



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

PARAGON SYSTEMS TESTING^{1,2}
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MECHANICAL

Valid To: May 31, 2024

Certificate Number: 1942.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory at the location listed above, as well as the satellite location listed below, to perform the following tests on materials, components, and assemblies:

<u>TEST(S):</u>	<u>TEST METHOD(S):</u>
<u>Environmental Simulation:</u>	
Dust Exposure	GMW3172 Dust; IEC 60529 Degrees of Protection Provided by Enclosures IP5X, IP6X; SAE J575 Lighting Devices and Components – Dust; JIS D 0207 Floating Dust
Salt Fog	ASTM B117; BI 103-01; DIN 50 021; EIA/ECA-364-26B; GM4298P (superseded December 2010) ³ ; GMW3286; GMW3172 Salt Spray; HES D6001; IEC 68-2-52 Test Kb; Salt Mist: ISO 9227; JIS H 8502 Cyclic Neutral Salt Spray; JIS Z 2371(using ACS reagents); MIL-STD-202G Method 101E, MIL-STD-810G Method 509.5; NES M0140; RTCA/DO-160E Section 14 – Salt Fog; ETSI EN 303-403 V 2.1.2, Section 7.6
Humidity-Water Fog	ASTM D1735, D4465; DIN EN ISO 6720-2; GMW14729
Cyclic Corrosion	FLTM BI 123-01, FLTM BI-123-03; GMW14872 (cyclic), GMW14214; SAE J2334; IEC 68-2-52 Test Kb: Salt Mist Cyclic; JIS H 8502 Cyclic Neutral Salt Spray; TSH1555G Accelerated Corrosion Under Complex Environment

<u>TEST(S):</u>	<u>TEST METHOD(S):</u>
<u>Environmental Simulation continued:</u>	
Water/Rain	IEC 60068-2-18 Test R and Guidance: Water, IEC 60529 Degrees of Protection Provided by Enclosures IPX1, IPX2, IPX3, IPX4, IPX5, IPX6, IPX7, IPX8, IPX9 ISO 20653 IPX1, IPX2, IPX3, IPX4, IPX5, IPX6, IPX7, IPX8, IPX9K; MIL-STD-202G Method 104A; ETSI EN 303-403 V 2.1.2, Section 7.7
Magnesium Sacrificial Anode Test	ASTM G97
<u>Tensile & Compression</u>	
Flat Specimens and Metal Components	ASTM E8/E8M, A370; DIN EN 10002-1; ISO 6892; JIS Z2241
Strain-Hardening (n-value) for Sheet	ASTM E646; ISO 10275; JIS Z2253
Metal Tension of Wrought and Cast Aluminum and Magnesium CIPP (Cured in Place Pipe)	ASTM B557 ISO 527-2
Flexural Properties and Tensile of CIPP Materials	ISO 178, 11296-4; ASTM D638, D790, D1599, F2019 Appendix X2
Apparent Hoop Tensile	ASTM D2290
Resistance to Short-Time Hydraulic Pressure of Plastic Pipe and Tubing	ASTM D1599
Tensile, Flexural, Creep and Creep-Rupture of Plastics	ASTM D2990
Conditioning Plastics for Testing	ASTM D618 (Procedure A)
Peel or Stripping Strength of Adhesive Bonds Pull-Off Strength of Coatings Using Potable Adhesion Testers	ASTM D4541
Flat Specimens and Plastic Components	ISO6259-1, ISO6259-3

<u>TEST(S):</u>	<u>TEST METHOD(S):</u>
<u>Wall Thickness Measurements:</u>	
Determine Dimensions of Thermoplastic Pipe and Fittings	ASTM D2122 (Section 6 & 7)
Determine Dimension of “Fiber Glass” Glass-Fiber Reinforced Thermosetting Resin Pipe and Fittings	ASTM D3567 (Section 6 & 7)
Cured-in-Place Thermosetting Resin Sewer Piping System	ASTM D5813 (Section 8.1.2)
Glass-Reinforced Thermosetting Plastics (GRP) pipes – Determination of Initial Ring Stiffness	ISO 7685
Standard Test Methods for Determination of External Loading Characteristics of Plastic Pipe by Parallel- Plate Loading	ASTM D2412
Plastics Piping Systems – Plastics Components – Determination of Dimensions	ISO 3126 (Section 5.2)
<u>Weld Examination:</u>	
Sectioning and Preparation of Weld Cross Sections to Measure Weld Features	GM4460P; PS-9471, 9472; ES-C8AB-11006-A
<u>Metallography:</u>	
Preparation of Metallographic Specimens	ASTM E3
Microetching Metals and Alloys	ASTM E407
Coating Thickness by Microscopic Examination	ASTM B487; ISO 1463, 2808 Method 6A; GM4260P (not active October 2013) ³
Case Depth	ASTM E1077; SAE J426
Performance for Exterior Plastic Parts	GMW14650
Heat Aging	Section 4.2
Temperature/Humidity Cycle	Section 4.3
Humidity Resistant	Section 4.4
Fuel Resistance	Section 4.8
Impact Resistance	Section 4.9
Chemical Resistance	Section 4.12
<u>Impact:</u>	
Falling Weight Test	JIS K 5600-5-3 (Section 3)
Solar Simulation Metal Halide	DIN 75220; MIL-STD-810

Durability and Environmental Exposure:

<u>PARAMETER</u>	<u>RANGE</u>	<u>TEST METHOD(S)</u>
High/Low Temperature without Humidity ⁴	(-70 to 177) °C	GMW3172 High Temperature Degradation; IEC 60068-2-1 Test A: Cold, IEC 60068-2-2 Test B: Dry Heat; IEC 60068-2-1 Test A: Cold; MIL-STD-202G Method 108A, MIL-STD-810G Method 501.5, 502.5; ETSI EN 303-403 V 2.1.2, Section 7.4
Temperature Capability with Humidity ⁴	(20 to 85) %RH (-70 to 177) °C	EIA-364-31B Humidity Test Procedure for Electrical Connectors and Sockets; FLTM BQ 104-02; GMW3172 Humid Heat, GMW14729; IEC 60068-2-3 Test Ca: Damp Heat, Steady State; IEC 60068-2-30 Test Db: Damp Heat Cyclic, IEC 60068-2-78 Test Cab: Damp Heat, Steady State; MIL-STD-202G Method 103B, 106G; MIL-STD-810G Method 507.5; RTCA/DO-160E Section 6 – Humidity
Cyclic Temperature Testing ⁴	Programmable Cycles from (-70 to 177) °C	EIA/ECA-364-110 Thermal Cycling Test Procedure for Electrical Connectors and Sockets; IEC 60068-2-14 Test N: Change of Temperature, IEC 60068-2-30 Test Db: Damp Heat; Cyclic MIL-STD-810G Method 524; NES M0132 Methods of Thermal Cycling for Plastic Parts RTCA/DO-160E Section 5 – Temperature Variation
Thermal Shock ⁴	Air to Air	GMW3172 Thermal Shock Air-To-Air; MIL-STD-202G Method 106G (Air), MIL-STD-810G Method 503.5
Altitude Testing (Small DUTs)	Up to 30 in Hg	MIL-STD-810G Procedures 1, 2 & 3

PARAMETER	RANGE	TEST METHOD(S)
<p>Single Axis Vibration Testing²</p> <p>Electro-dynamic vibration tables with sine, random and sine-on random controllers using client methods within the following parameters:</p>	<p>Shaker parameters:</p> <p>Displacement 2 inch peak-to-peak</p> <p>Force Up to 6000 lbf</p> <p>Frequency (3 to 3,000) Hz</p> <p>Acceleration Up to 100 g</p> <p>Temperature (-70 to +177) °C</p> <p>Ramp rate 20°C/min max.</p>	<p>EIA/ECA-364-28E</p> <p>GMW3172 Vibration with Thermal Cycling</p> <p>GMW3431 General Procedure for Testing</p> <p>Switches – Rattle Evaluation</p> <p>IEC 68-2-6 Test Fc: Vibration (sinusoidal)</p> <p>IEC 60068-2-64 Test Fh: Vibration, broad-band random and guidance</p> <p>IEC 61373 Railway Applications – Rolling Stock Equipment – Shock and Vibration Tests</p> <p>JIS D 1601 Vibration Testing for Automobile Parts</p> <p>MIL-STD-167-1A Mechanical Vibrations of Shipboard Equipment</p> <p>MIL-STD-202G Method 201A, 204D, 214A</p> <p>MIL-STD-810G Method 514.6, 528</p> <p>RTCA/DO-160E Section 8 - Vibration</p> <p>SAE J575 Lighting Devices and Components – Wide Band Random Vibration</p> <p>CFR CH. I Section 178.608</p> <p>ETSI EN 303-403 V 2.1.2, Section 7.5</p>
<p>Mechanical Shock²</p> <p>Electro-dynamic vibration tables with mechanical shock controller using client methods within the following parameters:</p>	<p>Displacement 2 inch peak-to-peak</p> <p>Force 11,000 lbf</p> <p>Acceleration 100 g max</p> <p>Temperature (-70 to +177) °C</p> <p>Ramp rate 20°C/m max.</p> <p>Payload 11,000 force pounds</p> <p>Acceleration 3,000 g max</p>	<p>EIA-364-27B</p> <p>GMW3431 General Procedure for Testing</p> <p>Switches – Bracket</p> <p>IEC 60068-2-27 Test Ea and Guidance: Shock</p> <p>IEC 61373 Railway Applications – Rolling Stock Equipment – Shock and Vibration Tests</p> <p>MIL-STD-202G Method 213B</p> <p>MIL-STD-810G Method 516.6 (Classical Pulse)</p> <p>RTCA/DO-160E Section 7 – Operational Shock and Crash Safety</p>
Vibration Test Fixture Transmissibility	Frequency: (3 to 3,000) Hz	GMW3172
Sound Level Measurement ⁴	(30 to 130) dB	GMW3431 General Procedure for Testing Switches - Audible Sound

PARAMETER	RANGE	TEST METHOD(S)
Buzz Squeak & Rattle (BSR) ⁴	Ambient Noise Level <30 dBA Sound Pressure (dBA) and Loudness (Sones) Horizontal and Vertical Excitation Simultaneous Sound and Acceleration Analysis	GMW14011, GMW7293; Ford: CETP: 15.01-L-402; Chrysler PF-8243
Voltage Measurement ⁴	100 mV to 600 VDC; 600 mV to 1,000 VAC	GMW3431 General Procedure for Testing Switches – Voltage Drop; Contact Bounce
Resistance Measurement ⁴	1Ω to 50 MΩ	MIL-STD-202G Method 303A
Insulation Measurement ⁴	Up to 100 MΩ-500 V, Up to 50 MΩ-250 V	Retention Components GMW3431 General Procedure for Testing Switches – Bracket Terminal, Connector, Body, Cover; Overload; GMW15179 Articulation Effort Plot –Body Closure Panels Horizontal Hinge Axis; ISO 16750-2 Part 2: Electrical Loads – Insulation Resistance; MIL-STD-202G Method 302
Force Measurement ⁴ (Tension and Compression)	(-100,000 to 100,000)N	FMVSS 206 Door Locks and Door
Displacement Measurement	Up to 600mm Up to 1inch	Vernier Caliper direct measurements Micrometer direct measurements

¹The laboratory is only accredited for the test methods listed above. The accredited test methods are used in determining compliance with the material specifications listed below. The inclusion of these documents on this Scope does not confer laboratory accreditation to them nor does it confer accreditation for the method(s) embedded within them. GMW14444, ISO 14125, ASTM F1216

² This accreditation covers testing performed at all laboratory locations listed in this scope of accreditation.

³This laboratory's scope contains withdrawn or superseded methods. As a clarification, 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.

⁴Also using customer specified test methods based on the parameters listed above.

PARAGON SYSTEMS TESTING
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Test(s):	Test Method(s):
Flexural Properties and Tensile of CIPP Materials	ASTM D790; ISO 178, 11296-4
Tensile:	
Hoop	ASTM D2290





Accredited Laboratory

A2LA has accredited

PARAGON SYSTEMS TESTING

Concord, Canada

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 16th day of May 2022.

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

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 1942.01
Valid to May 31, 2024
Revised April 19, 2024

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