

TESTING AND CALIBRATION LABORATORY ACCREDITATION PROGRAM (LAP)

Scope of Accreditation

Legal Name of Accredited Laboratory: Powertech Labs Inc

Contact Name: Ian Chang

Address: 12388 88th Avenue
Surrey, BC
V3W 7R7

Telephone: 604 598 5128

Fax: 888 590 6501

Website: powertechlabs.com

Email: ian.chang@powertechlabs.com

| | |
|-----------------------------------|--|
| SCC File Number: | 15669 |
| Accreditation Standard(s): | ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories |
| Fields of Testing: | Chemical/Physical Electrical/Electronic Mechanical/Physical |
| Program Specialty Area: | Environmental Testing (ET) |
| Initial Accreditation: | 2005-01-13 |
| Most Recent Accreditation: | 2023-02-11 |
| Accreditation Valid to: | 2025-01-13 |

Remarque: La présente portée d'accréditation existe également en français, sous la forme d'un document distinct.

Note: This scope of accreditation is also available in French as a document issued separately.

ELASTOMERS AND PROTECTIVE AND COATINGS

Paints, Varnishes, Inks, Coatings, and Allied Products:

| | |
|-----------|---|
| ASTM B117 | Standard Practice for Operating Salt Spray (Fog) Apparatus |
| ASTM G154 | Standard Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials |
| ISO 9227 | Corrosion tests in artificial atmospheres - Salt spray tests |

Plastics, Resins and Rubbers:

| | |
|------------|--|
| ASTM D412 | Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers – Tension Only for: 9, test method A |
| ASTM D572 | Standard Test Method for Rubber - Deterioration by Heat and Oxygen Only for: 10.2 and 10.4 |
| ASTM D638 | Standard Test Method for Tensile Properties of Plastics |
| ASTM D785 | Standard Test Method for Rockwell Hardness of Plastics and Electrical Insulating Materials |
| ASTM D2240 | Standard Test Method for Rubber Property - Durometer Hardness Only for: 3.0 and 9.2 |
| ASTM D3418 | Fusion and Crystallization of Polymers by Differential Scanning Calorimetry Only for: 10.2 For Glass Transition |

ELECTRICAL PRODUCTS AND ELECTRONIC PRODUCTS

Communications Equipment and Systems:

Components and Assemblies

| | |
|----------------|---|
| DNVGL-CG-0339 | Environmental test specification for electrical, electronic and programmable equipment and systems Only for: Clause 6 Vibration tests, except for Table 9 Extreme vibration strain |
| IEC 60068-2-27 | Environmental Testing – Part 2-27: Tests - Test Ea and guidance: Shock |
| IEC 60068-2-6 | Environmental testing – Part 2-6: Tests – Test Fc: Vibration (sinusoidal) |
| IEC 60068-2-64 | Environmental testing - Part 2-64: Tests – Test Fh: Vibration, broadband random and guidance |
| IEC 60945 | Maritime navigation and radiocommunication equipment and systems - General requirements - Methods of testing and required test results Only for: Clause 8.7 Vibration |

| | |
|-----------|--|
| IEC 61373 | Railway applications - Rolling stock equipment - Shock and vibration tests |
|-----------|--|

Components and Assemblies:

Conductors

| | |
|----------------|--|
| ASTM B1008 | Standard Test Method for Stress-Strain Testing for Overhead Electrical Conductors |
| CAN/CSA C61089 | Round wire concentric lay overhead electrical stranded conductors Only for: Annex B |
| DS/EN 50182 | Conductors for overhead lines – Round wire concentric lay stranded conductors Only for: Annex C |
| IEC 61089 | Round wire concentric lay overhead electrical stranded conductors Only for: Annex B |
| IEC 61395 | Overhead Conductors – Creep test procedures for stranded conductors |

Electrical Rotating Machines

| | |
|-----------|---|
| IEEE 1043 | IEEE Recommended Practice for Voltage Endurance Testing of Form-Wound Bars and Coils |
| IEEE 1310 | IEEE Recommended Practice for Thermal Cycle Testing of Form-Wound Stator Bars and Coils for Large Rotating Machines |
| IEEE 1553 | IEEE Standard for Voltage Endurance Testing of Form-Wound Coils and Bars for Hydrogenerators |

Insulators

| | |
|------------------|---|
| ANSI/NEMA C29.1 | American National Standard for Test Methods for Electrical Power Insulators Only for: Clause 4.2 Low-Frequency Dry Flashover Voltage Tests Clause 4.3 Low-Frequency Wet Flashover Voltage Tests Clause 4.4 Low-Frequency Dry Withstand Voltage Tests Clause 4.5 Low-Frequency Wet Withstand Voltage Tests Clause 4.7 Impulse Flashover Voltage Tests Clause 4.8 Impulse Withstand Voltage Tests Clause 4.9 Radio-Influence Voltage Tests Clause 5.2 Combined Mechanical- and Electrical-Strength Test (Suspension Insulators) |
| ANSI/NEMA C29.2A | American National Standard for Insulators Wet Process Porcelain and Toughened Glass – Distribution Suspension Type Only for: Clause 8.3.4 Combined Mechanical and Electrical-Strength Test |
| ANSI/NEMA C29.2B | American National Standard for Insulators - Wet Process Porcelain and Toughened Glass – Distribution Suspension Type |

| | |
|-------------|---|
| | Only for: Clause 8.3.4 Combined Mechanical and Electrical-Strength Test |
| CSA C411.1 | AC suspension insulators Only for: Clause 6.13 Electromechanical failing load test |
| IEC 60383-1 | Insulators for overhead lines with a nominal voltage above 1000V Part 1: Ceramic or glass insulator units for a.c. systems - Definitions, test methods and acceptance criteria Only for: Clause 18 Electromechanical failing load test (type and sample test) |

Switches and Controls

| | |
|------------------|--|
| ANSI/NEMA C37.54 | Indoor Alternating Current High-Voltage Circuit Breakers Applied as Removable Elements in Metal-Enclosed Switchgear -Conformance Test Procedures Only for: Clause 3.5 Lightning Impulse Withstand Voltage Tests Clause 3.6 Continuous Current Carrying Tests Clause 3.8 Load Current Switching Tests Clause 3.9 Short Time Current Carrying Tests Clause 3.10 Short-Circuit Current Tests Clause 6.2 Power Frequency Withstand Voltage Tests |
| ANSI/NEMA C37.55 | Switchgear - Medium Voltage Metal-Clad Assemblies - Conformance Test Procedures Only for: Clause 5.5.2 Power-Frequency Withstand Voltage Tests Clause 5.5.3 Lightning Impulse Withstand Tests Clause 5.7 Continuous Current Test Clause 5.8 Short-Time Withstand Current Test Clause 5.9 Momentary Withstand Current Test |
| ANSI/NEMA C37.57 | Metal-Enclosed Interrupter Switchgear Assemblies - Conformance Testing Only for: Clause 4.5.2 Power-Frequency Withstand Voltage Tests Clause 4.5.3 Lightning-Impulse Withstand Test Clause 4.7 Continuous Current Test Clause 4.8 Short-Time Withstand Current Test Clause 4.9 Momentary Withstand Current Test |
| ANSI/NEMA C37.58 | Indoor AC Medium-Voltage Switches for Use in Metal-Enclosed Switchgear - Conformance Test Procedures Only for: Clause 4.5 Lightning Impulse Withstand Test Clause 4.6 Continuous Current Test Clause 4.7.2 Momentary Withstand Current Test Clause 4.7.3 Short-Time Withstand Current Test Clause 4.9 Load-Switching Current Test (If Rated) |
| CSA C22.2 No. 31 | Switchgear Assemblies |

| | |
|----------------------------|--|
| | <p>Only for: Clause 6.1 Temperature</p> <p>Clause 8.5.1 Dielectric strength tests</p> <p>Clause 8.5.2 Impulse tests</p> <p>Clause 8.5.3 Corona-extinction tests</p> <p>Clause 8.5.4 Short-circuit withstand rating</p> |
| CSA-C22.2 No. 253/ UL 347 | <p>Medium-Voltage AC Contactors, Controllers, and Control Centers</p> <p>Only for: Clause 6.2.201 Impulse withstand tests</p> <p>Clause 6.2.202 Power-frequency voltage withstand tests</p> <p>Clause 6.5 Temperature Rise Test</p> <p>Clause 6.6 Short-Time, Momentary and Peak Withstand Current Bus Tests</p> <p>Clause 6.102 Make and Break Capacity Test</p> <p>Clause 6.103 Overload Test</p> <p>Clause 6.104 Fault Interruption Test</p> <p>Clause 6.202 Short Time Capability</p> |
| IEC 60282-1 | <p>Standard High-voltage fuses - Part 1: Current-limiting fuses</p> <p>Only for: Clause 7.4.5 Power-frequency voltage dry tests</p> <p>Clause 7.6 breaking tests</p> <p>Clause 7.5 temperature-rise tests and power-dissipation measurement</p> <p>Clause 7.7 tests for time-current characteristics</p> |
| IEC 60282-2 | <p>Standard High-voltage fuses - Part 2: Current-Expulsion fuses</p> <p>Only for: Clause 8.4.5 power-frequency voltage dry tests</p> <p>Clause 8.6 breaking tests</p> <p>Clause 8.5 temperature-rise tests</p> <p>Clause 8.7 time-current characteristics tests</p> |
| IEC 62271-1 | <p>High-voltage switchgear and controlgear –Part 1: Common specifications for alternating current switchgear and controlgear</p> <p>Only for: Clause 7.2 Power-frequency voltage tests</p> <p>Clause 7.4 Resistance measurement</p> <p>Clause 7.5 continuous current tests</p> <p>Clause 7.6 Short-time withstand current and peak withstand current tests</p> <p>Clause 7.9.1.1 Emission tests from the main circuits (radio interference voltage test, RIV)</p> |
| IEC 62271-111/ IEEE C37.60 | <p>High-voltage switchgear and controlgear - Part 111: Automatic circuit & reclosers and fault interrupters for alternating current systems up to 38 kV</p> <p>Only for: Clause 7.2 Dielectric tests</p> <p>Clause 7.4 Resistance measurement</p> <p>Clause 7.5 Continuous current tests</p> <p>Clause 7.6 Short-time withstand current and peak withstand current tests</p> <p>Clause 7.101 Line-charging current and cable-charging current interruption tests</p> <p>Clause 7.102 Making current capability</p> |

| | |
|---------------|--|
| | <p>Clause 7.103 Rated-short-circuit breaking current tests</p> <p>Clause 7.106 Partial discharge (corona) tests</p> <p>Clause 7.111.2 Simulated surge arrester operation test</p> <p>Clause 7.112 Condition of recloser after each test of 7.101, 7.103 and 7.104</p> <p>Clause 7.3 Radio interference voltage (RIV) test</p> |
| IEEE 386 | <p>IEEE Standard for Separable Insulated Connector Systems for Power Distribution Systems above 600 V</p> <p>Only for: Clause 7.6 Short-time current test</p> <p>Clause 7.7 Switching test</p> <p>Clause 7.8 Fault-closure test</p> |
| IEEE C37.09 | <p>Standard Test Procedure For AC High-Voltage Circuit Breakers Rated On A Symmetrical Current Basis</p> <p>Only for: Clause 4.2 Maximum voltage tests</p> <p>Clause 4.3 Power frequency tests</p> <p>Clause 4.4 Continuous current-carrying tests</p> <p>Clause 4.5.4 Power frequency withstand voltage tests</p> <p>Clause 4.5.5 Full-wave lightning impulse withstand voltage tests</p> <p>Clause 4.5.6 Impulse voltage test for interrupters and resistors</p> <p>Clause 4.5.7 Chopped wave lightning impulse withstand voltage tests</p> <p>Clause 4.5.8 Switching impulse voltage withstand tests</p> <p>Clause 4.6 Standard operating duty (standard duty cycle) tests</p> <p>Clause 4.7 Interrupting time tests</p> <p>Clause 4.8 Short-circuit current making and breaking tests</p> <p>Clause 4.9.2 Load current switching test conditions</p> <p>Clause 4.9.3 Load current endurance switching tests</p> <p>Clause 4.12 Out-of-phase switching current tests</p> <p>Clause 4.19 Partial discharge tests</p> <p>Clause 4.20 Radio interference voltage (RIV) tests</p> |
| IEEE C37.09a | <p>Standard Test Procedure for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis Amendment 1 - Capacitance Current Switching</p> <p>Only for: Clause 4.10 Capacitance current switching tests</p> |
| IEEE C37.20.2 | <p>Standard for Metal-Clad Switchgear</p> <p>Only for: Clause 6.2.1 Dielectric tests</p> <p>Clause 6.2.2 Rated continuous current tests</p> <p>Clause 6.2.3 Momentary withstand current tests</p> <p>Clause 6.2.4 Short-time withstand current tests</p> <p>Clause 6.2.5 Auxiliary equipment primary disconnecting device momentary current withstand test</p> |
| IEEE C37.20.3 | <p>Standard for Metal-Enclosed Interrupter Switchgear</p> <p>Only for: Clause 6.2 Dielectric tests</p> <p>Clause 6.5 Temperature-rise tests</p> |

| | |
|---------------|--|
| | <p>Clause 6.6 Short-time withstand current and peak withstand current tests</p> <p>Clause 6.14.1 Test for bus-bar insulation</p> |
| IEEE C37.20.4 | <p>IEEE Standard for Indoor AC Switches (1 kV to 38 kV) for Use in Metal-Enclosed Switchgear</p> <p>Only for: Clause 6.6 Short-time withstand current and peak withstand current (formerly momentary) tests</p> <p>Clause 6.13 Fault-making test</p> <p>Clause 6.14 Load-switching current test</p> <p>Clause 6.15 Cable-charging current switching test (optional)</p> <p>Clause 6.16 Unloaded-transformer switching test (optional)</p> <p>Clause 6.17 Direct-acting fuse-tripping current test (optional)</p> |
| IEEE C37.20.7 | <p>IEEE Guide for Testing Metal-Enclosed Switchgear Rated Up to 38 kV for Internal Arcing Faults</p> <p>Only for: 5 Arcing Fault</p> |
| IEEE C37.23 | <p>Metal-Enclosed Bus</p> <p>Only for: Clause 6.2.1.1 Power Frequency Withstand Voltage Tests</p> <p>Clause 6.2.1.2 Lightning impulse withstand voltage tests</p> <p>Clause 6.2.1.3 Test for bus-bar insulation, bus-joint insulation, and bus-tap insulation</p> <p>Clause 6.2.2 Continuous-current</p> <p>Clause 6.2.3 Momentary withstand current</p> <p>Clause 6.2.4 Short-time withstand current</p> |
| IEEE C37.30.1 | <p>Standard Requirements for AC High-Voltage Air Switches Rated Above 1000 V</p> <p>Only for: Clause 8.1.1 Power frequency withstand voltage tests</p> <p>Clause 8.1.2 Lightning impulse dry withstand voltage tests</p> <p>Clause 8.1.3 Power frequency and lightning impulse open gap withstand voltage tests</p> <p>Clause 8.1.4 Switching impulse voltage test of switches rated 362 kV and above</p> <p>Clause 8.2 Temperature rise tests</p> <p>Clause 8.3 Short-time Withstand Current Tests</p> <p>Clause 8.4 Fault-making current test</p> <p>Clause 8.7 Corona tests</p> <p>Clause 8.8 Radio-influence tests</p> |
| IEEE C37.30.4 | <p>IEEE Standard for Test Code for Switching and Fault Making Tests for High-Voltage Interrupter Switches, Interrupters or Interrupting Aids Used on or Attached to Switches Rated for Alternating Currents Above 1000 V</p> <p>Only for: Clause 8.1 Switching Tests</p> <p>Clause 8.2 Fault-making current test</p> |
| IEEE C37.41 | <p>ANSI/IEEE Standard Design Tests for High-Voltage (>1000 V) Fuses and Accessories</p> <p>Only for: Clause 8.2 Power-frequency dry-withstand voltage tests</p> |

| | |
|-------------|---|
| | <p>Clause 8.3 Power-frequency wet-withstand voltage tests on outdoor devices</p> <p>Clause 8.5 Lightning impulse-withstand voltage tests</p> <p>Clause 9 Interrupting tests</p> <p>Clause 10 Radio-influence tests</p> <p>Clause 11 Temperature-rise tests</p> <p>Annex A.4 Short-time withstand current tests for disconnecting switches</p> <p>Annex A.5 Load-break tests</p> |
| IEEE C37.42 | <p>IEEE Standard Specifications for High-Voltage (> 1000 V) Expulsion-Type Distribution-Class Fuses, Fuse and Disconnecting Cutouts, Fuse Disconnecting Switches, and Fuse Links, and Accessories Used with These Devices</p> <p>Only for: Clause 3.3.1 Dielectric tests</p> <p>Clause 3.3.2 Interrupting [breaking]</p> <p>Clause 3.3.5 Short-time current tests for disconnecting cutouts</p> <p>Clause 3.3.6 Temperature-rise tests</p> |
| IEEE C37.45 | <p>IEEE Standard for Design Test Specifications for High Voltage (> 1000 V) Distribution Class Enclosed Single-Pole Air Switches</p> <p>Only for: Clause 8.1 Dielectric tests</p> <p>Clause 8.2 Radio-influence tests</p> <p>Clause 8.3 Short-time current tests</p> <p>Clause 8.4 Temperature-rise tests</p> |
| IEEE C37.46 | <p>Specifications for High-Voltage (>1000 V) Expulsion and Current-Limiting Power Class Fuses and Fuse Disconnecting Switches</p> <p>Only for: Clause 4.1 Dielectric tests</p> <p>Clause 4.2 Interrupting [breaking]</p> <p>Clause 4.4 Temperature-rise</p> |
| IEEE C37.66 | <p>IEEE Standard Requirements for Capacitor Switches for AC Systems (1 kV to 38 kV)</p> <p>Only for: Clause 6.2 Insulation (dielectric) tests</p> <p>Clause 6.3 Short-time current tests</p> <p>Clause 6.4 Rated fault-making current tests</p> <p>Clause 6.5 Operating duty tests</p> |
| IEEE C37.74 | <p>Standard Requirements for Subsurface, Vault, and Pad-Mounted Load-Interrupter Switchgear and Fused Load-Interrupter Switchgear for Alternating Current Systems up to 38 kV</p> <p>Only for: Clause 6.7.2 Dielectric tests</p> <p>Clause 6.7.3 Continuous current test</p> <p>Clause 6.7.4 Short-circuit withstand current tests</p> <p>Clause 6.7.5 Switching tests</p> <p>Clause 6.7.6 Thermal runaway test</p> <p>Clause 6.7.7 Partial discharge tests</p> <p>Clause 6.7.8 DC withstand voltage test</p> |

| | |
|-----------------------|--|
| IEEE C37.100.1 | IEEE Standard for Common Requirements for High-Voltage Power Switchgear Rated Above 1000 V Only for: Clause 7.4 Radio influence voltage (RIV) test |
| IEEE/IEC 62271-37-013 | IEEE/IEC International Standard for High-voltage switchgear and controlgear -- Part 37-013: Alternating-current generator circuit-breakers Only for: Clause 6.2.2.1 Rated power frequency withstand voltage (dry) Clause 6.2.6.2 Lightning impulse voltage test Clause 6.2.12 Sound level tests Clause 6.5 Temperature rise test Clause 6.6 Short-time withstand current and peak withstand current tests Clause 6.103 System-source short-circuit current making and breaking tests Clause 6.104 Load Current Breaking Tests Clause 6.105 Generator-source short-circuit current making and breaking tests Clause 6.106 Out-Of-Phase Current Switching Tests |
| ASTM F855 | Standard Specifications for Temporary Protective Grounds to Be Used on De-energized Electric Power Lines and Equipment Only for: Clause 12.3 Electrical short circuit capacity (Clamp) Clause 25.2 Electrical short circuit capacity (Ferrule) |
| IEEE 837 | Standard for Qualifying Permanent Connections Used in Substation Grounding Only for: Clause 7.2 Electromagnetic force (EMF) test Clause 8.2 Fault-making current test Clause 11 Fault-current test |

Transformers

| | |
|-------------|--|
| IEC 61869-1 | Instrument transformers - Part 1: General requirements Only for: Clause 7.2.2 Temperature-rise test Clause 7.2.3 Impulse voltage withstand test on primary terminals Clause 7.2.4 Wet test for outdoor type transformers Clause 7.3.1 Power-frequency voltage withstand tests on primary terminals Clause 7.3.2 Partial discharge measurement Clause 7.3.4 Power-frequency voltage withstand tests on secondary terminals Clause 7.3.6 Verification of markings Clause 7.4.1 Chopped impulse voltage withstand test on primary terminals |
| IEC 61869-3 | Instrument transformers - Part 3: Additional requirements for inductive voltage transformers |

| | |
|----------------|---|
| | <p>Only for: Clause 7.2.2 Temperature-rise test Clause 7.2.3 Impulse voltage withstand test on primary terminals</p> |
| IEEE C57.12.90 | <p>Standard Test Code for Liquid-Immersed Distribution, Power, and Regulating Transformers</p> <p>Only for: Clause 5 Resistance measurements Clause 6 Polarity and phase-relation tests Clause 7 Ratio tests Clause 8 No-load losses and excitation current Clause 9 Load losses and impedance voltage Clause 10 Dielectric tests Clause 11 Temperature-rise tests Clause 12 Short circuit tests Clause 13 Audible sound emissions</p> |
| IEEE C57.12.91 | <p>Standard Test Code for Dry-Type Distribution and Power Transformers</p> <p>Only for: Clause 5 Resistance measurements Clause 6 Polarity and phase relation tests Clause 7 Ratio tests Clause 8 No load losses and excitation current Clause 9 Load losses and impedance voltage Clause 10 Dielectric tests Clause 11 Temperature tests Clause 12 Short circuit tests Clause 13 Audible Sound Level Measurements</p> |
| IEEE C57.13 | <p>Standard Requirements for Instrument Transformers</p> <p>Only for: Clause 8.2 Impedance excitation, and composite error measurements Clause 8.3 Polarity Clause 8.4 Resistance measurements Clause 8.6 Partial discharge measurement Clause 8.9 Measurement of Open-Circuit Voltage of Current Transformers Clause 9.3 Impedance measurements Clause 9.4 Polarity Clause 10.2 Impedance measurements Clause 10.3 Polarity Clause 11.2 Temperature rise tests Clause 11.4 Partial discharge measurement Clause 12.2 Current transformer temperature rise tests</p> |

Wiring and Related Products

| | |
|-------------|---|
| HD 629.1-S3 | <p>Test Requirements for accessories for use on power cable of rated voltage from 3,6/6(7,2) kV up to 20,8/36(42) kV – Part1: Accessories for cables with extruded insulation</p> |
|-------------|---|

| | |
|----------|--|
| | Exception: Table 14 |
| EN 61442 | <p>Test methods for accessories for power cables with rated voltages from 6 kV (Um = 7,2 kV) up to 36 kV (Um = 42 kV)</p> <p>Only for:</p> <ul style="list-style-type: none"> Clause 4 AC voltage tests Clause 6 Impulse voltage tests Clause 7 Partial discharge test Clause 9 Heating cycle voltage test Clause 9.4 Immersion test for outdoor terminations Clause 10 Thermal short-circuit test (screen) Clause 11 Thermal short-circuit test (conductor) Clause 12 Dynamic short-circuit test Clause 13 Humidity and salt fog tests Clause 14 Impact test at ambient temperature |

ENVIRONMENTAL AND OCCUPATIONAL HEALTH AND SAFETY

Environmental:

Soil/Sediment (PCB in Soil)

| | |
|--------|--|
| ACTP 6 | <p>Polychlorinated Biphenyls (PCB) in Soil by Gas Chromatography [BC ENV, EPA 3570, EPA 3665A, EPA 3620C, EPA 8082A]</p> <ul style="list-style-type: none"> Aroclor 1242 Aroclor 1248 Aroclor 1254 Aroclor 1260 Total PCB |
|--------|--|

Soil/Sediment (EPH in Soil)

| | |
|---------|---|
| ACTP 22 | <p>Extractable Petroleum Hydrocarbons (EPH) in Solids by GC/FID [BC ENV, EPA 3570]</p> <ul style="list-style-type: none"> EPHs10-19 EPHs19-32 |
|---------|---|

Soil/Sediment (Metals in Soil)

| | |
|---------|--|
| ACTP 25 | Strong Acid Leachable Metals (SALM) in Soil by ICP-OES |
|---------|--|

| | |
|--|--|
| | <p>[BC ENV, EPA 6010D]</p> <p>Aluminum</p> <p>Antimony</p> <p>Arsenic</p> <p>Barium</p> <p>Beryllium</p> <p>Boron</p> <p>Cadmium</p> <p>Chromium</p> <p>Cobalt</p> <p>Copper</p> <p>Iron</p> <p>Lead</p> <p>Lithium</p> <p>Manganese</p> <p>Mercury</p> <p>Molybdenum</p> <p>Nickel</p> <p>Selenium</p> <p>Silver</p> <p>Strontium</p> <p>Sulphur</p> <p>Thallium</p> <p>Thorium</p> <p>Tin</p> <p>Titanium</p> <p>Tungsten</p> <p>Uranium</p> <p>Vanadium</p> <p>Zinc</p> |
|--|--|

Water (Inorganic)

| | |
|--------|---|
| ACTP 8 | <p>pH in Water and Soil by Electrometry</p> <p>[BC ENV, APHA 4500-H+]</p> |
|--------|---|

Water (Organic – PCB in Water)

| | |
|--------|--|
| ACTP 7 | <p>Polychlorinated Biphenyls (PCB) in Water by Gas Chromatography</p> <p>[BC ENV, EPA 3511, EPA 3665A, EPA 3620C, EPA 8082A]</p> |
|--------|--|

| | |
|--|--|
| | <p>Aroclor 1242 Aroclor 1248 Aroclor 1254 Aroclor 1260 Total PCB</p> |
|--|--|

Water (Organic – EPH in Water)

| | |
|---------|--|
| ACTP 23 | <p>Extractable Petroleum Hydrocarbons (EPH) in Water by GC/FID [BC ENV, EPA 3511] EPHw10-19 EPHw19-32</p> |
|---------|--|

MACHINERY

Boilers, Pressure Vessels and Piping:

| | |
|----------|---|
| ISO 7866 | <p>Gas cylinders - Refillable seamless aluminium alloy gas cylinders - Design, construction and testing Only for: Annex B Test method to determine the sustained-load cracking resistance of aluminium alloy gas cylinders</p> |
|----------|---|

Transportation, Agricultural and Construction Vehicles and Components:

Automobiles, Light Trucks, Vans & Trailers

| | |
|------------|--|
| ANSI HGV 2 | <p>Compressed hydrogen gas vehicle fuel containers Only for: Clause 11.3 Leak Test Clause 12.4 Burst Test Clause 12.5 Cycle Test Clause 18.3.2 Ambient Cycling Test Clause 18.3.3 Environmental Test Clause 18.3.4 Extreme Temperature Cycling Clause 18.3.5 Hydrostatic Burst Test Clause 18.3.6 Flaw Tolerance Test Clause 18.3.7 Drop Test Clause 18.3.8 Fire Test Clause 18.3.9 Accelerated Stress Rupture Test Clause 18.3.10 High Strain Rate Impact Test Clause 18.3.11 Permeation Test Clause 18.3.12 Boss Torque Test Clause 18.3.13 Hydrogen Gas Cycling Test</p> |
|------------|--|

| | |
|------------------|---|
| | <p>Clause 18.3.14 Leak Before Break Test</p> <p>Clause 18.5.2 Ambient Cycling Test</p> <p>Clause 18.5.3 Hydrostatic Burst Test</p> <p>Clause 18.5.4 Container test for performance durability</p> <p>Clause 18.5.5 High strain rate impact test</p> <p>Clause 18.5.6 Permeation test</p> <p>Clause 18.5.7 Container test for expected on-road performance</p> |
| ANSI HGV 3.1 | <p>Fuel system components for compressed hydrogen gas powered vehicles</p> <p>Only for: Clause 5.3 Hydrostatic strength</p> <p>Clause 5.4 Leakage</p> <p>Clause 5.5 Excess torque resistance</p> <p>Clause 5.6 Bending moment</p> <p>Clause 5.7 Continuous operation</p> <p>Clause 5.8.1 Salt spray exposure</p> <p>Clause 5.9 Ultraviolet resistance of external surfaces</p> <p>Clause 5.10 Automotive fluid exposure</p> <p>Clause 5.12 Abnormal electrical voltages</p> <p>Clause 5.13 Vibration resistance</p> <p>Clause 5.15 Insulation resistance</p> <p>Clause 5.16 Pre-cooled hydrogen exposure</p> <p>Clause 8.4.1 Leakage</p> <p>Clause 8.4.2 Continuous operation</p> <p>Clause 10.4.1 Continuous operation</p> <p>Clause 10.4.2 Operating torque</p> <p>Clause 11.4.1 Automatic valve</p> <p>Clause 11.4.2 Automatic container valve</p> <p>Clause 13.4.3 Insulation resistance</p> <p>Clause 14.4.1 Hydrostatic strength</p> <p>Clause 14.4.2 External leakage</p> <p>Clause 14.4.3 Continuous operation</p> <p>Clause 14.4.4 Pressure impulse</p> <p>Clause 15.4.1 Hydrostatic strength</p> <p>Clause 15.4.2 Continuous operation</p> <p>Clause 15.4.3 Opening and reseating characteristics</p> |
| ANSI/CSA HGV 4.4 | <p>Breakaway devices for compressed hydrogen dispensing hoses and systems</p> <p>Only for: 2.2 Leakage</p> <p>2.3 Hydrostatic Strength</p> <p>2.4 Separation Test</p> <p>2.5.1 Oxygen Aging Test</p> <p>2.6 Electrical Conductivity</p> <p>2.7.1 Deformation</p> |

| | |
|-----------------------|---|
| | <p>2.7.2 Strength Tests - Impact Test</p> <p>2.7.3 Drop Test</p> <p>2.8.1 Pressure Cycle Test</p> |
| ANSI HPRD 1 | <p>Thermally activated pressure relief devices for compressed hydrogen vehicle fuel containers</p> <p>Only for: 7.2 Pressure Cycling</p> <p>7.3 Accelerated Life</p> <p>7.4 Thermal Cycling</p> <p>7.6 Automotive Fluid Exposure</p> <p>7.7 UV exposure</p> <p>7.8.1 Atmospheric exposure (oxygen ageing)</p> <p>7.10 Impact due to drop and vibration</p> <p>7.11 Leakage</p> <p>7.12 Bench top activation</p> <p>7.13 Flow capacity</p> <p>7.14 High Pressure activation and flow rate</p> |
| ANSI NGV 2 | <p>Compressed natural gas vehicle fuel containers</p> <p>Only for: Section 11.3 Leak Test</p> <p>Section 12.4 Burst Test</p> <p>Section 12.5 Cycle Test</p> <p>Section 19.3 Ambient Cycling Test</p> <p>Section 19.4 Environmental Test</p> <p>Section 19.5 Extreme Temperature Cycling</p> <p>Section 19.6 Hydrostatic Burst Test</p> <p>Section 19.7 Composite Flaw Tolerance Test</p> <p>Section 19.8 Drop Test</p> <p>*Section 19.9 Bonfire Test</p> <p>Section 19.10 Accelerated Stress Rupture Test</p> <p>*Section 19.11 Penetration Test</p> <p>Section 19.12 Permeation Test</p> <p>Section 19.13 Natural Gas Cycling Test</p> <p>Section 19.14 Leak Before Break Test</p> |
| ANSI NGV3.1/ CSA 12.3 | <p>Fuel System Components for Natural Gas Powered Vehicles</p> <p>Only for: 5.2 Hydrostatic Strength</p> <p>5.7.2 Salt spray exposure – Salt spray test only</p> <p>5.8.2 Atmospheric Exposure Test - Oxygen Aging</p> <p>5.11 Vibration resistance</p> <p>5.14 Ultraviolet Resistance of External Surfaces</p> <p>5.15 Automotive fluid exposure</p> |
| ANSI PRD 1 | <p>Pressure relief devices for natural gas vehicle (NGV) fuel containers</p> <p>Only for: 7.7 UV resistance</p> <p>7.10.2 Impact due to drop and vibration – vibration</p> <p>7.14.1 Atmospheric exposure - Oxygen Aging</p> |

| | |
|----------------|--|
| CSA B51 Part 2 | <p>High-Pressure Cylinders for the On-board Storage of Natural Gas as a Fuel for Automotive Vehicles</p> <p>Only for: Clause 14.12 Hydrostatic Pressure Burst Test</p> |
| EC 79 | <p>Implementing Regulation (EC) No 79/2009 of the European Parliament and of the Council on type-approval of hydrogen-powered motor vehicles Annex IV</p> <p>Only for: Part 2, Para. 4.2.1 Burst test</p> <p>Part 2, Para. 4.2.2 Ambient temperature pressure cycle test</p> <p>Part 2, Para. 4.2.3 Leak-before-break (LBB) performance test</p> <p>*Part 2, Para. 4.2.4 Bonfire test</p> <p>*Part 2, Para. 4.2.5 Penetration test</p> <p>Part 2, Para. 4.2.6 Chemical exposure test</p> <p>Part 2, Para. 4.2.7 Composite flaw tolerance test</p> <p>Part 2, Para. 4.2.8 Accelerated stress rupture test</p> <p>Part 2, Para. 4.2.9 Extreme temperature pressure cycle test</p> <p>Part 2, Para. 4.2.10 Impact damage test</p> <p>Part 2, Para. 4.2.11 Leak test</p> <p>Part 2, Para. 4.2.12 Permeation test</p> <p>Part 2, Para. 4.2.13 Boss torque test</p> <p>Part 2, Para. 4.2.14 Hydrogen gas cycling test</p> <p>Part 3, Para. 4.1.1.2(b) Hydrogen compatibility test (non-metallic materials)</p> <p>Part 3, Para. 4.1.2 Ageing test</p> <p>Part 3, Para. 4.2.1 Corrosion resistance test (Test a only)</p> <p>Part 3, Para. 4.2.2 Endurance</p> <p>Part 3, Para. 4.2.3 Hydraulic pressure cycle test</p> <p>Part 3, Para. 4.2.4 Internal leakage test</p> <p>Part 3, Para. 4.2.5 External leakage test</p> |
| ISO 11114-4 | <p>Transportable gas cylinders - Compatibility of cylinder and valve materials with gas contents -Part 4: Test methods for selecting steels resistant to hydrogen embrittlement</p> <p>Only for: Section 5.1 (Method A) – Disc test</p> <p>Section 5.3 (Method C) - Test method to determine the resistance to hydrogen assisted cracking of steel cylinders</p> |
| ISO 11119-3 | <p>Gas cylinders - Refillable composite gas cylinders and tubes - Design, construction and testing - Part 3: Fully wrapped fibre reinforced composite gas cylinders and tubes up to 450L with non-load-sharing metallic or non-metallic liner</p> <p>Only for: 8.5.1 Proof pressure test</p> <p>8.5.3 Cylinder burst test</p> <p>8.5.4 Ambient cycle test</p> <p>8.5.6 Environmental cycle test</p> <p>8.5.7 Environmentally assisted stress rupture test</p> <p>8.5.8 Flaw test</p> <p>8.5.12 Permeability test</p> |

| | |
|------------|---|
| | <p>8.5.13 Torque test on cylinder neck boss</p> <p>8.5.15 Leak test</p> <p>8.5.16 Pneumatic cycle test</p> |
| ISO 17268 | <p>Gaseous hydrogen land vehicle refuelling connection devices</p> <p>Only for: Section 7 Design Verification Tests Procedures</p> |
| SAE J2600 | <p>Compressed hydrogen surface vehicle fueling connection devices</p> <p>Only for: Section 5 Type (Design Verification) Tests</p> |
| UNECE R110 | <p>Uniform provisions concerning the approval of:</p> <p>I. Specific components of motor vehicles using compressed natural gas (CNG) and/or liquefied natural gas (LNG) in their propulsion system II. Vehicles with regard to the installation of specific components of an approved type for the use of compressed natural gas (CNG) and/or liquefied natural gas (LNG) in their propulsion system</p> <p>Annex 3A, Appendix A</p> <p>Only for: Para. A.6 Leak Before Break Test</p> <p>Para. A.7 Extreme Temperature Cycling</p> <p>Para. A.10 Leak Test</p> <p>Para. A.11 Hydraulic Test</p> <p>Para. A.12 Hydrostatic pressure burst test</p> <p>Para. A.13 Ambient temperature pressure cycling</p> <p>Para. A.14 Acid environment test</p> <p>*Para. A.15 Bonfire test</p> <p>*Para. A.16 Penetration tests</p> <p>Para. A.17 Composite flaw tolerance tests</p> <p>Para. A.18 High temperature creep test</p> <p>Para. A.19 Accelerated stress rupture test</p> <p>Para. A.20 Impact damage test</p> <p>Para. A.21 Permeation test</p> <p>Para. A.25 Boss torque test</p> <p>Para. A.24 (a) Pressure relief device requirements - 24 hr temperature and pressure hold</p> <p>Para. A.24 (b) Pressure relief device requirements - Pressure Cycling</p> <p>Para. A.27 Natural gas cycling test</p> |
| UNECE R134 | <p>Uniform provisions concerning the approval of motor vehicles and their components with regard to the safety-related performance of hydrogen-fuelled vehicles (HFCV)</p> <p>Only for: Para. 5.1 Verification tests for baseline metrics</p> <p>Para. 5.2 Verification tests for performance durability (sequential hydraulic tests)</p> <p>Para. 5.3 Verification test for expected on-road performance (sequential pneumatic tests)</p> <p>Para. 5.4 Verification test for service terminating performance in fire</p> <p>Para. 9.3.2.1 Rupture test in batch testing</p> <p>Para. 9.3.2.2 Ambient temperature pressure cycling test in batch testing</p> <p>Annex 3, Para. 2 Test procedures for baseline performance metrics</p> <p>Annex 3, Para. 3 Test procedures for performance durability</p> <p>Annex 3, Para. 4 Test procedures for expected on-road performance</p> <p>Annex 3, Para. 5 Test procedures for service termination performance in fire</p> <p>Annex 4, Para. 1.1 Pressure cycling test</p> <p>Annex 4, Para. 1.2 Accelerated life test</p> <p>Annex 4, Para. 1.3 Temperature cycling test</p> |

| | |
|---------------|---|
| | <p>Annex 4, Para. 1.5 Vehicle environment test Annex 4, Para. 1.7 Drop and vibration test Annex 4, Para. 1.8 Leak test Annex 4, Para. 1.9 Bench top activation test Annex 4, Para. 1.10 Flow rate test Annex 4, Para. 2.1 Hydrostatic strength test Annex 4, Para. 2.2 Leak test Annex 4, Para. 2.3 Extreme temperature pressure cycling test Annex 4, Para. 2.4 Salt corrosion resistance test Annex 4, Para. 2.5 Vehicle environment test Annex 4, Para. 2.6(a) Atmospheric exposure test (oxygen) Annex 4, Para. 2.7 Electrical tests Annex 4, Para. 2.8 Vibration test Annex 4, Para. 2.10 Pre-cooled hydrogen exposure test</p> |
| ISO 19880-3 | <p>Gaseous hydrogen - Fueling stations - Part 3: Valves Only for: 5 General test methods 6 Check valves 7 Excess flow valves 8 Flow control valves 9 Hose breakaway devices (Except for 9.2.13 Twisting test) 10 Manual valves 11 Pressure safety valves (PSV) 12 Shut-off valves</p> |
| ISO 19880-5 | <p>Gaseous hydrogen - Fuelling stations - Part 5: Dispenser hoses and hose assemblies Only for: 7.2 Leakage Test 7.3 Hydrostatic Strength 7.4 Electrical Conductivity 7.5 Tensile Test of Hose Assembly 7.6 Vertical Load Strength 7.7 Torsion Strength 7.8 Pressure Cycle Test (Hydraulic-Pressure Impulse Test) 7.9 Hydrogen Impulse Test 7.10 Corrosion Test 7.11 Minimum Bend Radius 7.12 Hose Permeation 7.15 Crush Test 7.16 Abrasion Resistance Test 7.17 Marking Material Legibility</p> |
| UN GTR No. 13 | <p>Global technical regulation on hydrogen and fuel cell vehicles Part II Only for: Para. 5.1.1 Verification tests for baseline metrics Para. 5.1.2 Verification tests for performance durability (hydraulic sequential tests) Para. 5.1.3 Verification test for expected on-road performance (pneumatic sequential tests) Para. 5.1.4 Verification test for service terminating performance in fire Para. 6.2.2 Test procedures for baseline performance metrics Para. 6.2.3 Test procedures for performance durability Para. 6.2.4 Test procedures for expected on-road performance Para. 6.2.5 Test procedures for service terminating performance in fire Para. 6.2.6.1.1 Pressure cycling test</p> |

| | |
|--|---|
| | Para. 6.2.6.1.2 Accelerated life test Para. 6.2.6.1.3 Temperature cycling test Para. 6.2.6.1.5 Vehicle environment test Para. 6.2.6.1.7 Drop and vibration test Para. 6.2.6.1.8 Leak test Para. 6.2.6.1.9 Bench top activation test Para. 6.2.6.1.10 Flow rate test Para. 6.2.6.2.1 Hydrostatic strength test Para. 6.2.6.2.3 Extreme temperature pressure cycling test Para. 6.2.6.2.4 Salt corrosion resistance test Para. 6.2.6.2.5 Vehicle environment test Para. 6.2.6.2.6(a) Atmospheric exposure test (oxygen) Para. 6.2.6.2.7 Electrical tests Para. 6.2.6.2.8 Vibration tests Para. 6.2.6.2.10 Pre-cooled hydrogen exposure test |
|--|---|

METALLIC ORES AND PRODUCTS

Articles of Metal:

All Forms, Articles of Metals

| | |
|-----------------|---|
| ASTM E8/E8M | Standard Test Methods for Tension Testing of Metallic Materials |
| ASTM A370 | Standard Test Methods and Definitions for Mechanical Testing of Steel Products |
| ASTM F606/F606M | Standard Test Methods for Determining the Mechanical Properties of Externally and Internally Threaded Fasteners, Washers, Direct Tension Indicators, and Rivets |
| ISO 898-1 | Mechanical properties of fasteners made of carbon steel and alloy steel - - Part 1: Bolts, screws and studs with specified property classes - Coarse thread and fine pitch thread |
| ISO 6892-1 | Metallic materials -- Tensile testing -- Part 1: Method of test at room temperature |
| SAE J429 | Mechanical and Material Requirements for Externally Threaded Fasteners Only for: 6.4 Proof Load 6.5 Axial Tensile Strength, 6.6 Wedge Tensile Strength 6.7 Testing of Machined Test Specimens |
| CSA-G30.18 | Carbon Steel Bars for Concrete Reinforcement Only for: 9.1 Tensile Test |

Cast, Forged, Welded or Pressed Metal Components

| | |
|----------|---|
| ASTM E18 | Standard Test Methods for Rockwell Hardness of Metallic Materials |
|----------|---|

NON-METALLIC MINERALS AND PRODUCTS

Petroleum Refinery Products (including asphalt materials, petrochemicals, fuels and lubricants)

Fuels and Lubricants

| | |
|------------|---|
| ASTM D664 | Standard Test Method for Acid Number of Petroleum Products by Potentiometric Titration [ACTP 16] |
| ASTM D7042 | Standard Test Method for Dynamic Viscosity and Density of Liquids by Stabinger Viscometer (and the Calculation of Kinematic Viscosity) [ACTP 17] |
| ASTM D7596 | Standard Test Method for Automatic Particle Counting and Particle Shape Classification of Oils Using a Direct Imaging Integrated Tester [ACTP 13] |
| ASTM D4739 | Standard Test Method for Base Number Determination by Potentiometric Hydrochloric Acid Titration [ACTP 19] |
| ASTM D5185 | Standard Test Method for Multielement Determination of Used and Unused Lubricating Oils and Base Oils by Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES) [ACTP 20] |

Other (Specify):

Insulating Fluid

| | |
|------------|--|
| ASTM D4059 | Standard Test Method for Analysis of Polychlorinated Biphenyls in Insulating Liquids by Gas Chromatography [ACTP 4] |
| ASTM D3612 | Standard test Method for Analysis of Gases Dissolved in Electrical Insulating Oil by Gas Chromatography Except for: Propane and Propylene |
| ASTM D1816 | Standard Test Method for Dielectric Breakdown Voltage of Insulating Liquids Using VDE Electrode |
| ASTM D971 | Standard Test Method for Interfacial Tension of Insulating Liquids Against Water by the Ring Method |

Number of Scope Listings: 107

Notes:

ACTP: Internal Powertech Labs Inc. Procedure (Applied Chemistry Test Procedure)

ASME: American Society of Mechanical Engineers

ASTM: ASTM International, previously American Society for Testing and Materials

BC ENV: British Columbia Environmental Laboratory Manual

CSA: Canadian Standards Association

DNVGL: Det Norske Veritas (Norway) and Germanischer Lloyd (Germany)

EC: European Environment Agency

EPA: United States Environmental Protection Agency

IEC: International Electrotechnical Commission

IEEE: Institute of Electrical and Electronics

NIOSH: National Institute for Occupational Safety and Health (USA)

UNECE: United Nations Economic Commission for Europe

UN GTR: United Nations Global Technical Regulations

(*): These tests are performed in a temporary location (Justice Institute of BC (JI), 13500 256 St, Maple Ridge, BC V4R 1C9; Or Dewdney Creek North PIT #7004 (Off Coquihalla highway, Carolin Mines exit, between Hope and Coquihalla summit).

This document forms part of the Certificate of Accreditation issued by the Standards Council of Canada (SCC). The original version is available in the Directory of Accredited Laboratories on the SCC website at www.scc.ca.

Elias Rafoul
Vice-President, Accreditation Services
Publication on: 2023-02-13