Mechanical Technology & Testing
Powertech’s clients have to ensure that new components and systems will perform as designed under field conditions, which subject the equipment to vibration, thermal cycling, and corrosion. Electric utilities, too, need to know that components such as conductors, connectors, tower anchor bolts, surge arresters, and insulators meet specifications for tensile strength and fatigue performance.

MECHANICAL PERFORMANCE

Powertech’s Mechanical Technology and Testing Group has extensive experience in many areas of mechanical testing—from research and development to consulting to failure analysis. We work closely with clients in the electric utility, automotive, electronics, and other industries to verify the performance of prototypes in advance of product release and also conduct failure analyses when problems arise.

Powertech’s Mechanical Technology and Testing Laboratory conducts tests to evaluate the performance of a wide variety of materials, components, and systems. The laboratory performs testing for vibration/shock, environmental, combined vibration and environmental (HALT/HASS), tension, compression, and impact to simulate in-service conditions or other specifications. Tests are typically conducted according to industry standards and custom, non-standard tests are a specialty.

Powertech has the capabilities for on-site mechanical field investigations of equipment and structures such as hydroelectric installations, rotating machinery, and bridges. With its long history in the industry, the Mechanical Technology and Testing Group can utilize its R&D skills to help clients determine what tests to conduct and, if necessary, to develop new advanced test methods.

Powertech’s mechanical engineers and technologists provide expert evaluation of test results and recommendations for solutions. The Mechanical Technology and Testing Group also conducts integrated test programs through collaboration with Powertech’s in-house High Voltage, High Current, High Power, Applied Materials, and Asset Management Labs.

Testing and failure analysis services
CONTENTS

04 Services

05 Capabilities

06 Structural, Vibration/Shock, and Tensile Testing

07 Focus On: Composite Bearing Testing
Research and Development
To meet specialized needs, the Mechanical Testing Group can work with clients to develop and demonstrate new, advanced test methods.

Testing
Powertech offers a full range of mechanical testing services, including:

Vibration and Shock
- Vibration testing (sine wave or random vibration profiles up to 13,500 lbf)
- Shock testing (up to 118 g)
- Transport simulation
- Drop testing

Environmental
- Environmental testing, including thermal cycling with humidity
- Combined vibration/environment testing ("shake and bake")
- Pressurized gaseous environment tension and fatigue testing (up to 10,000 psi)
- Temperature-controlled mechanical testing

Tensile Testing
- Tension, compression, bend testing (up to 440,000 lbf)
- Fatigue testing (up to 55,000 lbf)
- Charpy impact testing
- Large-scale tension/compression load frame (up to 40 feet in length)

Other
- Custom-designed or nonstandard mechanical testing
- Design optimization: modal analysis, FEA simulation
- On-site vibration and shock measurement and monitoring
- Facilitate witnessing of product certification
**CAPABILITIES**  An extensive variety of testing and analytical capabilities.

Tests can be conducted in accordance with standards set by ANSI, ASTM, CEA, CSA, DNV, IEC, IEEE, ISO, NACE, MIL, SAE, and others. With experience in making adaptations for custom projects, the lab can also meet specialized requests for non-standard tests or setups.

**VIBRATION AND SHOCK**

<table>
<thead>
<tr>
<th>EQUIPMENT</th>
<th>SPECIFICATIONS</th>
<th>TESTS</th>
</tr>
</thead>
</table>
| Unholtz-Dickie Electro-Dynamic Vibration Table | **Force capability:** 60 kN (13,500 lbf)  
**Frequency range:** 5-2,000 Hz | • Sine wave or random vibration profiles  
• Resonance frequency search |
| Ling Dynamics Electro-Dynamic Vibration Table | **Force capability:** 33.4 kN (7,500 lbf)  
**Frequency range:** 5-2,000 Hz | • Sine wave or random vibration profiles  
• Resonance frequency search |

**ENVIRONMENTAL**

<table>
<thead>
<tr>
<th>EQUIPMENT</th>
<th>SPECIFICATIONS</th>
<th>TESTS</th>
</tr>
</thead>
</table>
| Envirotronics Environmental Chamber | **Temperature range:** -73°C to +177°C  
**Humidity range:** 20 to 95% RH  
**Interior dims:** 46” W x 49” D x 60” H | • Temperature and humidity cycling  
• Temperature accelerated aging  
• Combined thermal and vibration [HALT and HASS] |
| Custom Walk-in Environmental Chamber | **Temperature range:** -50°C to +70°C  
**Interior dims:** 105” W x 144” D x 96” H | • Temperature and humidity testing  
• Temperature accelerated testing |

**TENSILE, COMPRESSION, FATIGUE, IMPACT & STRUCTURAL**

<table>
<thead>
<tr>
<th>EQUIPMENT</th>
<th>SPECIFICATIONS</th>
<th>TESTS</th>
</tr>
</thead>
</table>
| Tinius Olsen Test Frame          | **Capacity:** 1,800 kN (400,000 lbf)  
**Testing speed:** 0-76 mm/min | • Tensile, compression, and flexural tests |
| Satec Impact Tester              | **Capacity:** 25 – 300 ft-lb     | • Charpy and Izod impact tests            |
| Instron Servo Hydraulic Dynamic Testing Equipment | **Capacity:** 245 kN (55,000 lbf) | • Linear and compression tests  
• Torsion tests |
| MTS Criterion Electromechanical Test Equipment | **Capacity:** 100 kN (22,500 lbf) | • Tensile, compression, and flexural tests |
| Long Bed Tensile Load Frame      | **Capacity:** 2000 kN (440,000 lbf) | • Tensile and creep tests up to 19m length |
| Floor anchor pads                | **Capacity:** various depending on specific test requirements. | • Custom tests of full scale sub-structures such as crossarms, towers |
STRUCTURAL, VIBRATION/SHOCK, AND TENSILE TESTING

- Full-scale load testing of sub-structures
- Tensile testing
- Cable and shackle testing
- Long bed tensile test frame
FOCUS ON: COMPOSITE BEARING TESTING

Powertech specializes in accelerated wear and friction testing for self-lubricating bearings. In fact, it is the only lab in the world with the unique expertise to conduct life testing of self-lubricating bearings for hydroelectric plants for the United States Army Corps of Engineers.

This background also has direct application for assessment of bearing performance in other fields such as the marine industry, wind turbines and other rotating equipment.

Testing is performed using our in-house custom universal load frame. Bearing properties such as static and dynamic coefficients of friction, wear rate, and operating temperature are continuously monitored and reported during testing under wet and dry conditions.

SELECTED CLIENTS
THE POWERTECH ADVANTAGE

Powertech Labs Inc. is one of the largest testing and research laboratories in North America, situated in beautiful British Columbia, Canada. Our 11-acre facility offers 15 different testing labs for a one-stop-shop approach to managing utility generation, transmission and distribution power systems.

Powertech is home to a broad range of scientists, engineers, and technical specialists, with capabilities in electrical testing, cable condition assessment, mechanical and materials engineering, software technologies, power system studies, chemical analysis, gas systems engineering, and smart utility services. These skilled researchers have decades of collective and real-world experience and often work in cross-departmental teams to investigate, diagnose and solve complex problems.

As an independent, third-party testing facility, we adhere to the highest laboratory (ISO 17025), quality (ISO 9001) and environmental (ISO 14001) management standards. Many of our scientists and engineers chair or participate in various standards committees within their fields of expertise. Additionally we have the capabilities to derive and develop non-standard testing methods and setups required to test product prototypes and perform forensic analysis.

Outside of the utilities industry, Powertech provides routine testing capabilities, product development, research and consulting services to support an array of industrial-type operations, electrical equipment manufacturers and automotive original equipment manufacturers.

12388 - 88th Avenue
Surrey, British Columbia
Canada V3W 7R7

604.590.7500
info@powertechlabs.com
powertechlabs.com