TESTING AND CALIBRATION LABORATORY ACCREDITATION PROGRAM (LAP)

Scope of Accreditation

La présente portée d'accréditation existe également en français et est publiée séparément.

Legal Name of Accredited Laboratory:	**Powertech Labs Inc.**
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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:	2024-09-06
Accreditation Valid to:	2029-01-13

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.

Canada

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 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

(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 Only for: Clause 6.1 Temperature Clause 8.5.1 Dielectric strength tests Clause 8.5.2 Impulse tests Clause 8.5.3 Corona-extinction tests Clause 8.5.4 Short-circuit withstand rating

CSA-C22.2 No. 253/ UL 347	Medium-Voltage AC Contactors, Controllers, and Control Centers Only for: Clause 6.2.201 Impulse withstand tests Clause 6.2.202 Power-frequency voltage withstand tests Clause 6.5 Temperature Rise Test Clause 6.6 Short-Time, Momentary and Peak Withstand Current Bus Tests Clause 6.102 Make and Break Capacity Test Clause 6.103 Overload Test Clause 6.104 Fault Interruption Test Clause 6.202 Short Time Capability
IEC 60282-1	Standard High-voltage fuses - Part 1: Current-limiting fuses Only for: Clause 7.4.5 Power-frequency voltage dry tests Clause 7.6 breaking tests Clause 7.5 temperature-rise tests and power-dissipation measurement Clause 7.7 tests for time-current characteristics
IEC 60282-2	Standard High-voltage fuses - Part 2: Current-Expulsion fuses Only for: Clause 8.4.5 power-frequency voltage dry tests Clause 8.6 breaking tests Clause 8.5 temperature-rise tests Clause 8.7 time-current characteristics tests
IEC 62271-1	High-voltage switchgear and controlgear –Part 1: Common specifications for alternating current switchgear and controlgear Only for: Clause 7.2 Power-frequency voltage tests Clause 7.4 Resistance measurement Clause 7.5 continuous current tests Clause 7.6 Short-time withstand current and peak withstand current tests Clause 7.9.1.1 Emission tests from the main circuits (radio interference voltage test, RIV)
IEEE/IEC C37.60/62271-111	High-voltage switchgear and controlgear - Part 111: Automatic circuit reclosers for alternating current systems up to and including 38 kV Only for: Clause 7.2 Dielectric tests Clause 7.3 Radio interference voltage (RIV) test Clause 7.4 Resistance measurement Clause 7.5 Continuous current tests Clause 7.6 Short-time withstand current and peak withstand current tests Clause 7.101 Line-charging current and cable-charging current interruption tests Clause 7.102 Making current capability Clause 7.103 Rated short-circuit breaking current tests Clause 7.106 Partial discharge (corona) tests Clause 7.111.2 Simulated surge arrester operation test Clause 7.112 Condition of recloser after each test of 7.101, 7.103 and 7.104

IEEE 386	IEEE Standard for Separable Insulated Connector Systems for Power Distribution Systems above 600 V Only for: Clause 7.6 Short-time current test Clause 7.7 Switching test Clause 7.8 Fault-closure test
IEEE C37.09	Standard Test Procedure For AC High-Voltage Circuit Breakers Rated On A Symmetrical Current Basis Only for: Clause 4.2 Maximum voltage tests Clause 4.3 Power frequency tests Clause 4.4 Continuous current-carrying tests Clause 4.5.4 Power frequency withstand voltage tests Clause 4.5.5 Full-wave lightning impulse withstand voltage tests Clause 4.5.6 Impulse voltage test for interrupters and resistors Clause 4.5.7 Chopped wave lightning impulse withstand voltage tests Clause 4.5.8 Switching impulse voltage withstand tests Clause 4.6 Standard operating duty (standard duty cycle) tests Clause 4.7 Interrupting time tests Clause 4.8 Short-circuit current making and breaking tests Clause 4.9.2 Load current switching test conditions Clause 4.9.3 Load current endurance switching tests Clause 4.12 Out-of-phase switching current tests Clause 4.19 Partial discharge tests Clause 4.20 Radio interference voltage (RIV) tests
IEEE C37.09a	Standard Test Procedure for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis Amendment 1 - Capacitance Current Switching Only for: Clause 4.10 Capacitance current switching tests
IEEE C37.20.2	Standard for Metal-Clad Switchgear Only for: Clause 6.2.1 Dielectric tests Clause 6.2.2 Rated continuous current tests Clause 6.2.3 Momentary withstand current tests Clause 6.2.4 Short-time withstand current tests Clause 6.2.5 Auxiliary equipment primary disconnecting device momentary current withstand test
IEEE C37.20.3	Standard for Metal-Enclosed Interrupter Switchgear Only for: Clause 6.2 Dielectric tests Clause 6.5 Temperature-rise tests Clause 6.6 Short-time withstand current and peak withstand current tests Clause 6.14.1 Test for bus-bar insulation

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

IEEE C37.41	ANSI/IEEE Standard Design Tests for High-Voltage (>1000 V) Fuses and Accessories Only for: Clause 8.2 Power-frequency dry-withstand voltage tests Clause 8.3 Power-frequency wet-withstand voltage tests on outdoor devices Clause 8.5 Lightening impulse-withstand voltage tests Clause 9 Interrupting tests Clause 10 Radio-influence tests Clause 11 Temperature-rise tests Annex A.4 Short-time withstand current tests for disconnecting switches Annex A.5 Load-break tests
IEEE C37.42	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 Only for: Clause 3.3.1 Dielectric tests Clause 3.3.2 Interrupting [breaking] Clause 3.3.5 Short-time current tests for disconnecting cutouts Clause 3.3.6 Temperature-rise tests
IEEE C37.45	IEEE Standard for Design Test Specifications for High Voltage (> 1000 V) Distribution Class Enclosed Single-Pole Air Switches Only for: Clause 8.1 Dielectric tests Clause 8.2 Radio-influence tests Clause 8.3 Short-time current tests Clause 8.4 Temperature-rise tests
IEEE C37.46	Specifications for High-Voltage (>1000 V) Expulsion and Current-Limiting Power Class Fuses and Fuse Disconnecting Switches Only for: Clause 4.1 Dielectric tests Clause 4.2 Interrupting [breaking] Clause 4.4 Temperature-rise
IEEE C37.62	IEEE Standard for Pad-Mounted Dry Vault, Submersible, and Overhead Fault Interrupters for Alternating Current Systems Up to and Including 38 kV Only for: 7.3 Insulation (dielectric) tests 7.4 Radio interference voltage (RIV) test 7.5 Measurement of the resistance of circuits 7.6 Continuous current tests 7.7 Short-time withstand current and peak withstand current tests 7.13 Line-charging current and cable-charging current interruption tests 7.14 Making current capability 7.15 Rated symmetrical interrupting current tests 7.16 Low current tests 7.18 Partial discharge tests 7.23.3 Simulated surge arrester operation test 7.24 Condition of FI after each test of 7.13–7.16

IEEE C37.66	IEEE Standard Requirements for Capacitor Switches for AC Systems (1 kV to 38 kV) Only for: Clause 6.2 Insulation (dielectric) tests Clause 6.3 Short-time current tests Clause 6.4 Rated fault-making current tests Clause 6.5 Operating duty tests
IEEE C37.74	Standard Requirements for Subsurface, Vault, and Pad-Mounted Load-Interrupter Switchgear and Fused Load-Interrupter Switchgear for Alternating Current Systems up to 38 kV Only for: Clause 6.7.2 Dielectric tests Clause 6.7.3 Continuous current test Clause 6.7.4 Short-circuit withstand current tests Clause 6.7.5 Switching tests Clause 6.7.6 Thermal runaway test Clause 6.7.7 Partial discharge tests Clause 6.7.8 DC withstand voltage test
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 Only for: Clause 7.2.2 Temperature-rise test Clause 7.2.3 Impulse voltage withstand test on primary terminals
IEEE C57.12.90	Standard Test Code for Liquid-Immersed Distribution, Power, and Regulating Transformers 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
IEEE C57.12.91	Standard Test Code for Dry-Type Distribution and Power Transformers 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

IEEE C57.13	Standard Requirements for Instrument Transformers 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
IEC 60076-21/ IEEE Std C57.15	Power transformers – Part 21: Standard requirements, terminology, and test code for step-voltage regulators Only for: 9.2 Resistance measurements 9.3 Polarity Test 9.4 Ratio Test 9.5 No-load loss and excitation current 9.6 Load loss and impedance voltage 9.7 Dielectric tests 9.8 On-load tap-changer routine tests 9.9 Control system routine tests 9.10 Temperature-rise test 9.11 Short-circuit test 9.12 Determination of sound level

Wiring and Related Products

HD 629.1-S3	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 Exception: Table 14
EN 61442	Test methods for accessories for power cables with rated voltages from 6 kV (Um = 7,2 kV) up to 36 kV (Um = 42 kV) Only for: 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	Polychlorinated Biphenyls (PCB) in Soil by Gas Chromatography [BC ENV, EPA 3570, EPA 3665A, EPA 3620C, EPA 8082A] Aroclor 1242 Aroclor 1248 Aroclor 1254 Aroclor 1260 Total PCB

Soil/Sediment (EPH in Soil)

ACTP 22	Extractable Petroleum Hydrocarbons (EPH) in Solids by GC/FID [BC ENV, EPA 3570] EPHs10-19 EPHs19-32

Soil/Sediment (Metals in Soil)

ACTP 25	Strong Acid Leachable Metals (SALM) in Soil by ICP-OES [BC ENV, EPA 6010D] Aluminum Antimony Arsenic Barium Beryllium Boron Cadmium Chromium Cobalt Copper Iron Lead Lithium Manganese Mercury Molybdenum Nickel Selenium Silver Strontium Sulphur

	Thallium Thorium Tin Titanium Tungsten Uranium Vanadium Zinc

Water (Inorganic)

ACTP 8	pH in Water and Soil by Electrometry [BC ENV, APHA 4500-H+]

Water (Organic – PCB in Water)

ACTP 7	Polychlorinated Biphenyls (PCB) in Water by Gas Chromatography [BC ENV, EPA 3511, EPA 3665A, EPA 3620C, EPA 8082A] Aroclor 1242 Aroclor 1248 Aroclor 1254 Aroclor 1260 Total PCB

Water (Organic – EPH in Water)

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

MACHINERY

Boilers, Pressure Vessels and Piping:

ISO 7866	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

Transportation, Agricultural and Construction Vehicles and Components:

Automobiles, Light Trucks, Vans & Trailers

CSA/ANSI HGV 2	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 test Clause 18.3.5 Burst Test Clause 18.3.6 Flaw Tolerance Test Clause 18.3.7 Drop Test *Clause 18.3.8 Bonfire Test Clause 18.3.9 High temperature static pressure Test *Clause 18.3.10 Penetration Test Clause 18.3.11 Permeation Test Clause 18.3.12 Boss Torque Test Clause 18.3.13 Hydrogen Gas Cycling Test Clause 18.3.14 Leak Before Break Test Clause 18.5.2 Ambient Cycling Test Clause 18.5.3 Burst Test Clause 18.5.4 Container test for performance durability Clause 18.5.5 High strain rate impact test Clause 18.5.6 Permeation test Clause 18.5.7 Container test for expected on-road performance
CSA/ANSI HGV 3.1	Fuel system components for compressed hydrogen gas powered vehicles Only for: Clause 5.2 Hydrostatic strength Clause 5.3 Leakage Clause 5.4 Excess torque resistance Clause 5.5 Bending moment Clause 5.6 Continuous operation Clause 5.7.2 Salt spray exposure Clause 5.8 Ultraviolet resistance of external surfaces Clause 5.9 Automotive fluid exposure Clause 5.11 Abnormal electrical voltages Clause 5.13 Vibration resistance Clause 5.15 Insulation resistance Clause 5.16 Pre-cooled hydrogen exposure Clause 8.3.2 Continuous operation Clause 10.4.1 Continuous operation Clause 10.4.2 Operating torque Clause 11.4.1 Automatic valve Clause 11.4.2 Automatic container valve Clause 13.4.3 Insulation resistance Clause 14.4.1 Hydrostatic strength Clause 14.4.2 External leakage

	Clause 14.4.3 Continuous operation Clause 14.4.4 Pressure impulse Clause 15.4.1 Hydrostatic strength Clause 15.4.2 Continuous operation Clause 15.4.3 Opening and reseating characteristics
CSA/ANSI HGV 4.4	Gaseous hydrogen - Fuelling stations - Valves (ISO 19880-3, MOD)Only for: 5.4 Leakage 5.7 Hydrostatic Strength 9.1.4 Separation Test
CSA/ANSI HPRD 1	Thermally activated pressure relief devices for compressed hydrogen vehicle fuel containers Only for: 7.2 Pressure Cycling 7.3 Accelerated Life 7.4 Thermal Cycling 7.6 Automotive Fluid Exposure 7.7 UV exposure 7.8.1 Atmospheric exposure (oxygen ageing) 7.10 Impact due to drop and vibration 7.11 Leakage 7.12 Bench top activation 7.13 Flow capacity 7.14 High Pressure activation and flow rate 7.15 Excess torque resistance 7.16 Bending moment 7.17 Hydrostatic strength 7.18 Abnormal electrical voltages 7.19 Insulation resistance 7.20 Water jet protection
CSA/ANSI NGV 2	Compressed natural gas vehicle fuel containers Only for: Section 11.3 Leak Test Section 12.4 Burst Test Section 12.5 Cycle Test Section 19.3 Ambient Cycling Test Section 19.4 Environmental Test Section 19.5 Extreme Temperature Cycling Section 19.6 Hydrostatic Burst Test Section 19.7 Composite Flaw Tolerance Test Section 19.8 Drop Test *Section 19.9 Bonfire Test Section 19.10 High Temperature Static Pressure Test *Section 19.11 Penetration Test Section 19.12 Permeation Test Section 19.13 Natural Gas Cycling Test

	Section 19.14 Leak Before Break (Burst) Test
CSA/ANSI NGV3.1	Fuel System Components for Compressed Natural Gas Powered Vehicles Only for: 5.2 Hydrostatic Strength 5.7.2 Salt spray exposure – Salt spray test only 5.8.2 Atmospheric Exposure Test - Oxygen Aging 5.11 Vibration resistance 5.14 Ultraviolet Resistance of External Surfaces 5.15 Automotive fluid exposure
CSA/ANSI PRD 1	Pressure relief devices for natural gas vehicle (NGV) fuel containers Only for: 7. 2 Pressure Cycling 7. 3 Accelerated Life 7. 4 Thermal Cycling 7. 6 Automotive fluid exposure 7.7 UV resistance 7.10.1 Impact due to drop and vibration - Impact due to drop 7.10.2 Impact due to drop and vibration – vibration 7.11 Leakage 7.12.2 Bench top activation - Thermally activated relief devices 7.12.3 Bench top activation - Pressure activated relief devices 7.12.4 Bench top activation - Series combination relief devices 7.12.5 Bench top activation - Manually activated devices 7.12.6 Bench top activation - Combined manual and thermal activation devices 7.13 Flow capacity 7.14.2 Atmospheric exposure test - Oxygen Aging 7.15 High pressure activation and flow rate 7.16 Water jet protection 7.17 Excess torque resistance 7.18 Bending moment 7.19 Hydrostatic strength 7.20 Abnormal electrical voltages 7.21 Insulation resistance 7.22 Nonmetallic material immersion
CSA B51 Part 2	High-Pressure Cylinders for the On-board Storage of Natural Gas and Hydrogen as Fuels for Automotive Vehicles Only for: Clause 14.12 Hydrostatic Pressure Burst Test
EC 79	Implementing Regulation (EC) No 79/2009 of the European Parliament and of the Council on type-approval of hydrogen-powered motor vehicles Annex IV Only for: Part 2, Para. 4.2.1 Burst test Part 2, Para. 4.2.2 Ambient temperature pressure cycle test Part 2, Para. 4.2.3 Leak-before-break (LBB) performance test *Part 2, Para. 4.2.4 Bonfire test

	*Part 2, Para. 4.2.5 Penetration test Part 2, Para. 4.2.6 Chemical exposure test Part 2, Para. 4.2.7 Composite flaw tolerance test Part 2, Para. 4.2.8 Accelerated stress rupture test Part 2, Para. 4.2.9 Extreme temperature pressure cycle test Part 2, Para. 4.2.10 Impact damage test Part 2, Para. 4.2.11 Leak test Part 2, Para. 4.2.12 Permeation test Part 2, Para. 4.2.13 Boss torque test Part 2, Para. 4.2.14 Hydrogen gas cycling test Part 3, Para. 4.1.1.2(b) Hydrogen compatibility test (non-metallic materials) Part 3, Para. 4.1.2 Ageing test Part 3, Para. 4.2.1 Corrosion resistance test (Test a only) Part 3, Para. 4.2.2 Endurance Part 3, Para. 4.2.3 Hydraulic pressure cycle test Part 3, Para. 4.2.4 Internal leakage test Part 3, Para. 4.2.5 External leakage test
ISO 11114-4	Transportable gas cylinders - Compatibility of cylinder and valve materials with gas contents -Part 4: Test methods for selecting steels resistant to hydrogen embrittlement Only for: Section 5.1 (Method A) – Disc test Section 5.3 (Method C) - Test method to determine the resistance to hydrogen assisted cracking of steel cylinders
ISO 11119-3	Gas cylinders – Design, construction and testing of refillable composite gas cylinders and tubes - Part 3: Fully wrapped fibre reinforced composite gas cylinders and tubes up to 450L with non-load-sharing metallic or non-metallic liners or without liners Only for: 8.5.1 Proof pressure test 8.5.3 Cylinder burst test 8.5.4 Ambient cycle test 8.5.6 Environmental cycle test 8.5.7 Environmentally assisted stress rupture test 8.5.8 Flaw test 8.5.12 Permeability test 8.5.13 Torque test on cylinder neck boss 8.5.15 Leak test 8.5.16 Pneumatic cycle test
ISO 11515	Gas cylinders - Refillable composite reinforced tubes of water capacity between 450 l and 3000 l - Design, construction and testing Only for: 8.5.1 Hydraulic proof pressure test 8.5.2 Hydraulic volumetric expansion test 8.5.5 Ambient temperature cycling test 8.5.6 Environmental cycling test 8.5.7 Flaw test 8.5.8 Blunt impact test 8.5.9 Fire resistance test 8.5.10 Neck strength test

	8.5.11 Leak test 8.5.12 Accelerated stress rupture test 8.5.13 Permeability test 8.5.14 Gas cycle test 8.5.17 Acid environment test
ISO 17268	Gaseous hydrogen land vehicle refuelling connection devices Only for: Section 7 Design Verification Tests Procedures
JARI S 004	Technical Standard for Obtaining Special Filling Permission for Compressed Hydrogen Vehicle Fuel System Containers for Development and Compressed Hydrogen Two-Wheeled Vehicle Fuel System Containers for Development Only for: Article 9 Initial burst test Article 10 Initial normal temperature pressure cycle test Article 11 Durability performance test Article 12 Continuous gas pressure test Article 17 Airtightness test Article 18 Normal temperature pressure cycle test Article 19 Burst test
SAE J2600	Compressed hydrogen surface vehicle fueling connection devices Only for: Section 5 Type (Design Verification) Tests
UNECE R110	Uniform provisions concerning the approval of: 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 Annex 3A, Appendix A Only for: Para. A.6 Leak Before Break Test Para. A.7 Extreme Temperature Cycling Para. A.10 Leak Test Para. A.11 Hydraulic Test Para. A.12 Hydrostatic pressure burst test Para. A.13 Ambient temperature pressure cycling Para. A.14 Acid environment test *Para. A.15 Bonfire test *Para. A.16 Penetration tests Para. A.17 Composite flaw tolerance tests Para. A.18 High temperature creep test Para. A.19 Accelerated stress rupture test Para. A.20 Impact damage test Para. A.21 Permeation test Para. A.25 Boss torque test Para. A.24 (a) Pressure relief device requirements - 24 hr temperature and pressure hold Para. A.24 (b) Pressure relief device requirements - Pressure Cycling Para. A.27 Natural gas cycling test
UNECE R134	Uniform provisions concerning the approval of motor vehicles and their components with regard to the safety-related performance of hydrogen-fuelled vehicles (HFCV) Only for: Para. 5.1 Verification tests for baseline metrics Para. 5.2 Verification tests for performance durability (sequential hydraulic tests)

	Para. 5.3 Verification test for expected on-road performance (sequential pneumatic tests) Para. 5.4 Verification test for service terminating performance in fire Para. 9.3.2.1 Rupture test in batch testing Para. 9.3.2.2 Ambient temperature pressure cycling test in batch testing Annex 3, Para. 2 Test procedures for baseline performance metrics Annex 3, Para. 3 Test procedures for performance durability Annex 3, Para. 4 Test procedures for expected on-road performance Annex 3, Para. 5 Test procedures for service termination performance in fire Annex 4, Para. 1.1 Pressure cycling test Annex 4, Para. 1.2 Accelerated life test Annex 4, Para. 1.3 Temperature cycling test 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
ISO 19880-3	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
ISO 19880-5	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
UN GTR No. 13	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 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 9.2 Bend Test

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 Liguids Against Water by the Ring Method

Number of Scope Listings: 106

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

JARI: Japan Automobile Research Institute

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).

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