEF STAN 00-035, Part 3, Issue 5, Section 3, Chapters 9, 11-13, 15, 20; GR-63-CORE, Issue 1 Paragraph 4.1 and 5.1; GR-63-CORE, Issue 2, 3 Paragraph 4.1.3 and 5.1.3; IEC 60721-4-1; IEC 60721-4-2; IEC 60721-4-3; IEC 60721-4-4; IEC 60721-4-7; IEC 60601-1-11; IEC 60601-1-12; JSS 55555:2000 Rev.2, JSS 55555:2012 Rev.3 Test Number 3; ISO 10236 Part 9; ISO 14708-1; MIL-B-49430C (ER) Paragraph 4.8.7; MIL-B-49458C (ER) Paragraph 4.7.7; MIL-PRF-49471B (CR) Paragraph 4.7.7; MIL-PRF-28800F 3.8.3; MIL-STD-202F Method 105C, Conditions A, B, C, and F; MIL-STD-202G Method 105C, Conditions A, B, C, and F

<u>Test Type</u>	<u>Test Methods⁴:</u>
Altitude; Temperature & Altitude / Pressure; Temperature, Humidity and Altitude/Pressure (cont)	MIL-STD-810B, Methods 500, 504, 518; MIL-STD-810C, Methods 500.1 504.1, 518.1; MIL-STD-810D, Methods 500.2, 520 Procedure III; MIL-STD-810E, Methods 500.3, 520.1 Procedure III; MIL-STD-810F, Methods 500.4, 520.2 Procedure III; MIL-STD-810G, Methods 500.5, 520.3 Procedure III; MIL-STD-810G (Change1), Methods 500.6, 520.4 Procedure III; MIL-STD-810H, Methods 500.6, 520.5 Procedure I; SAE J1455; RTCA DO-160D, E, F, G Section 4, Paragraph 4.6.1, Category Ax, Bx, Cx, Dx, Ex, Fx; UN Transport of Dangerous Goods, Test T.1
Bench Handling	AECTP-400 Method 414 ATPD 2404B; MIL-STD-810B, Method 516, Procedure V; MIL-STD-810C Method 516.2, Procedure V; MIL-STD-810D Method 516.3, Procedure VI; MIL-STD-810E Method 516.4, Procedure VI; MIL-STD-810F Method 516.5, Procedure VI; MIL-STD-810G Method 516.6, Procedure VI; MIL-STD-810G (Change 1) Method 516.7, Procedure VI; MIL-STD-810H Method 516.8, Procedure VI; MIL-PRF-28800F 3.8.5.3
Bounce (Loose Cargo Vibration)	AECTP-400 Method 406 - Loose Cargo ASTM D4169; ASTM D999; DEF STAN 00-35, Part 3, Issue 4, Chapter 2-11; DEF STAN 00-035, Part 3, Issue 5, Chapter 2-11; IEC 68-2-55, IEC 60068-2-55, Test Ee; ISTA 1A; ISTA 1B; ISTA 1C; ISTA 2A; ISTA 2B; ISTA 3A ISO 9022-3; JSS 55555:2000 Rev.2, JSS 55555:2012 Rev.3 Test Number 4; MIL-STD-810B, Method 514, Procedure XI MIL-STD-810C Method 514.2, Procedure IX Part 2, X, and XI; MIL-STD-810D Method 514.3, Category 3, Procedure II; MIL-STD-810E Method 514.4, Category 3, Procedure III; MIL-STD-810F Method 514.5, Category 5, Procedure II; MIL-STD-810G Method 514.6, Category 5, Procedure II; MIL-STD-810G (Change 1) Method 514.7, Category 5, Procedure II; MIL-STD-810H Method 514.8 Category 5, Procedure II; MIL-PRF-28800F 3.8.4.3; MIL-STD-331B
Compression, Stacking	ASTM D4169; ASTM D642; ASTM D7386; ISTA 1C; ISTA 2A; ISTA 2B; ISO 2234; IEC 60601-1 – Push Test

<u>Test Type</u>	<u>Test Methods⁴:</u>
Drop	ASTM D5276; ASTM D7386; ASTM D6179; ASTM D4169; ASTM D5487; EN 50130 Section 21 Free Fall (Operational); EN 50130:1999 Section 21 Free Fall (Operational); EN 1789:2007+A2; ETSI EN 300 019-2-7; GR-63-CORE, Paragraph 5.3.1, Category A & B; GR-63-CORE, Paragraph 5.3.2; GS 95024-3-1 (BMW); IEC 68-2-31, IEC 60068-2-31, Test Ec; IEC 68-2-32, IEC 60068-2-32: Test Ed, Free Fall; IEC 60601-1-11; IEC 60721-4-7; IEC 60721-4-2; IEC 61131-2; IEC 60601-1; JSS 55555:2000 Rev. 2, JSS 55555:2012 Rev.3 Test Number 26; MIL-B-49430C (ER), Paragraph 4.8.3; MIL-PRF-28800F 3.8.5.2; MIL-PRF-49471B (CR), Paragraph 3.10; MIL-STD-810B Method 516 Procedure II; MIL-STD-810C Method 516.2 Procedure II; MIL-STD-810D Method 516.3 Procedures III and IV; MIL-STD-810E Method 516.4 Procedures III and IV; MIL-STD-810F Method 516.5 Procedure IV; MIL-STD-810G Method 516.6 Procedure IV; MIL-STD-810G (Change 1) Method 516.7 Procedure IV; MIL-STD-810H Method 516.8 Procedure IV; MIL-STD-1344A Method 2015; MIL-STD-331B; ISO 10651-3 Lung Ventilators Medical Use Part 3 Section 4: Protection against mechanical hazards; BMW Group GS95003-1; BS EN 50130-5:1999 Alarm Systems Part 5: Environmental Test Methods; DEF STAN 00-35, Part 3, Issue 4, Chapter 2-04; DEF STAN 00-035, Part 3, Issue 5, Chapter 2-04; ISTA 1A; ISTA 1B; ISTA 1G; ISTA 1C; ISTA 2A; ISTA 2B; ISTA 3A; ISTA 3B; MIL-STD-648D; IS 10236, Part 15; ISO 14708-1; ISO 9022-3; ISO 4180-2; ISO 11608-1; ISO 16750-3; SAE J1455; QM-333 Paragraph 13.0, Categories A, B, C, D;

<u>Test Type</u>	<u>Test Methods⁴:</u>
Fire, Flammability	ABD0100.1.2 (Airbus); RTCA/DO-160E, F, G, Section 26; UL-94
Immersion	AECTP-300 Method 307 - Immersion ABD0100.1.2 (Airbus); ATPD 2404B; DEF STAN 00-35, Part 3, Issue 4, Chapter 3-29; DEF STAN 00-035, Part 3, Issue 5, Chapter 3-29; GS 95024-3-1 (BMW); IEC 60529, Temporary Immersion IPx7, IPx8; ISO 20653 Degrees of protection (IP-Code); ISO 20653 Degrees of protection (IP-Code), IPx7, IPx8; JSS 55555:2000 Rev. 2, JSS 55555:2012 Rev.3 Test Number 19; MIL-DLT-62547C(AT); MIL-STD-810B Method 512, Procedure I; MIL-STD-810C Method 512.1, Procedure I and IV; MIL-STD-810D Method 512.2, Procedure I; MIL-STD-810E Method 512.3, Procedure I; MIL-STD-810F Method 512.4, Procedure I; MIL-STD-810G Method 512.6, Procedure I; MIL-STD-810G (Change 1) Method 512.6, Procedure I; MIL-STD-810H Method 512.6, Procedure I; SAE J1455
Mechanical Shock	ABD0100.1.2 (Airbus); AECTP-400 Method 403 - Classical Waveform Shock AECTP-400 Method 417 - SRS SHOCK ASTM D4169; ASTM D6344; ASTM D880 (Side Impact); ISO 2244 (Horizontal impact by means of pendulum test); ATPD 2404B; BMW Group GS95003-1; BS EN 50130-5 Alarm Systems Part 5: Environmental Test Methods; EN 1789; BS EN 61373; BS EN 50155; DEF STAN 00-35, Part 3, Issue 4, Section 2, Chapters 3, 12; DEF STAN 00-035, Part 3, Issue 5, Section 2, Chapters 3, 12; ECSS-E-ST-10-03C (1 June 2012); ETSI 300-019-2-1, 2, 3, 4, 5, 6, 7, 8; GM 9123P; GS 95024-3-1:2019-08 (BMW); MIL-STD-648D; IEC 68-2-27, IEC 60068-2-27: Test Ea; IEC 68-2-29, IEC 60068-2-29: Test Eb; IEC 60601-1-11; IEC 60601-1-12; IEC 60601-1 – Impact; IEC 60721-4-1; IEC 60721-4-2; IEC 60721-4-3; IEC 60721-4-4; IEC 60721-4-7; IEC 60721-3-2;

<u>Test Type</u>	<u>Test Methods⁴:</u>
Mechanical Shock (cont)	IEC 61131-2; IEC 60068-2-75 – Hammer Tests; IEC 62262 (EN 62262, IK ratings) – Impact; IS 10236 Part 10 - Bump, IS 10236 Part 12 – Shock; ISO 10651-3 Lung Ventilators Medical Use Part 3; Section 4: Protection against mechanical hazards; ISO 80601-2-55, Clause 201.15.3.5.101; ISO 80601-2-12, Clause 201.15.3.5.101; ISO 9022-3; ISO 15004-1; ISO 14708-1; ISO 11608-4; ISO 16750-3; ISO 2233; JEDEC Standard JESD22-B104C; JSS 55555:2000 Rev. 2, JSS 55555:2012 Rev.3 Test Number 4, 24; MIL-B-49430, Paragraph 4.8.5; MIL-B-49458C (ER), Paragraph 4.7.5; MIL-DLT-62547C(AT); MIL-PRF-49471B (CR), Paragraph 3.9; MIL-STD-202F Method 213B, Conditions A, B, C, D, E, F, G,H, I, J, and K; MIL-STD-202G Method 213B, Conditions A, B, C, D, E, F, G,H, I, J, and K; MIL-STD-810B Method 516, Procedures I, III, IV; MIL-STD-810C Method 516.2, Procedures I, III, IV, and VI; MIL-STD-810D Method 516.3, Procedures I, II, V, and VIII; MIL-STD-810E Method 516.4, Procedures I, II, V, and VIII; MIL-STD-810F Method 516.5, Procedures I, II, III, V, and VIII; MIL-STD-810G Method 516.6, Procedures I, II, III, V, and VIII; MIL-STD-810G (Change 1) Method 516.7, Procedures I, II, III, V, and VIII; MIL-STD-810H Method 516.8, Procedures I, II, III, V, and VIII; MIL-STD-883A Method 2002.1, Condition A; MIL-STD-883E Method 2002.3, Condition A; MIL-STD-883F Method 2002.4, Condition A; MIL-STD-883G Method 2002.5, Condition A; MIL-STD-883H Method 2002.6, Condition A; MIL-STD-883J Method 2002.7, Condition A; MIL-STD-1344A Method 2004.1, Conditions A, B, C, E, F, G, H, and I; MIL-STD-1344A Method 2004.1, Conditions A, B, C, E, F, G, H, and I; RTCA DO-160D, 160E Section 7, Paragraphs 7.2.1, 7.2.2, Operational; RTCA DO-160D Section 7, Paragraphs 7.3.1, 7.3.1.1, Crash Safety; RTCA DO-160E, 160F, 160G Section 7, Paragraphs 7.3.1, 7.3.2, Crash Safety; UL-1642 4ED Rev August 2006, Paragraph 14A; UL 1254, Section 46; MIL-PRF-28800F 3.8.5; SAE J1455

<u>Test Type</u>	<u>Test Methods⁴:</u>
Rain (Water)	ABD0100.1.2 (Airbus); AECTP-300 Method 310 – Rain/Watertightness ATPD 2404B; BS EN 50155; BS EN 50130-5 Alarm Systems Part 5: Environmental Test Methods; DEF STAN 00-35, Part 3, Issue 4, Section 3, Chapters 27, 28; DEF STAN 00-035, Part 3, Issue 5, Section 3, Chapters 27, 28; DIN 40050-9; GS 95024-3-1 (BMW); IEC 68-2-18, IEC 60068-2-18 Test Rb2; IEC 60721-4-1; IEC 60721-4-2; IEC 60721-4-3; IEC 60721-4-4; IEC 60721-4-7; IEC 60721-3-2; IEC 60529 IPX1 Vertically Dripping; IEC 60529 IPX2 Dripping (15° tilted); IEC 60529 IPX3 Spraying; IEC 60529 IPX4 Splashing; IEC 60529 IPX5 Jetting; IEC 60529 IPX6 Powerful Jetting; IEC 60529 IPX7 Immersion; IEC 60529 IPX8 Immersion; IEC 60529 IPX9 Resist Ingress of High Temperature (Steam)/High Pressure Water; IS 10236 Part 14 – Driving Rain; ISO 20653; JSS 55555:2000 Rev.2, JSS 55555:2012 Rev.3 Test Number 11,12,16; MIL-DLT-62547C(AT); MIL-STD-810B Method 506, Procedure I; MIL-STD-810C Method 506.2, Procedures I and II; MIL-STD-810D Method 506.3, Procedures I and II; MIL-STD-810E Method 506.4, Procedures I and III; MIL-STD-810F Method 506.5, Procedures I and III; MIL-STD-810G Method 506.6, Procedures I and III; MIL-STD-810G (Change 1) Method 506.6, Procedures I and III; MIL-STD-810H Method 506.6, Procedures I and III; MIL-STD-108, Splashproof; MIL-STD-108E, Splashproof Paragraph 4.9; RTCA DO-160D, E, F, G Section 10; MIL-PRF-28800F 3.8.6; SAE J1455

<u>Test Type</u>	<u>Test Methods⁴:</u>
Contamination by Fluids	AECTP-300, Method 314 Procedure I ABD0100.1.2 (Airbus); ATPD 2404B; DEF STAN 00-35, Part 3, Issue 4, Chapter 4-04; DEF STAN 00-035, Part 3, Issue 5, Chapter 4-04; GS 95024-3-1 (BMW); JSS 55555:2000 Rev. 2 Test Number 6; MIL-STD 810F Method 504; MIL-STD 810G Method 504.1; MIL-STD-810G (Change 1) Method 504.2 MIL-STD-810H Method 504.3 RTCA/DO-160 C, D, E, F, Section 11; SAE J1455
Explosive Atmosphere	ABD0100.1.2 (Airbus); AECTP-300 Method 316 MIL-STD 810B Method 511; MIL-STD 810C Method 511.1; MIL-STD 810D Method 511.2; MIL-STD 810E Method 511.3; MIL-STD 810F Method 511.4; MIL-STD 810G Method 511.5; MIL-STD-810G (Change 1) Method 511.6; MIL-STD-810H Method 511.7; RTCA/ DO-160C Section 9; RTCA/DO-160D: +CHG1:00+ CHG2:01+ CHG3:02 Section 9; RTCA/DO-160E: Section 9; RTCA/DO-160F: Section 9; RTCA/DO-160G: Section 9; MIL-PRF-28800F 3.8.9
Icing	AECTP-300 Method 311 - Icing AECTP-300, Method 315 - Freezing, Procedure I ABD0100.1.2 (Airbus); ATPD 2404B; DEF STAN 00-35, Part 3, Issue 4, Chapter 3-10; DEF STAN 00-035, Part 3, Issue 5, Chapter 3-10; JSS 55555:2000 Rev.2, JSS 55555:2012 Rev.3 Test Number 18; MIL-STD-810D, Method 521; MIL-STD-810E, Method 521.1; MIL-STD-810F, Method 521.2; MIL-STD-810G, Method 521.3; MIL-STD-810G (Change 1) Method 521.4; MIL-STD-810H Method 521.4; RTCA/DO-160 C, D, E, F, G, Section 24

<u>Test Type</u>	<u>Test Methods⁴:</u>
Salt Fog (Spray)	AECTP-300 Method 309 - Salt Fog ABD0100.1.2 (Airbus); ASTM B117; ATPD 2404B; BS EN 50155; BS EN 50130-5 Alarm Systems Part 5: Environmental Test Methods; DEF STAN 00-35, Part 3, Issue 4, Chapter 4-02; DEF STAN 00-035, Part 3, Issue 5, Chapter 4-02; DET NORSKE VERITAS (DNV) standard for certification no. 2.4: environmental test specification for instrumentation and automation equipment (April 2006); GM 9123P; GS 95024-3-1(BMW); IEC 68-2-11; IEC 68-2-52, IEC 60068-5-52; IS 10236 Part 6; ISO 9227; ISO 7253; ISO 12944-6; JSS 55555:2000 Rev. 2, JSS 55555:2012 Rev.3 Test Number 9; MIL-C-83733; MIL-C-5541E Class: 1A and 3; MIL-DLT-62547C(AT); MIL-STD-202F Method 101D, Conditions A and B; MIL-STD-202G Method 101E, Conditions A and B; MIL-STD-810B Method 509; MIL-STD-810C Method 509.1; MIL-STD-810D Method 509.2; MIL-STD-810E Method 509.3; MIL-STD-810F Method 509.4; MIL-STD-810G Method 509.5; MIL-STD-810G (Change 1) Method 509.6; MIL-STD-810H Method 509.7; MIL-STD-883E Method 1009.8, Conditions A, B, C, and F; MIL-STD-883F Method 1009.8, Conditions A, B, C, and F; MIL-STD-883G Method 1009.8, Conditions A, B, C, and F; MIL-STD-883H Method 1009.8, Conditions A, B, C, and F; MIL-STD-883J Method 1009.8, Conditions A, B, C, and F; MIL-STD-1344A Method 1001.1, Conditions A, B, C, and D; MIL-C-675C; MIL-C-48497A; RTCA DO-160D, E, F, G, Section 14; MIL-PRF-28800F 3.8.8; SAE J1455

<u>Test Type</u>	<u>Test Methods⁴:</u>
Solar Radiation (Sunshine)	AECTP-300 Method 305 - Solar Radiation ASTM G154-12a; ATPD 2404B; BS EN 50130-5 Alarm Systems Part 5: Environmental Test Methods; GS 95024-3-1 (BMW); MIL-STD-810B Method 505; MIL-STD-810C Method 505.1; MIL-STD-810D Method 505.2; MIL-STD-810E Method 505.3; MIL-STD-810F Method 505.4; MIL-STD-810G Method 505.5; MIL-STD-810G (Change 1) Method 505.6; MIL-STD-810H Method 505.7; IEC 60068-2-5; IEC 60721-4-1; IEC 60721-4-2; IEC 60721-4-3; IEC 60721-4-4; IEC 60721-4-7; IS 10236 Part 16; JSS 55555:2000 Rev.2, JSS 55555:2012 Rev.3 Test Number 25; MIL-PRF-28800F 3.8.13
Temperature & Humidity	ABD0100.1.2 (Airbus); AECTP-300 Method 302 - High Temperature AECTP-300 Method 303 - Low Temperature AECTP-300 Method 304 - Thermal Shock AECTP-300 Method 306 - Humidity Heat ASTM D4169; ASTM D4332; ASTM F2825; ASTM D7386; ASTM F1980; ATPD 2404B; BS EN 50130-5; DEF STAN 00-35, Part 3, Issue 4, Section 3, Chapters 1, 2, 4, 5, 6, 7, 14, 21; DEF STAN 00-035, Part 3, Issue 5, Section 3, Chapters 1, 2, 4, 5, 6, 7, 14, 21; DET NORSKE VERITAS (DNV) standard for certification no. 2.4: environmental test specification for instrumentation and automation equipment (April 2006); ECSS-E-ST-10-03C (1 June 2012); EIA/JEDEC Standard EIA/JESD22-A101-B; EN 50130-5:1999 Section 12 Damp Heat, Steady State (Operational); EN 50130-5:1999 Section 13 Damp Heat (Endurance); EN 50130-5:1999 Section 14 Damp Heat Cycling (Operational); EN 50130-5:1999 Section 15 Damp Heat Cycling (Endurance); BS EN 50155; ETSI 300-019-2-1, 2, 3, 4, 5, 6, 7, 8; GM 9123P; GR-63-CORE, Paragraph 5.1.1.1, Low Temperature; GR-63-CORE, Paragraph 5.1.1.2, High Temperature; GR-1221-CORE, Paragraph 6.2.4, High Temperature; GR-1221-CORE, Paragraph 6.2.6, Low Temperature; GR-1221-CORE, Paragraph 6.2.7, Thermal Shock; GR-63-CORE, Issue 1, Paragraph 5.1.1.3, Humidity; GR-63-CORE, Issue 1, 2 and 3, Paragraph 5.1.2, Humidity;

Test Type	Test Methods⁴:
Temperature & Humidity (cont)	GR-1221-CORE, Paragraph 6.2.5 and 6.2.8, Humidity; GS 95024-3-1 (BMW); IEC 68-2-1, IEC 60068-2-1, Test Aa, Ab, Ac, and Ad, Low Temperature; IEC 68-2-2, IEC 60068-2-2, Test Ba, Bb, Bc, and Bd, High Temperature; IEC 68-2-14, IEC 60068-2-14, Test Na, Nb, and Nc, Temperature Cycling; IEC 68-2-3, Test Ca, Humidity [replaced by IEC 60068-2-78] ³ ; IEC 68-2-30, IEC 60068-2-30, 3ed 2005, Test Db, Humidity; IEC 68-2-38 led 1974, Test Z/AD, Humidity; IEC 60068-2-56, Test Cb, Humidity [superseded by IEC 680068-2-78:2001] ³ ; IEC 60721-4-1; IEC 60721-4-2; IEC 60721-4-3; IEC 60721-4-4; IEC 60721-4-7; IEC 60601-1-11; IEC 60601-1-12; IEC 60721-3-2; IEC 61131-2 (Edition 3); IS 10236 Part 2, 3, 4, 5, 8; ISO 10079-1; ISO 15004-1; ISO 9022-2; ISO 12944-6; ISO 11608-1; ISO 16750-4; ISO 14708-1; ISTA 2A; ISTA 2B; ISTA 3A; ISTA 3B; JSS 55555:2000 Rev. 2, JSS 55555:2012 Rev.3 Test Number 10, 13, 20, 22, 27; MIL-DLT-62547C(AT); MIL-STD-202F Method 103B, Conditions A, B, C, and D; MIL-STD-202F Method 106E; MIL-STD-202G Method 103B, Conditions A, B, C, and D; MIL-STD-202G Method 106G; MIL-STD-202F Method 107D, Conditions A, A-1, A-2, A-3, B, B-1, B-2, B-3, F, F-1, F-2, and F-3; MIL-STD-202G Method 107G, Conditions A, A-1, A-2, A-3, B, B-1, B-2, B-3, F, F-1, F-2, and F-3; MIL-STD-202F, G Method 108A MIL-STD-810B Method 501, 502, 503, 507; MIL-STD-810C Method 501.1, Procedure I, II; MIL-STD-810C Method 502.1, Procedure I, II, III; MIL-STD-810C Method 503.1, Procedure I; MIL-STD-810C Method 507.1, Procedures I, II, III, IV, and VI; MIL-STD-810D Method 501.2, Procedure I, II; MIL-STD-810D Method 502.2, Procedure I, II, III; MIL-STD-810D Method 503.2, Procedure I; MIL-STD-810D Method 507.2, Procedures I, II, and III; MIL-STD-810E Method 501.3, Procedure I, II; MIL-STD-810E Method 502.3, Procedure I, II, III; MIL-STD-810E Method 503.3, Procedure I; MIL-STD-810E Method 507.3, Procedures I, II, and III; MIL-STD-810F

<u>Test Type</u>	<u>Test Methods⁴:</u>
Temperature & Humidity (cont)	Method 501.4, Procedure I, II; MIL-STD-810F Method 502.4, Procedure I, II, III; MIL-STD-810F Method 503.4, Procedure I, II; MIL-STD-810F Method 507.4, Procedure I; MIL-STD-810G Method 501.5, Procedure I, II; MIL-STD-810G Method 502.5, Procedure I, II, III; MIL-STD-810G Method 503.5, Procedure I, II; MIL-STD-810G Method 507.5, Procedures I and II; MIL-STD-810G (Change 1) Method 501.6, Procedure I, II; MIL-STD-810G (Change 1) Method 502.6, Procedure I, II, III; MIL-STD-810G (Change 1) Method 503.6, Procedure I, II; MIL-STD-810G (Change 1) Method 507.6; MIL-STD-810H Method 501.7, Procedure I, II; MIL-STD-810H Method 502.7, Procedure I, II, III; MIL-STD-810H Method 503.7, Procedure I, II; MIL-STD-810H Method 507.6; MIL-STD-883E Method 1004.7; MIL-STD-883F Method 1004.7; MIL-STD-883G Method 1004.7; MIL-STD-883H Method 1004.7; MIL-STD-883J Method 1004.7; MIL-STD-883E, F, G, H Method 1010.7, Conditions A, B, C, and F; MIL-STD-1344A Method 1002.2, Type I, Conditions A, B, C, and D; MIL-STD-1344A Method 1002.2, Type II, and III; MIL-C-675C; MIL-C-48497A; RTCA DO-160C, D, E, F, G, Sections 4, 5, 6; TIA/EIA 455-4C, High Temperature TIA/EIA 455-5C, Method A, Conditions A, B, C, D, and E, Humidity; TIA/EIA 455-5C, Methods B and C, Humidity; MIL-PRF-28800F 3.8.2; SAE J1455
Vibration	ABD0100.1.2 (Airbus); AECTP-400 Method 401 - Vibration AECTP-400 Method 405 - Gunfire AECTP-400 Method 420 - Buffet Vibration ASTM D4169; ASTM D7386; ASTM D4728; ASTM D999; ATPD 2404B; BRB/LU Ltd /RIA SPECIFICATION No 20:1988 (Testing for Railway Vehicles); DET NORSKE VERITAS (DNV) standard for certification no. 2.4: environmental test specification for instrumentation and automation equipment (april 2006); ECSS-E-ST-10-03C (1 June 2012); GR-63-CORE, Paragraph 5.4.2, Sine Vibration; GR-63-CORE, Paragraph 5.4.3, Sine Vibration; GR-1221-CORE, Paragraph 6.2.2, Sine Vibration; General Motors Engineering Standards GM 9123P; General Motors Engineering Standards GM 3155; GS 95024-3-1 (BMW);

<u>Test Type</u>	<u>Test Methods⁴:</u>
Vibration (cont)	IEC 68-2-6, IEC 60068-2-6, Test Fc, Sine Vibration; IEC 68-2-34:73 AMD 1 83, Test Fd, Random Vibration; IEC 68-2-36, Test Fdb, Random Vibration [superseded by IEC 60068-2-64] ³; IEC 68-2-64 1993 COR 1 1993, Test Fh, Random Vibration; IEC 60601-1-11; IEC 60601-1-12; EN-45502-1; IEC 60721-4-1; IEC 60721-4-2; IEC 60721-4-3; IEC 60721-4-4; IEC 60721-4-7; IEC 60721-3-2; IEC 61131-2 (Edition 3); IS 10236 Part 11; ISTA 1A, ISTA 1C, ISTA 1G, ISTA 1H; ISTA 2A; ISTA 2B; ISTA 3A; ISTA 3B; JIS E 3014 Part of Railway signal – Vibration Test Methods; JSS 55555:2000 Rev. 2, JSS 55555:2012 Rev.3 Test Number 4, 28; MIL-B-49430, Paragraph 4.8.6, Sine Vibration; MIL-B-49458C (ER), Paragraph 4.8.6, Sine Vibration; MIL-DLT-62547C(AT); MIL-PRF-49471B (CR), Paragraph 4.7.6; MIL-STD-202F Method 201A, Sine Vibration; MIL-STD-202F Method 204D, Test Conditions A, B, C, D, E, F, G, H, Sine Vibration; MIL-STD-202F Method 214 Condition I, Test Conditions A, B, C, D, E, F, G, H, J, K, Random Vibration; MIL-STD-202F Method 214 Condition II, Test Conditions A, B, C, D, E, F, G, H, J, K, Random Vibration; MIL-STD-202G Method 201 A, Sine Vibration; MIL-STD-202G Method 204D, Test Conditions A, B, C, D, E, F, G, H, Sine Vibration; MIL-STD-202G Method 214 Condition I, Test Conditions A, B, C, D, E, F, G, H, J, K, Random Vibration; MIL-STD-202G Method 214 Condition II, Test Conditions A, B, C, D, E, F, G, H, J, K, Random Vibration; MIL-STD 167-1A:05 - Vibrations of Shipboard Equipment; MIL-STD-810B, Method 514; MIL-STD-810C Method 514.2, Procedure I, Curve AR-L, Sine Vibration; MIL-STD-810C Method 514.2, Procedure 1, Curve B, Sine Vibration; MIL-STD-810C Method 514.2, Procedure 1, Curve M, Sine Vibration; MIL-STD-810C Method 514.2, Procedure IA, Figure 514.2-2A, Random Vibration; MIL-STD-810C Method 514.2, Procedure IIA, Figure 514.2-4, Random Vibration; MIL-STD-810C Method 514.2, Procedure IIB, Figure 514.2-4A, Random Vibration; MIL-STD-810C Method 514.2, Procedure V, VI, VII; MIL-STD-648D Figure 514.2-4A, Sine & Random Vibration;

<u>Test Type</u>	<u>Test Methods⁴:</u>
Vibration (cont)	MIL-STD-810C Method 514.2, Procedure VIII, Curve V, Sine Vibration; MIL-STD-810C Method 514.2, Procedure VIII, Curve W, Sine Vibration; MIL-STD-810C Method 514.2, Procedure VIII, Curve Y, Sine Vibration; MIL-STD-810D Method 514.3, Category 1, Procedure I, Random Vibration; EIA/JEDEC STANDEARD EIA/JESD22 –B103-B; MIL-STD-810D Method 514.3, Category 10, Procedure 1, Sine & Random Vibration; MIL-STD-810D Method 514.3, Category 4, 5, 6, 7B, 7C, 8, 9, Procedure I, Random Vibration; MIL-STD-810D Method 514.3, Category 7A, Procedure IV, Random Vibration; MIL-STD-810D Method 519.3, Random Vibration; MIL-STD-810E Method 514.4, Category 1, 4, 5, 6, 7B, 7C, 8, 9, Procedure I, Random Vibration; MIL-STD-810E Method 514.4, Category 10, Procedure 1, Sine & Random Vibration; MIL-STD-810E Method 514.4, Category 7A, Procedure IV, Random Vibration; MIL-STD-810E Method 519.4, Gunfire Vibration; MIL-STD-810F Method 514.5, Category 1, 2, 3, 4, 7, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21, 22, 23, 25, Procedure I, Random Vibration; MIL-STD-810F Method 514.5, Category 15, 17, 18, 19, Procedure IV, Random Vibration; MIL-STD-810F Method 514.5, Category 20, Procedure III, Random Vibration; MIL-STD-810F Method 514.5, Category 24, Procedure 1, Sine Vibration; MIL-STD-810F Method 519.5, Gunfire Vibration; MIL-STD-810F Method 528, Shipboard Equipment; MIL-STD-810G Method 514.6, Category 1, 2, 3, 4, 7, 8, 9, 11, 12, 13, 14, 16, 17, 18, 19, 20, 22, 23, 24, 25, Procedure I, Random Vibration; MIL-STD-810G Method 514.6, Category 15, 17, 18, 19, Procedure IV, Random Vibration; MIL-STD-810G Method 514.6, Category 20, Procedure III, Random Vibration; MIL-STD-810G Method 519.6, Gunfire Vibration; MIL-STD-810G (Change 1) Method 514.7; MIL-STD-810G (Change 1) Method 519.7; MIL-STD-810H Method 514.8; MIL-STD-810H Method 519.8; MIL-STD-883E, F, G, H, J Method 2005.2, Test Conditions A, B, C, Sine Vibration; MIL-STD-883E, F, G, H, J Method 2006.1, Sine Vibration; MIL-STD-883E, F, G, H, J Method 2007.2, Test Conditions A, B, C, Sine Vibration; MIL-STD-883E, F, G, H, J Method 2026, Condition 1, Test Conditions A, B, C, E, F, G, H, J, K, Random Vibration; MIL-STD-883E, F, G, H, J Method 2026, Condition 11, Test Conditions A, B, C, E, F, G, H, J, K, Random Vibration; MIL-STD- I 344A Method 1015, Condition B (Group III) Sine Vibration; MIL-STD- I 344A Method 2005.1, Conditions I, II, III, IV, V (A, B, C, D, E, F, G, H, J, K), VI (A, B, C, D, E, F, G, H, J, K);

<u>Test Type</u>	<u>Test Methods⁴:</u>
Vibration (cont)	RTCA DO-160D Section 8; RTCA DO-160E Section 8; RTCA DO-160F Section 8; RTCA DO-160G Section 8;TIA/EIA 455-1 IB, TIA/EIA 455-11C, Condition I, Sine Vibration; TIA/EIA 455-1113, TIA/EIA 455-11C, Condition II, Sine Vibration; TIA/EIA 455-1113, TIA/EIA 455-11C, Condition III, Sine Vibration; TIA/EIA 455-11B, TIA/EIA 455-11C, Condition IV, Sine Vibration; TIA/EIA 455-1113, TIA/EIA 455-11C, Condition IV, Sine Vibration; TIA/EIA 455-1113, TIA/EIA 455-11C, Condition VI, Random Vibration; TIA/EIA 455-1 IB, TIA/EIA 455-11C, Condition VII, Random Vibration; TIA/EIA 455-1 IC, TIA/EIA 455-11C, Condition I, Sine Vibration; TIA/EIA 455-11C, TIA/EIA 455-11C, Condition II, Sine Vibration; TIA/EIA 455-1 IC, TIA/EIA 455-11C, Condition III, Sine Vibration; TIA/EIA 455-11C, TIA/EIA 455-11C, Condition IV, Sine Vibration; TIA/EIA 455-11C, TIA/EIA 455-11C, Condition IV, Sine Vibration; TIA/EIA 455-11C, TIA/EIA 455-11C, Condition VI, Random Vibration; TIA/EIA 455-11C, TIA/EIA 455-11C, Condition VII, Random Vibration; QM-333 Paragraph 12.0, Category A, B, C, D, Sine Vibration; UL 1642, Paragraph 15, Sine Vibration; UL 1254, Section 46; UN Transport of Dangerous Goods, Test T.2, Sine Vibration; ISO 10651-3 Lung Ventilators Medical Use Part 3; ISO 14708-1; ISO 80601-2-55 Clause 201.15.3.5.101; ISO 80601-2-12 Clause 201.15.3.5.101; ISO 9022-3; ISO 15004-1; ISO 11608-1; ISO 11608-4; ISO 16750-3; BS EN 50155; BS EN 61373; DEF STAN 00-35, Part 3, Issue 4, Chapter 2-01; DEF STAN 00-035, Part 3, Issue 5, Chapter 2-01; ETSI 300-019-2-1, 2, 3, 4, 5, 6, 7, 8; NATO AECTP-400 Edition 3; BMW Group GS95003-1; EN 50130 Section 22, 23 Vibration, Sinusoidal; EN 50130:1999 Section 22 Vibration, Sinusoidal (Operational); EN 50130:1999 Section 23 Vibration, Sinusoidal (Endurance); BS EN 50130-5:1999 Alarm Systems Part 5: Environmental Test methods; EN 1789; SAE J1455

<u>Test Type</u>	<u>Test Methods⁴:</u>
HALT ¹	Highly Accelerated Life Test (HALT); Cold Temperature Steps; Hot Temperature Steps; Cold Start Test; Temperature Cycling; Random Vibration-3 axis; Temperature & Vibration Combined Cycling; Temperature Measurements
HASS ^{1,2}	Highly Accelerated Stress Simulation (HASS); Stress Profile Definition; Analyzing POS Stage; Mounting Jig Assembly; Running Multi-Tester Jig; Set-up for Mass Production; Temperature & Vibration Combined Cycling
Sand & Dust	AECTP -300 Method 313 Procedure I, Procedure II, and Procedure III ABD0100.1.2 (Airbus); ATPD 2404B; DEF STAN 00-35, Part 3, Issue 4, Chapter 3-25; DEF STAN 00-035, Part 3, Issue 5, Chapter 3-25; GS 95024-3-1 (BMW); IEC 60529-2001 COR 1 2003, Degrees of Protection provided by Enclosures (IP Code) Degrees of protection (IP-Code), IP5X,6X; IEC 60068-2-68; IS 10236 Part 13; ISO 20653; MIL-PRF-28800F 3.8.10; JSS 55555:2000 Rev.2, JSS 55555:2012 Rev.3 Test Number 14; MIL-DLT-62547C(AT); MIL-STD-810B Method 510; MIL-STD-810C Method 510.1; MIL-STD-810D Method 510.2; MIL-STD-810E Method 510.3; MIL-STD-810F Method 510.4; MIL-STD-810G Method 510.5; MIL-STD-810G (Change 1) Method 510.6; MIL-STD-810H Method 510.7; RTCA DO-160 C, D, E, F, G, Section 12, Procedure II; MIL-PRF-28800F 3.8.4; SAE J1455

Test Type	Test Methods⁴:
Acceleration (Sustained)	MIL-STD-810B Method 513; MIL-STD-810C Method 513.2; MIL-STD-810D Method 513.3; MIL-STD-810E Method 513.4; MIL-STD-810F Method 513.5; MIL-STD-810G Method 513.6; MIL-STD-810G (Change 1) Method 513.7; MIL-STD-810H Method 513.8 MIL-STD-883F (Method 2001-2); MIL-STD-202G (Method 212A); DEF STAN 00-35, Part 3, Issue 4, Chapter 2-13 (Steady State Acceleration); DEF STAN 00-035, Part 3, Issue 5, Chapter 2-13 (Steady State Acceleration); STANAG 4370 AECTP (Method 404); JSS 55555:2000 Rev.2, JSS 55555:2012 Rev.3, Test Number 1; JSS 0256-01:1992 (Test No. 16); RTCA DO-160D, E, F, G, Section 7 (Crash Safety – Sustained); IEC 60068-2-7, Test Ga; ETSI (Method 300-019-2-2, 300-019-2-6); AECTP-400 Edition 3 (Method 404); BS G 260; ISO 2669; ABD0100.1.2 (Airbus); ECSS-E-ST-10-03C (1 June 2012)
Peel & Dye Test	ASTM F88 / F88M; ASTM F1929; ASTM F1886 (Visual Inspection); ISO 11607-1
Protection Against Foreign Objects	IEC 60529, IP Rating - IP1x, IP2x, IP3x, IP4x; ISO 20653:2013

^{1,2} HALT, HASS, & HASA Explained: Accelerated Reliability Techniques
Harry W. McLean; ASQ Quality Press, 2000.

³ This laboratory's scope contains withdrawn or superseded methods. As a clarifier, this indicates that the applicable method itself has been withdrawn or is now considered "historical" and not that the laboratory's accreditation for the method has been withdrawn.

⁴ 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 for Accreditation of ISO/IEC 17025 Laboratories*.



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Presented this 25th day of October 2022.

A blue ink signature of Mr. Trace McInturff, written over a horizontal line.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 2881.01
Valid to May 31, 2024
Revised March 28, 2024

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