PERRY JOHNSON LABORATORY ACCREDITATION INC.

Certificate of Accreditation

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

ZWICKROELL, S.A. de C.V.

Av. Santa Fe # 170, Col. Lomas de Santa Fe
Alcaldía Alvaro Obregón, Ciudad de México, México. C.P. 01210

(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, Mass, Force, and Weighing Devices and Dimensional Calibration
(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:*
December 05, 2014	April 10, 2023	May 31, 2025

Accreditation No.:	*Certificate No.:*
80306	L23-311

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

ZWICKROELL, S.A. de C.V.
Av. Santa Fe # 170, Col. Lomas de Santa Fe
Alcaldía Álvaro Obregón, Ciudad de México, México. C.P. 01210
Contact Name: Zoila Isabel Fernandez Garcia Phone: 555-292-4326

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

Mechanical

MEASURED INSTRUMENT QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Indirect Verification of Rockwell Hardness Testers HRA[O]	20 HRA to 40 HRA	0.45 HRA	Hardness Test Blocks Indentec Hardness Testing Machines Ltd ISO 6508-2 ASTM E18
	41 HRA to 75 HRA	0.32 HRA	
	76 HRA to 88 HRA	0.4 HRA	
Indirect Verification of Rockwell Hardness Testers HRBW[O]	20 HRBW to 50 HRBW	1 HRBW	
	51 HRBW to 80 HRBW	1.1 HRBW	
	81 HRBW to 100 HRBW	0.49 HRBW	
Indirect Verification of Rockwell Hardness Testers HRC[O]	20 HRC to 30 HRC	0.39 HRC	
	31 HRC to 55 HRC	0.44 HRC	
	56 HRC to 70 HRC	0.34 HRC	
Indirect Verification of Rockwell Hardness Testers HRD[O]	40 HRD to 47 HRD	0.37 HRD	
	48 HRD to 63 HRD	0.34 HRD	
	64 HRD to 77 HRD	0.32 HRD	
Indirect Verification of Rockwell Hardness Testers HREW[O]	70 HREW to 84 HREW	0.89 HREW	
	84 HREW to 93 HREW	0.51 HREW	
	93 HREW to 100 HREW	0.47 HREW	
Indirect Verification of Rockwell Hardness Testers HRFW[O]	60 HRFW to 75 HRFW	0.93 HRFW	
	76 HRFW to 90 HRFW	0.6 HRFW	
	91HRFW to 100 HRFW	0.66 HRFW	
Indirect Verification of Rockwell Hardness Testers HRHW[O]	80 HRHW to 106 HRHW	0.45 HRHW	
	106 HRHW to 118 HRHW	0.42 HRHW	
	118 HRHW to 125 HRHW	0.42 HRHW	
Indirect Verification of Rockwell Hardness Testers HRRW[O]	80 HRRW to 125 HRRW	0.46 HRRW	
	125 HRRW to 150 HRRW	0.42 HRRW	
Indirect Verification of Rockwell Hardness Testers HR15N[O]	70 HR15N to 77 HR15N	0.51 HR15N	
	78 HR15N to 88 HR15N	0.5 HR15N	
	89 HR15N to 91 HR15N	0.3 HR15N	
Indirect Verification of Rockwell Hardness Testers HR30N[O]	42 HR30N to 54 HR30N	0.67 HR30N	
	55 HR30N to 73 HR30N	0.32 HR30N	
	74 HR30N to 80 HR30N	0.38 HR30N	
Indirect Verification of Rockwell Hardness Testers HR45N[O]	20 HR45N to 31 HR45N	0.84 HR45N	
	32 HR45N to 61 HR45N	0.47 HR45N	
	62 HR45N to 70 HR45N	0.31 HR45N	

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Indirect Verification of Rockwell Hardness Testers HR15TW^{O}	73 HR15TW to 80 HR15TW	0.41 HR15TW	Hardness Test Blocks Indented Hardness Testing Machines Ltd ISO 6508-2 ASTM E18
	81 HR15TW to 87 HR15TW	0.5 HR15TW	
	88 HR15TW to 93 HR15TW	0.44 HR15TW	
Indirect Verification of Rockwell Hardness Testers HR30TW^{O}	43 HR30TW to 56 HR30TW	1.3 HR30TW	
	57 HR30TW to 69 HR30TW	0.77 HR30TW	
	70 HR30TW to 82 HR30TW	0.72 HR30TW	
Indirect Verification of Rockwell Hardness Testers HR45TW^{O}	12 HR45TW to 33 HR45TW	1.2 HR45TW	
	34 HR45TW to 54 HR45TW	1 HR45TW	
	55 HR45TW to 72 HR45TW	0.77 HR45TW	
Indirect Verification of Brinell Hardness Tester HBW 1/10^{O}	10 HBW to 100 HBW	2.2 HBW	Hardness Test Blocks Indented Hardness Testing Machines Ltd ISO 6506-2
	100 HBW to 200 HBW	3.2 HBW	
	200 HBW to 400 HBW	6.2 HBW	
Indirect Verification of Brinell Hardness Tester HBW 1/30^{O}	95 HBW to 250 HBW	3.9 HBW	
	250 HBW to 450 HBW	7.9 HBW	
	450 HBW to 650 HBW	9.5 HBW	
Indirect Verification of Brinell Hardness Tester HBW 2.5/31.25^{O}	10 HBW to 70 HBW	1.3 HBW	
	70 HBW to 100 HBW	1.4 HBW	
	100 HBW to 200 HBW	1.8 HBW	
Indirect Verification of Brinell Hardness Tester HBW 2.5/62.5^{O}	10 HBW to 100 HBW	1.3 HBW	
	100 HBW to 200 HBW	2.1 HBW	
	200 HBW to 400 HBW	3.8 HBW	
Indirect Verification of Brinell Hardness Tester HBW 2.5/187.5^{O}	42 HBW to 250 HBW	1.8 HBW	
	250 HBW to 450 HBW	5.6 HBW	
	450 HBW to 650 HBW	6 HBW	
Indirect Verification of Brinell Hardness Tester HBW 5/250^{O}	10 HBW to 100 HBW	1.1 HBW	
	100 HBW to 200 HBW	1.4 HBW	
	200 HBW to 400 HBW	2.8 HBW	
Indirect Verification of Brinell Hardness Tester HBW 5/750^{O}	37.6 HBW to 83 HBW	1.2 HBW	
	83 HBW to 450 HBW	4.6 HBW	
	450 HBW to 650 HBW	5.4 HBW	
Indirect Verification of Brinell Hardness Tester HBW 10/3 000^{O}	95 HBW to 250 HBW	1.6 HBW	
	250 HBW to 467 HBW	4 HBW	
	467 HBW to 650 HBW	4.6 HBW	

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Mechanical

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Indirect Verification of Micro Hardness Tester Vickers HV/0.01^{O}	50 HV to 225 HV	28 HV	Hardness Test Blocks Indented Hardness Testing Machines Ltd ISO 6507-2
	226 HV to 600 HV	150 HV	
	601 HV to 1 500 HV	270 HV	
Indirect Verification of Micro Hardness Tester Vickers HV/0.025^{O}	50 HV to 225 HV	24 HV	
	226 HV to 600 HV	78 HV	
	601 HV to 1 500 HV	140 HV	
Indirect Verification of Micro Hardness Tester Vickers HV/0.05^{O}	50 HV to 225 HV	20 HV	
	226 HV to 600 HV	54 HV	
	601 HV to 1 500 HV	98 HV	
Indirect Verification of Micro Hardness Tester Vickers HV/0.2^{O}	50 HV to 225 HV	10 HV	
	226 HV to 600 HV	39 HV	
	601 HV to 1 500 HV	78 HV	
Indirect Verification of Micro Hardness Tester Vickers HV/0.3^{O}	50 HV to 225 HV	8.7 HV	
	226 HV to 600 HV	41 HV	
	601 HV to 1 500 HV	64 HV	
Indirect Verification of Micro Hardness Tester Vickers HV/0.5^{O}	50 HV to 225 HV	7 HV	
	226 HV to 600 HV	26 HV	
	601 HV to 1 500 HV	51 HV	
Indirect Verification of Micro Hardness Tester Vickers HV/1^{O}	50 HV to 225 HV	4.8 HV	
	226 HV to 600 HV	19 HV	
	601 HV to 1 500 HV	36 HV	
Indirect Verification of Micro Hardness Tester Vickers HV/5^{O}	50 HV to 225 HV	4.2 HV	
	226 HV to 600 HV	12 HV	
	601 HV to 1 500 HV	18 HV	
Indirect Verification of Micro Hardness Tester Vickers HV/10^{O}	50 HV to 225 HV	2.5 HV	
	226 HV to 600 HV	8.9 HV	
	601 HV to 1 500 HV	13 HV	
Indirect Verification of Micro Hardness Tester Vickers HV/30^{O}	50 HV to 225 HV	4.7 HV	
	226 HV to 600 HV	5.4 HV	
	601 HV to 1 500 HV	8.3 HV	
Indirect Verification of Micro Hardness Tester Vickers HV/50^{O}	50 HV to 225 HV	3 HV	
	226 HV to 600 HV	4.6 HV	
	601 HV to 1 500 HV	6.8 HV	

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Indirect Verification of Micro Hardness Tester Knoop HK/0.1[O]	100 HK to 250 HK	11 HV	Hardness Test Blocks Indented Hardness Testing Machines Ltd ISO 4545-2
	250 HK to 650 HK	36 HK	
	650 HK to 800 HK	54 HK	
Indirect Verification of Micro Hardness Tester Knoop HK/0.2[O]	100 HK to 250 HK	7.5 HK	
	250 HK to 650 HK	30 HK	
	650 HK to 840 HK	42 HK	
Indirect Verification of Micro Hardness Tester Knoop HK/0.3[O]	100 HK to 250 HK	8.1 HV	
	250 HK to 650 HK	26 HK	
	650 HK to 840 HK	38 HV	
Indirect Verification of Micro Hardness Tester Knoop HK/0.5[O]	100 HK to 250 HK	6.8 HV	
	250 HK to 650 HK	24 HV	
	650 HK to 840 HK	27 HV	
Indirect Verification for Impact Tests Machines for Metallic Materials[O]	2 J to 88 J	0.64 J	ASTM E-23 18 ISO 148-2 SRM 2092 (NIST) Low Energy Level SRM 2096 (NIST) High Energy Level l SRM 2098 (NIST) Super High Energy Level 2
	88 J to 200 J	1.6 J	
	200 J to 750 J	4.1 J	
Direct Verification for Impact Tests Machines for Plastic Materials Time[O]	0.15 s to 60 s	0.05 s	Stopwatch Hanhart ASTM D256 ASTM D6110 ISO 179 / ISO 180
Direct Verification for Impact Tests Machines for Plastic Materials Force[O]	1 N to 100 N	0.02 N	Load Cell ACD100N ASTM D256 ASTM D6110 ISO 179 / ISO 180
Direct Verification for Impact Tests Machines for Plastic Materials Angle[O]	1° to 150°	0.08°	Digital Angle Gauge Wyler ASTM D256 ASTM D6110 ISO 179 / ISO 180
Verification of the Speed of the Crosshead in Testing Machines[O]	0.01 mm/min to 200 mm/min	0.045 mm/min	Digital Length Gauge Stopwatch ASTM E2658

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Verification of Flow Index Machines – Force[O]	0.325 kg to 21.6 kg	3 g	Weight Scale ASTM D1238
	2.55 kg to 50 kg	0.15 % of reading	Load Cell ASTM D1238
Verification of Flow Index Machines - Temperature	21 °C to 400 °C	0.09 °C	RTD PT100 ASTM D1238
Flow Index Displacement[O]	0.003 mm to 60 mm	1 µm	Digital Length Gauge ASTM D1238
	1.1 mm to 100 mm	2 µm	Gauge Length Blocks ASTM D1238

Mass, Force, and Weighing Devices

MEASURED INSTRUMENT QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Material Testing Machines and Force Instruments – Tensile[O]	0.01 N to 200 N	0.1 % of reading	Dead Weights, Kern & Son ISO 7500-1 ASTM E4
	0.025 kN to 0.25 kN	0.059 % of reading	Load Cell of 2.5 kN GTM/ZWICK Model: KTN-P ISO 7500-1 ASTM E4
	0.25 kN to 2.5 kN	0.046 % of reading	
	0.5 kN to 5 kN	0.047 % of reading	Load Cell of 50 kN GTM/ZWICK Model: KTN-P ISO 7500-1 ASTM E4
	5 kN to 50 kN	0.046 % of reading	
	2.5 kN to 25 kN	0.047 % of reading	Load Cell of 250 kN GTM/ZWICK Model: KTN-P ISO 7500-1 ASTM E4
	25 kN to 250 kN	0.049 % of reading	
	6 kN to 60 kN	0.051 % of reading	Load Cell of 600 kN GTM/ZWICK Model: KTN-P ISO 7500-1 ASTM E4
	60 kN to 600 kN	0.053 % of reading	
Material Testing Machines and Force Instruments – Compression[O]	0.01 N to 200 N	0.1 % of reading	Dead Weights, Kern & Son ISO 7500-1 ASTM E4

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Mass, Force, and Weighing Devices

MEASURED INSTRUMENT QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Material Testing Machines and Force Instruments – Compression[O]	0.025 kN to 0.25 kN	0.056 % of reading	Load Cell of 2.5 kN GTM/ZWICK Model: KTN-P ISO 7500-1, ASTM E4
	0.25 kN to 2.5 kN	0.047 % of reading	
	0.5 kN to 5 kN	0.049 % of reading	Load Cell of 50 kN GTM/ZWICK Model: KTN-P ISO 7500-1 ASTM E4
	5 kN to 50 kN	0.046 % of reading	
	2.5 kN to 25 kN	0.047 % of reading	Load Cell of 250 kN GTM/ZWICK Model: KTN-P ISO 7500-1 ASTM E4
	25 kN to 250 kN	0.049 % of reading	
	6 kN to 60 kN	0.049 % of reading	Load Cell of 600 kN GTM/ZWICK Model: KTN-P ISO 7500-1 ASTM E4
	60 kN to 600 kN	0.054 % of reading	

Dimensional

MEASURED INSTRUMENT QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Extensometers and Crosshead Travel[O]	Up to 200 mm	0.62 µm	Linear Encoder Heidenhain Epsilon 3590VHR ISO 9513 ASTM E83, ASTM E2309

1. The CMC (Calibration and Measurement Capability) stated for calibrations included on this scope of accreditation represents the smallest measurement uncertainty attainable by the laboratory when performing a more or less routine calibration of a nearly ideal device under nearly ideal conditions. It is typically expressed at a confidence level of 95 % using a coverage factor *k* (usually equal to 2). The actual measurement uncertainty associated with a specific calibration performed by the laboratory will typically be larger than the CMC for the same calibration since capability and performance of the device being calibrated and the conditions related to the calibration may reasonably be expected to deviate from ideal to some degree.

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2. The laboratories range of calibration capability for all disciplines for which they are accredited is the interval from the smallest calibrated standard to the largest calibrated standard used in performing the calibration. The low end of this range must be an attainable value for which the laboratory has or has access to the standard referenced. Verification of an indicated value of zero in the absence of a standard is common practice in the procedure for many calibrations but by its definition it does not constitute calibration of zero capacity.

3. The presence of a superscript F means that the laboratory performs calibration of the indicated parameter at its fixed location. Example: Outside Micrometer^{F} would mean that the laboratory performs this calibration at its fixed location.

4. The presence of a superscript O means that the laboratory performs calibration of the indicated parameter onsite at customer locations. Example: Outside Micrometer^{O} would mean that the laboratory performs this calibration onsite at the customer's location.

5. Measurement uncertainties obtained for calibrations performed at customer sites can be expected to be larger than the measurement uncertainties obtained at the laboratories fixed location for similar calibrations. This is due to the effects of transportation of the standards and equipment and upon environmental conditions at the customer site which are typically not controlled as closely as at the laboratories fixed location.