PERRY JOHNSON LABORATORY ACCREDITATION, INC.

Certificate of Accreditation

Perry Johnson Laboratory Accreditation, Inc. has assessed the Laboratory of:

Phoenix National Laboratories, Inc

2837 East Chambers Street, Phoenix, AZ 85040

(Hereinafter called the Organization) and hereby declares that Organization is accredited in accordance with the recognized International Standard:

ISO/IEC 17025:2017

This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system
(as outlined by the joint ISO-ILAC-IAF Communiqué dated April 2017):

Mechanical, Metallurgical/Materials, and Nondestructive Testing and Welding Qualification Services

(As detailed in the supplement)

Accreditation claims for such testing and/or calibration services shall only be made from addresses referenced within this certificate. This Accreditation is granted subject to the system rules governing the Accreditation referred to above, and the Organization hereby covenants with the Accreditation body's duty to observe and comply with the said rules.

For PJLA:

Tracy Szerszen
President

Perry Johnson Laboratory Accreditation, Inc. (PJLA)
755 W. Big Beaver, Suite 1325
Troy, Michigan 48084

Initial Accreditation Date:	*Issue Date:*	*Expiration Date:*
February 20, 2012	May 13, 2022	July 31, 2024

Accreditation No.:	*Certificate No.:*
71936	L22- 373

The validity of this certificate is maintained through ongoing assessments based on a continuous accreditation cycle. The validity of this certificate should be confirmed through the PJLA website: www.pjlabs.com

Certificate of Accreditation: Supplement

Phoenix National Laboratories, Inc
2837 East Chambers Street, Phoenix, AZ 85040
Contact Name: Alexander Zuran Phone: 602-431-8887

Accreditation is granted to the facility to perform the following testing:

FIELD OF TEST	ITEMS, MATERIALS OR PRODUCTS TESTED	SPECIFIC TESTS OR PROPERTIES MEASURED	SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED	RANGE (WHERE APPROPRIATE) AND DETECTION LIMIT
Physical/Mechanical [F]	Elastomeric Bridge Bearings, Expansion Joints and Seals, Sealants, Rubber, Plastics, PTFE	Tensile Strength, Ultimate Elongation, Permanent Set	ASTM D412 ASTM 4894	6 lbf to 50 000 lbf
		Tensile Strength, Tensile Stress at Yield, Ultimate Elongation	ASTM D638	6 lbf to 50 000 lbf
		Hardness	ASTM D2240	Shore A, Shore D
		Heat Resistance, Change in Hardness, Tensile Strength, Ultimate Elongation	ASTM D573	100 °F to 600 °F
		Compression Set, oven aged	ASTM D395 Method B	100 °F to 600 °F
		Compression Set, low temp	ASTM D1229	-40 °F minimum
		Ozone Resistance	ASTM D1149 ASTM D518	5 ppm to 1 000 ppm ozone concentration
		Low Temperature Brittleness	ASTM D746 Procedure B	-130 °F minimum
		Instantaneous Thermal Stiffening (Clashburg)	ASTM D1043	-70 °F minimum
		Shear Modulus	ASTM D4014, Annex A	40 psi to 2 000 psi -40 °F to SLA
		Low Temperature Crystallization	AASHTO LRFD, Sect 18, AASHTO M251	40 psi to 2 000 psi -40° F to SLA
		Adhesion	ASTM D429, Method B	6 lb to 50 000 lb
		Adhesion	TX-601-J	400 000 lb max
		Creep/Shear Bond	AASHTO M251-06	50 000 lb max load
		Tear Strength	ASTM D624 (Type C)	6 lb to 50 000 lb
		Oil Swell	ASTM D471	ASTM Oil
		Chlorinated Compound Test	TX-601-J	N/A

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Physical/Mechanical [F]	Elastomeric Bridge Bearings, Expansion Joints and Seals, Sealants, Rubber, Plastics, PTFE	Short/Long Duration Compression Test	AASHTO LRFD, Sect. 18 CHB Design Code S6	2 000 000 lb max load, 36” x 48” plan size x 20” height
		Compression Strain	AASHTO M251 CHB Design Code S6 LS-428	2 000 000 lb max load, 36” x 48” plan size x 20” height
		Low/High Temperature Recovery	ASTM D2628	5 in width max
		Compression Deflection	ASTM D575	Up to 50 000 lbf
		Density and Specific Gravity	ASTM D4894 ASTM D792, Method A	Sheet
	Structural Steel, Welded Plate and Pipe	Mechanical Properties Tension Test Bend Test Hardness Test (Charpy Impact Test - subcontracted)	ASTM A370 ASTM E18	450 000 lb max tensile Scales HRA,HRB, HRC, 15N, 30N, 45N, 15T, 30T, 45T
		Tension Testing of Metallic Materials	ASTM E8	450 000 lb max
		Testing of Steel Reinforcement Bars – Tension / Elongation / Yield Load/Bend	ASTM A615 ASTM A706	450 000 lb max Size 3 to 14 bars
Metallurgical / Materials [F]	Metals/Metallic Coatings	Grain Size	ASTM E112	Visual
		Hardness, HV or HK	ASTM E92	HV 1 g to 30 kg HK 1 g to 5 kg
		Metallic Coating Thickness, Cross-sectioning	ASTM B748	> 50 nm
		Scanning Electron Microscope Analysis (SEM) With Energy Dispersive Spectroscopy (EDS)	SOP SEM-1	Up to 300 000X Magnification Up to 30 keV

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Non-Destructive [FO]	Commercial and Industrial Based Construction Projects including Bridges, Buildings, Pressure Vessels, Pipelines, Tanks; Manufacturing during and after fabrication of materials and products	Ultrasonic Testing (UT)	ASME Section V Articles 4 and 5; ASME Sections I, VIII, IX, B31.1, B31.3; AWS D1.1, D1.5, API 1104, 650 ASTM A388, E164, A609, E797	Contact applications – 1 MHz to 25 MHz
		Ultrasonic Phased Array Testing (UTPA)	ASME Section V Article 4, Section VIII – Division 2, API 650, AWS D1.1, D1.5	2.25 MHz to 7.5 MHz LPA applications with or without encoded scanners
		Radiographic Testing (RT)	ASME Section V Article 2; ASME Sections I, VIII, IX, B31.1, B31.3; AWS D1.1, D1.5; API 1104, 650; ASTM E94, E1032, E1742 AWWA D100	160 kV, 5 mA 320 kV, 10 mA IR 120 curies to 192 curies
		Computed Radiographic Testing (CRT)	ASME Section V Article 2, Appendix VIII, AWS D1.1	160 kV, 5 mA 320 kV, 10 mA IR 120 curies to 192 curies
		Magnetic Particle Testing (MT)	ASME Section V Article 7; ASME Sections I, VIII, IX, B31.1, B31.3; AWS D1.1, D1.5; API 1104, 650, ASTM E709	Portable and mobile applications, AC, DC, DCHW, Wet or Dry, Visible or Fluorescent, 6,000 A max
		Liquid Penetrant Testing (PT)	ASME Section V Article 6; ASME Sections I, III, VIII, IX, B31.1, B31.3; AWS D1.1, D1.5; API 1104, 650, ASTM E165	Type I and II, Methods A and C
		Electromagnetic Testing (ET)	ASME Section V Article 8	Multi-frequency Ferrous and Non-ferrous Heat Exchanger Tubes, Single Frequency Contact Applications

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Non-Destructive [FO]	Commercial and Industrial Based Construction Projects including Bridges, Buildings, Pressure Vessels, Pipelines, Tanks; Manufacturing during and after fabrication of materials and products	Visual Testing (VT)	ASME Section V Article 9; ASME Sections I, III, VIII, IX, B31.1, B31.3; AWS D1.1, D1.2, D1.3, D1.4, D1.5, D1.6; API 1104, 650, 653	Direct and Remote Applications 6mm dia. x 3.5 m long 12 mm dia. x 10 m long 1" dia. X 100 ft. long
		Leak Test (Bubble, Pressure, Voltage)	API 650, ASME B31.3, ASTM E1003	Pressure: -15 psi to 18 000 psi, Voltage: 35 kV max
		Magnetic Flux Leakage (MFL)	API 653 Annex G	Up to 1/2" thickness
		Equipment Evaluations	API 510, 570, 653 API 579/ASME FFS-1	Qualitative application
		Metallurgical Field Replications	ASTM E1351	Qualitative application
	Special Inspections per the International Building Code (IBC)	ICC – Spray Applied Fireproofing	IBC Section 1702, ASTM E605, ASTM E736, Technical Manuals 12A and 12B	Qualitative Application
		ICC – High Strength Bolts and Structural Steel	IBC, Section 1702 AISC Specification for A325 and A490 High Strength Bolts	
		ICC – Welding Inspection	IBC Section 1702, AWS D1.1, D1.3, D1.4, AISC Code of Standard Practice	
		ICC – Epoxied Anchors	IBC Section 1702 and Manufacturer's Documentation	
		IFC- Firestop	ASTM E2174 ASTM E2393	
	Structural Steel, Welded Plate and Pipe	Hardness	ASTM A833 ASTM E110	Micro hardness – field portable equipment
		Positive Material Identification	Thermo Scientific Niton XL3t Sciaps Z200C+	XRF (X-ray Fluorescence) method – no carbon content LIBS method with carbon content
	Structural Concrete	Ground Penetrating Radar	Geophysics Structure Scan SIR-3000	1 600 MHz Antenna 2 600 MHz Antenna 0 in to 24 in concrete thickness
		Anchor Bolt Pull Out Tests	ASTM E488	120 000 lb max

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Welding Qualification Services [FO]	Welding Procedure Qualification and Welder Qualifications	Administration of Qualifications at PNL weld test booths or in Field	ASME IX; API 1104; AWS B2.1, D1.1, D1.2, D1.3, D1.4, D1.5, D1.6, D17.1	In-house up to 350 A- SMAW, FCAW, GMAW, GTAW processes. Any process or amperage in the field
	PQR and WPQ testing	X-ray, Tensile Tests, Bend Tests, Fillet Weld Break Tests, Macro-etching, Twist Tests, Nick Break Tests, Hardness Profiles	ASME IX; API 1104; AWS B2.1, D1.1, D1.2, D1.3, D1.4, D1.5, D1.6, D17.1 ASTM A370	All Welding Processes
Materials [F]	Organic Compounds	Positive Material Identification, Identity	FTIR, Micro FTIR	Wavelength 4 000 cm^{-1} to 400 cm^{-1}

1. The presence of a superscript FO means that the laboratory performs testing of the indicated parameter at its fixed location and onsite at customer locations. Example: Outside Micrometer [FO] would mean that the laboratory performs this testing at its fixed location and onsite at customer locations.

2. The presence of a superscript F means that the laboratory performs testing of the indicated parameter at its fixed location. Example: Outside Micrometer[F] would mean that the laboratory performs this testing at its fixed location.

3. Charpy impact testing is currently being subcontracted for Structural Steel, Welded Plate and Pipe, PQR and WPQ testing.