PERRY JOHNSON LABORATORY ACCREDITATION, INC.

Certificate of Accreditation

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

Ebatco

10025 Valley View Road, Suite 150, Eden Prairie, MN 55344

(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):

Chemical, Mechanical, Metallurgical, and Thermodynamic Testing

(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

Initial Accreditation Date:	*Issue Date:*	*Expiration Date:*
November 3, 2017	February 23, 2022	May 31, 2024
Revision Date:	*Accreditation No.:*	*Certificate No.:*
March 22, 2023	92808	L22-152-R1

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

The validity of thi, s 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

Ebatco
10025 Valley View Road, Suite 150, Eden Prairie, MN 55344
Contact Name: James Schroder Phone: 844-332-2826

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
Chemical [F]	Dry Particles or Particles in Solution	Particle Analysis (Laser Diffraction)	ASTM E2651	0.017 µm to 2 000 µm (0.017 µm by PIDS to 0.4 µm by PIDS)
	Liquid Samples	Density	ASTM D4052	0.000 01 g/cm^3 to 3 g/cm^3 D.L. = 0.000 01 g/cm^3
		Dielectric Constant	ASTM D924	1 to 200 D.L = 0.01
		Refractive Index	ASTM D1747	1.26 RI to 1.7 RI D.L. = 0.000 01 RI
		Surface Tension (Pendant Drop)	ISO 19403	0.2 mN/m to 100 mN/m D.L. = 0.2 mN/m
		Viscosity	ASTM D2556	1 cP to 6 000 000 cP D. L. = 0.1 cP
	Liquid Samples, Powders, and Solid Samples	Density (Archimedes Method)	ASTM B962 ASTM B963	0.000 1 g/cm^3 to 200 g/cm^3 D.L. = 0.000 1 g/cm^3
	Liquid Samples and Surfactant Solution	Critical Micelle Concentration	ISO 4311	Volume Concentrate: 0.000 1 % to 100 % D.L. = 0.000 1 %
		Dynamic Surface Tension	ASTM D3825	10 mN/m to 100 mN/m
	Liquid Samples, Including those with Surfactants	Surface / Interfacial Tension	ASTM D1331	0.01 mN/m to 100 mN/m D.L. = 0.01 mN/m
	Nanomaterials / Microstructure Substrates and Liquids	Micro-Contact Angle	ASTM D7490	0.1 ° to 180 ° D.L. = 0.1 °
	Particles in Solution	Particle Analysis (Electrical Sensing Zone)	ASTM F2149	0.2 µm to 1 600 µm
	Particles in Solution or Solid Surface	Particle Analysis (Dynamic Light Scattering)	ASTM E2490	0.6 nm to 7 µm
		Zeta Potential	ASTM E2865	-100 mV to 100 mV
	Powders	Powder Contact Angle	EDC No. 0102072	0.1 ° to 90 ° D.L. = 0.1 °
	Solid Samples	Sedimentation	EDC No. 0102073	0 g/s to 999 g/s D.L. = 0.000 1 g/s
	Solid Samples, Preferable Inorganic Compounds	Energy Dispersive X-Ray Spectroscopy	ASTM E1508	Mass Concentrate: 0.1 % to 100 % D.L. = 0.1 %

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Chemical [F]	Solid Substrates and Liquid Samples	Contact Angle	ASTM D7334 ASTM D7490	0.1° to 180 ° D.L. = 0.1 °
	Polycrystalline Solids	XRD Phase Identification	ASTM D934 ASTM D380	Presence/Absence D.L. = Sample dependent, 0.1 %
		XRD Quantitative Composition	ASTM C1365 ASTM D3720	0 % to 100 % phase fraction D.L. = Sample dependent
	Variable	FTIR Transmission Bulk Analysis	ASTM E1252-98	400 cm^{-1} to 6 000 cm^{-1} D.L. = 5 ug, Sample Dependent
		ATR Bulk Analysis	ASTM E573-01 ASTM E1252-98	600 cm^{-1} to 5 500 cm^{-1} D.L. = 5 ug, Sample Dependent
		FTIR Transmission & Reflection Microscopic Analysis (Obj.: 4x)	ASTM E334 ASTM E1252-98	1 000 cm^{-1} to 5 500 cm^{-1} D.L. = N/A Spatial Resolution: N/A
		FTIR Transmission & Reflection Microscopic Analysis (Obj.: 15x, 25x)	ASTM E334 ASTM E1252-98	450 cm^{-1} to 5 500 cm^{-1} D.L. = N/A Spatial Resolution: N/A
		ATR Microscopic Analysis (Obj: 15x)	ASTM E573-01 ASTM E334 ASTM E1252-98	650 cm^{-1} to 5 500 cm^{-1} D.L. = N/A Spatial Resolution: N/A
		FTIR Transmission and Reflection Focal Plane Array Imaging (Obj: 4x)	ASTM E334 ASTM E1252-98	1 000 cm^{-1} to 3 950 cm^{-1} D.L. = N/A Spatial Resolution: 4.1 µm to 20 µm
		FTIR Transmission and Reflection Focal Plane Array Imaging (Obj: 15x, 25x)	ASTM E334 ASTM E1252-98	850 cm^{-1} to 3 950 cm^{-1} D.L. = N/A Spatial Resolution: 0.7 µm to 6 µm
		ATR Focal Plane Array Imaging (Obj: 15x)	ASTM E573-01 ASTM E334 ASTM E1252-98	850 cm^{-1} to 3 950 cm^{-1} D.L. = N/A Spatial Resolution: 1.1 µm
		Raman Microscopy	EDC# 0102096	400 cm^{-1} to 4 000 cm^{-1} D.L. = 0.1 wt%, Sample Dependent Horizontal Resolution: 360 nm Vertical Res: 500 nm
		Raman Spectroscopy	EDC# 0102096	400 cm^{-1} to 4 000 cm^{-1} D.L. = 0.1 wt%, Sample Dependent Horizontal Resolution: 360 nm Vertical Res: 500 nm
		AFM	ASTM E2859 ASTM E2382	150 µm x 150 µm x 20 µm D.L. = 1 nm

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Chemical [F]	Variable	EFM	ASTM E2859 ASTM E2382	150 µm x 150 µm x 20 µm D.L. = 1 nm
		MFM	ASTM E2859 ASTM E2382	150 µm x 150 µm x 20 µm D.L. = 1 nm
	Powders, Particles, and Fibers	Powder Zeta Potential Cylindrical Cell (Streaming Potential)	ISO 13099	Up to 2 000 mV D.L. = 50 mg
	Surfaces	Surface Zeta Potential (Streaming Potential)	ISO 13099	Up to 2 000 mV D.L. = < 2 mm thick
	Flexible Tubing	Surface Zeta Potential	ISO 13099	Up to 2 000 mV D.L. = 10 cm length, 1 mm to 6 mm outer diameter
	Liquids	Turbidity	ISO 7027 ASTM D6855 ASTM D7315	Up to 2 000 NTU D.L. = 0.01 NTU (<9.99) 0.1 NTU (10 to 99.9) 1 NTU (100 to 1 000)
		ICP-OES/ICP-AES	EPA 200.7 ASTM UOP 303 ASTM UOP 389 ASTM UOP 549 ASTM UOP 714 ASTM UOP 796 ASTM UOP 925 ASTM UOP 961 ASTM UOP 972 ASTM UOP 1003 ASTM C1301 ASTM C1875 ASTM D7151 ASTM D5708 ASTM D7111 ASTM D7260 ASTM D7691 ASTM D5185 ASTM D5600 ASTM E1479	Wavelength 167 nm to 785 nm D.L.= ppb-ppm (varies by element)

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Chemical [F]	Liquids, Semi-Solids	Rheology	ASTM D4440 ASTM D4473 ASTM D5279 DIN Standards DIN 1342 1-3 DIN 3219 DIN 13343 DIN 51810 Part 1 DIN 51810 Part 2 DIN 53019-1 DIN 53019-2 DIN 54458 EN 3219 EN 14770 ISO 3219 ISO 6721-1 Pharmacopoeia Europe 2.2.8 Viscosity Pharmacopoeia Europe 2.2.10 - Rotating Viscometer Method Pharmacopoeia Europe 0132 USP 912 - Rotational Rheometer Methods	Up to 314 rad/s Angular Velocity Range D.L.= 0.05 µrad 0.05 nNm to 250 mNm Torque
	Solid Materials	Color	CIEL*a*b* ASTM E2194 SAE J1545	Wavelength range: 400 nm to 700 nm Reflectance range: Up to 600 % $\Delta E^* \leq 0.25$
		Gloss	ASTM D523	Range: Up to 2 000 Gloss Units D.L. = 0.2 GU (Up to 100 GU) D.L. = 0.2% (100 to 2 000 GU)
	Solids	Refractive Index	ISO 489	Range: 0 to1.42391 D.L: 0.00001

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Mechanical [F]	Adhesive Materials	Peel Strength of Adhesives	ASTM D3330	0.1 N to 100 N D.L. = 0.1 N
	Ceramics, Fabrics, Geologicals, Membranes, Papers, and Porous Materials	Porosity	ASTM F316	0.018 µm to 500 µm
	Solid Materials	Optical Profilometry	ASTM E2244	0.1 nm to 2 mm D.L. = 0.1 nm
		Scanning Electron Microscopy	ASTM E766	5 X to 300 000 X D.L. = 3 nm
	Solid Materials (Tested Dry or Lubricated)	Friction	ASTM G115	0.001 to 100 D.L. = 0.001
Mechanical [F]	Solid Materials, Thin Films, Coatings	Micro indentation	ASTM E384	50 mN to 30 000 mN D.L. = 0.1 mN
		Micro scratch	ASTM C1624	1 mN to 30 000 mN D.L. = 0.1 mN
			ASTM C1624 ISO 20502	0.5 N to 200 N D.L. = 0.1 mN
		Modulus Mapping	EDC No. 0102054	0.01 GPa to 1 140 GPa D.L. = 0.01 GPa
		Nano-DMA	EDC No. 0102055	
		Nanoindentation	ASTM E2546	
		Nanoscratch	ASTM C1624	0.1 µN to 10 000 µN D.L. = 1 nN
			ASTM D7187	
		Scanning Probe Microscopy	ISO 3274	X,Y: 0.05 µm to 60 µm Z: 0.001 µm to 5µm
		Scratch	ISO 1518	N/A
		Scanning Wear	EDC No. 0102066	X,Y: 0.05 µm to 50 µm Z: 0.001 µm to 5µm
		Macro scratch	ASTM C1624 ISO 20502	0.5 N to 200 N D.L. = 0.1 mN
	Printed Materials	Smear Rubbing	ASTM D5264	N/A
	Polycrystalline Solids	XRD Residual Stress	ASTM E915 ASTM E2860	7 MPa to material yield strength D.L. = 7 MPa

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Mechanical [F]	Solid Materials	Tensile, Compression, 3 Point Bend, 4 Point Bend, Shear	ASTM A370 ASTM C1499 ASTM C1550 ASTM C1609-10 ASTM C297 ASTM C364 ASTM C365 ASTM C469 ASTM C633 ASTM C1161 ASTM C1421 ASTM D1002 ASTM D1004 ASTM D1037 ASTM D1184 ASTM D1335 ASTM D1414 ASTM D143 ASTM D1621 ASTM D1623 ASTM D1708 ASTM D1761 ASTM D1781 ASTM D1876 ASTM D2256 ASTM D2261 ASTM D2295 ASTM D2344 ASTM D2519 ASTM D2844 ASTM D3039 ASTM D3043 ASTM D3163 ASTM D3167 ASTM D3410 ASTM D3518 ASTM D3574 ASTM D3822 ASTM D3846 ASTM D4018 ASTM D412 ASTM D413 ASTM D4255 ASTM D429	Range: Up to 100 N, Up to 1 kN, and Up to 10 kN D.L.= +/- 1% error down to 1/1000 Load Cell Capacity

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Mechanical [F]	Solid Materials	Tensile, Compression, 3 Point Bend, 4 Point Bend, Shear	ASTM D4833 ASTM D5034 ASTM D5035 ASTM D5045 ASTM D5083 ASTM D5379 ASTM D5528 ASTM D5587 ASTM D575 ASTM D5766 ASTM D5868 ASTM D5961 ASTM D6068 ASTM D624 ASTM D6319 ASTM D638 ASTM D6641 ASTM D6671 ASTM D695 ASTM D7137 ASTM D7269 ASTM D732 ASTM D7774 ASTM D790 ASTM D882 ASTM D885 ASTM D903 ASTM D905 ASTM E1820 ASTM E190 ASTM E290 ASTM E399 ASTM F1264 ASTM F1306 ASTM F1717 ASTM F2077 ASTM F2606 ASTM F382 ASTM F606 ASTM F88	Range: Up to 100 N, Up to 1 kN, and Up to 10 kN D.L.= +/- 1% error down to 1/1000 Load Cell Capacity

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Thermodynamic [F]	Liquid and Solid Samples	Differential Scanning Calorimetry	ASTM E1356 ASTM E794	20 °C to 1 650 °C D.L. = 0.25 %
		Thermogravimetric Analysis	ASTM E2402 ASTM E2250	1 g to 35 g D.L. = 1 µg
	Solid Samples	Dynamic Mechanical Analysis	ASTM E1640	0.5 MPa to 100 GPa D.L. = 1 %
		Thermal Mechanical Analysis	ASTM E831	5 µm/(m•°C) to 100 µm/(m•°C) D.L. = 0.1 %
	Variable	Modulated DSC	ASTM E2716 ASTM E2602 ASTM E1952	-180 °C to 550 °C D.L. = 1 uW (1 J/s)
Chemical[F]	Solids	Metallographic Phase Identification	ASTM E45 ASTM B795 ASTM A247 ASTM E1268 ASTM G209 ASTM B657 ASTM E2567 ASTM A892	N/A
	Metals and Alloys	Etching of Metallographic Samples	ASTM E407	N/A
		Grain Size	ASTM E112 ASTM E1382 ASTM E1181	D.L. = Up to 50 nm
		Case Depth	ASTM B931 ASTM B934	D.L. = Up to 1µm
	Rigid Solids	Microscopy for Microstructural Analysis	ASTM B748 ASTM E1508	10 X to 1 000 X optical, 30 X to 300 000 X SEM D.L. = N/A
		Metallographic Sample Preparation	ASTM E3	N/A

1. 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.