



THE AMERICAN ASSOCIATION FOR
LABORATORY ACCREDITATION

ACCREDITED LABORATORY

A2LA has accredited

MGA RESEARCH CORPORATION

Akron, NY

for technical competence in the field of

Mechanical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *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 8 January 2009*).

Presented this 31st day of March 2009.

A handwritten signature in black ink, appearing to read "Peter Abney", written over a horizontal line.

President
For the Accreditation Council
Certificate Number 1762.01
Valid to April 30, 2011



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

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

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MECHANICAL

Valid To: April 30, 2011

Certificate Number: 1762.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory for the following tests on aerospace, defense, automotive, battery, and any other parts/items using the test methods listed below as well as other industry accepted or customer specified methods within the parameters listed below:

<u>Test Description</u>	<u>Test Method</u>
<u>Acceleration Testing</u> Up to 100g constant acceleration Connections during test: electrical/pressure Chamber size: 12' x 10' x 8' 36 inch wing	MIL-STD-202 (Method 212), MIL-STD-810F (Method 513 Centrifuge); RTCA/DO/160D
<u>Altitude Testing</u> 29.2 inches Hg Connections during test: electrical/pressure *Can be conducted in conjunction with Temperature Testing	MIL-STD-202G (Method 105), MIL-STD-810F (Method 520 w/o Vibration at Altitude); RTCA/DO/160D (Section 4); ST/SG/ac.10/27/Add.2; United Nations 3090/3091 T1
<u>Charge / Discharge Testing</u> <u>Battery Forced discharge Testing</u> <u>Battery Overcharge Test</u> <u>Current measure</u> (0.01 to 200) amps <u>DC Current measure</u> (0.01 to 200) amps	ST/SG/ac.10/27/Add.2; UL 1642, UL 2054; SAE J2464 section 4.4.3; United Nations 3090/3091 T7, United Nations 3090/3091 T8

<u>Test Description</u>	<u>Test Method</u>
<p data-bbox="212 235 659 266"><u>Charge / Discharge Testing (Cont..)</u></p> <p data-bbox="261 300 509 331"><u>Resistance measure</u> 100 $\mu\Omega$ to 100 MΩ</p> <p data-bbox="261 401 529 495"><u>Voltage measure</u> (0.0001 to 1000) VDC (0.0001 to 1000) VAC</p>	
<p data-bbox="212 535 483 567"><u>Short Circuit Testing</u></p> <p data-bbox="261 569 651 600">Down to 0.01Ω circuit resistance</p>	<p data-bbox="837 569 1243 730">United Nations 3090/3091 T5; ST/SG/ac.10/27/Add.2; UL 1642, UL 2054; SAE J2464 section 4.4.1 and 4.4.2</p>
<p data-bbox="212 770 711 802"><u>Force Deflection (Tensile/Compression)</u></p> <p data-bbox="261 804 623 898">Cylinder stroke: 12 inches Compression Load: 50,000 lbs Tension Load: 50,000 lbs</p>	
<p data-bbox="212 928 435 959"><u>Humidity Testing</u></p> <p data-bbox="261 961 672 1056">Humidity Range: 10% to 95% Temperature Range: +4$^{\circ}$C to 93$^{\circ}$C Chamber Size (max): 3x3x3 Feet</p>	<p data-bbox="837 961 1268 1056">MIL-STD-202G (Method 103, 106), MIL-STD-810F (Method 507); RTCA/DO/160D</p>
<p data-bbox="212 1085 399 1117"><u>Mass Measure</u></p> <p data-bbox="261 1119 711 1150">(0.02 to 100) lbs (10 to 45,359 grams)</p>	

<u>Test Description</u>	<u>Test Method</u>
<p><u>Pressure Testing</u> Static / Cyclic (0-10,000) PSI Pneumatic, Hydraulic, Stoddard Solvent, etc. *Can be conducted in conjunction with Vibration and Temperature Testing</p>	
<p><u>Salt Fog (Corrosion)</u> Chamber size (max): 2x3x4 Feet Modified Gas</p>	<p>ASTM B117, ASTM B685, ASTM-G85, A4; IEC 60529; JIS-D-0203, S2; MIL-STD-202D (Method 101), MIL-STD-810F (Method 509); RTCA/DO/160D</p>
<p><u>Shock Testing</u></p> <p><u>Mechanical Shock</u> Up to 3500g Peak Minimum duration: 0.5 milliseconds</p> <p><u>Pyrotechnic (Pyro) Shock</u> Up to 10,000 g Frequency: 20 to 2000 Hz</p> <p><u>Impact</u></p>	<p>United Nations 3090/3091 T4; IST A-1A2001; MIL-STD-202G (Method 213), MIL-STD-810F (Method 516), RTCA/DO/160D (Section 7); ST/SG/ac.10/27/Add.2</p> <p>MIL-STD-202G (Method 213), MIL-STD-810 (Procedure VII)</p> <p>United Nations 3090/3091 T6; ST/SG/ac.10/27/Add.2; UL 1642, UL 2054</p>

<u>Test Description</u>	<u>Test Method</u>
<p><u>Temperature Testing</u></p> <p><u>Temperature Measure</u> (-80c to +500)°C</p> <p><u>Temperature Testing</u> Temperature Range: (-80°C to +300)°C Ramp Rate: 10°C /minute</p> <p>Remote chamber available *Can be conducted in addition to Vacuum Testing, Vibration Testing</p> <p><u>Thermal Cycling (Thermal Shock)</u> Temperature Range: (-70°C to +200)°C Chamber Size (max): 16"x16"x16"</p>	<p>United Nations 3090/3091 T2; MIL-STD-202G (Method 108 up to +177°C), MIL-STD-810F (Method 501, 503); NAVMAT-P-9492; RTCA/DO/160D (Section 4 & 5); ST/SG/ac.10/27/Add.2; SAE J2464 section 4.3.2</p> <p>MIL-STD-202G (Method 107), MIL-STD-810F (Method 503); NAVMAT-P-9492; RTCA/DO/160D; ST/SG/ac.10/27/Add.2</p>
<p><u>Vibration</u> *Can be conducted in conjunction with Temperature Testing</p> <p><u>Random Vibration</u> Up to 45 Grms Frequency: 1 to 4000 Hz Peak-Peak: 1 inch Pounds Force: 9,000 lbs</p> <p><u>Sine Vibration</u> Up to 90g Frequency: 1 to 4000 Hz Peak-Peak: 1 inch Pounds Force: 12,000 lbs</p> <p><u>Sine on Random Vibration</u> Up to 45 Grms Frequency: 5 to 2000 Hz Peak-Peak: 1 inch</p> <p><u>Random on Random Vibration</u> Up to 45 Grms Frequency: 5 to 2000 Hz Peak to Peak: 1 inch</p>	<p>United Nations 3090/3091 T3; IST A-1A2001; MIL-STD-202G (Method 214), MIL-STD-810F, 514; NAVMAT-P-9492; ST/SG/ac.10/27/Add.2; RTCA/DO/160D</p> <p>MIL-STD-202G (Method 201, 204, 214), MIL-STD-810F (Method 514); NAVMAT-P-9492; ST/SG/ac.10/27/Add.2 38.3.4.2; RTCA/DO/160D</p> <p>MIL-STD-202G (Method 201, 204, 214), MIL-STD-810F (Method 514), NAVMAT-P-9492; ST/SG/ac.10/27/Add.2 38.3.4.2; RTCA/DO/160D</p> <p>MIL-STD-810E (Method 514.4 Procedure I, Category 8)</p>

<u>Test Description</u>	<u>Test Method</u>
<u>Waterproof Ness</u> <u>Blowing Rain</u> <u>Water Spray</u> <u>Immersion</u> Depth up to 500 feet	MIL-STD-810F (Method 506.4) MIL-STD-810F (Method 506.4); SAE J 1455 MIL-STD-810F (Method 512.4)
<u>Drop Test</u>	MIL-STD-810F (Method 516.5)
<u>Vacuum Testing</u> 1 ⁻⁵ Torr Connections during test: electrical/pressure *Can be conducted in conjunction with Temperature Testing	ST/SG/ac.10/27/Add.2
<u>Crush Testing</u> Upto 60,000 lbs Variable platens	SAE J2464 section 4.2.6
<u>Nail Penetration</u> Speed up to 3 in/sec Variable nail diameter	SAE J2464 section 4.2.3