



PERRY JOHNSON LABORATORY ACCREDITATION, INC.

Certificate of Accreditation

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

**RMS Quality Services, Inc.
1500 Sylvania Avenue, Suite #115
Sturtevant, WI 53177**

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

ISO/IEC 17025:2005

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 January 2009):

**Calibration of Electrical, Mechanical, Pressure,
Thermodynamics and Hard Gauging
(As detailed in the supplement)**

Such testing and/or calibration services shall only be offered at or from the address given above. 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/Operations Manager

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

<i>Initial Accreditation Date:</i>	<i>Issue Date:</i>	<i>Accreditation No.:</i>	<i>Certificate No.:</i>
June 6, 2003	June 1, 2011	59289	L11-97

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.pjlab.com.



Certificate of Accreditation: Supplement

RMS Quality Services, Inc.
 1500 Sylvania Avenue, Suite #115
 Sturtevant, WI 53177

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

Dimensional

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Gage Blocks	0.05 in to 8 in	(4.4 + 1.7L) μ in	Lab Master
	8 in to 13 in	(13.0 + 1.5L) μ in	
Length Standards	1 in to 10 in	(25.0 + 1.2L) μ in	Super Micrometer
	10 in to 24 in	(35.0 + 2.0L) μ in	
Cylindrical Rings	0.04 in to 13 in	(30.1 + 2.4D) μ in	Lab Master
Cylindrical Plugs	0.01 in to 14 in	(19.8 + 1.1D) μ in	
Threaded Rings - Pitch	2-56 to 10-7	(152 + 5.9D) μ in	Lab Master & Set Plugs
Threaded Rings - Minor	2-56 to 10-7	(121 + 4.4D) μ in	Lab Master
Threaded Plugs - Pitch	0-96 to 10-4	120 μ in	Super Micrometer & Thread Wires
Threaded Plugs - Major	0-96 to 10-4	(30.1 + 3.0D) μ in	Super Micrometer
NPT Rings	1/16-27 to 6-8	170 μ in	Master Plugs and Super Micrometer or Lab Master
NPT Plugs	1/16-27 to 6-8	290 μ in	Master Rings and Mini Checker/Linear Height Gage Super Micrometer and Mini Checker/Linear Height Gage
Profilometer Specimens	15 μ in to 300 μ in	3 μ in	Profilometer
Surface Plate Flatness	12 in to 192 in	(65.2 + 3.2D) μ in	Laser Planekator
Surface Plate Repeat Reading	200 μ in	45 μ in	Rahn Repeat-o-Meter
Thread Wires	0.005 in to 0.05 in	(18.1 + 0.5D) μ in	Super Micrometer
Height Gages	0.05 in to 40 in	(202 + 14L) μ in	Gage Blocks
Indicators	0.05 in to 0.1 in	(98 + 12L) μ in	
Calipers	0.05 in to 40 in	(236 + 14L) μ in	
Micrometers	0.05 in to 24 in	(55 + 5.7L) μ in	
Profilometers Fixed points	115.6 μ in	4 μ in	Roughness Specimen
	19 μ in	4 μ in	
	12 μ in	4 μ in	



Certificate of Accreditation: Supplement

RMS Quality Services, Inc.
 1500 Sylvania Avenue, Suite #115
 Sturtevant, WI 53177

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

Dimensional

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Optical Comparators X length	12 in maximum	470 μ in	Glass Scale
Y length	12 in maximum	470 μ in	
Angularity	0° to 90.0°	0.2°	Angle Masters
Squareness	8 in of Y axis travel or maximum Y axis travel if maximum is less than 8 in	0.023°	Master Square
Magnification	10X	0.05 %	Glass Master and Precision Balls
	20X	0.04 %	
	31.25X	0.04 %	
	50X	0.03%	
	62.5X	0.03 %	
	100X	0.02 %	
Glass Scale Masters	12 in Maximum	130 μ in	Video CMM (non contact)
CMM Calibration Repeatability	18 in to 40 in	110 μ in	Ball Bars ASME B89.4.10360.2
CMM Calibration Linearity	18 in to 40 in	120 μ in	Step Gage ASME B89.4.10360.2
CMM Calibration Volumetric	18 in to 40 in	130 μ in	Test Sphere ASME B89.4.10360.2
Surface Flatness	0.38 in to 2 in	5 μ in	Optical Flat

Chemical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
pH Meters Fixed points	4.00 pH	0.020 pH	pH Buffer Solutions
	7.00 pH	0.020 pH	
	10.00 pH	0.020 pH	
Conductivity Meters	12.85 mS/cm	0.13 mS/cm	Conductivity Solutions



Certificate of Accreditation: Supplement

RMS Quality Services, Inc.
 1500 Sylvania Avenue, Suite #115
 Sturtevant, WI 53177

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

Mass, Force, and Weighing Device

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Bench and Floor Scales	0.005 lb to 5 000 lb	$(1.2 \times 10^{-3} + 1.15 \times 10^{-4}Wt)$ lb	Class F Weights NIST Handbook 44
Force Load Cells	10 lb to 50 000 lb	$(2.31 + 7.82 \times 10^{-5}Wt)$ lb	Load Cells and Class F Weights

Mechanical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Pressure Gages – Transducers	-13 psi to 10 000 psi	0.1 % of reading	Pressure Tester & Transducer
Torque - Generate	5 lbf-ft to 600 lbf-ft	0.6 lbf-ft	Torque Arm & Dead Weight
Torque - Measure	5 lbf-ft to 600 lbf-ft	1.0 % of reading	Torque Arm & Dead Weight
Tachometers	5 rpm to 6 000 rpm	0.1 % of reading	Tachometer Calibrator
Indirect Verification of Rockwell Hardness HRA	20 to 65 HRA	0.7 HRA	ASTM E18 and calibrated Rockwell Hardness Test Blocks
	66 to 79 HRA	0.7 HRA	
	80 to 84 HRA	1.0 HRA	
Indirect Verification of Rockwell Hardness HRBW	40 HRBW to 59 HRBW	1.3 HRBW	
	60 HRBW to 79 HRBW	1.3 HRBW	
	80 HRBW to 100 HRBW	1.3 HRBW	
Indirect Verification of Rockwell Hardness HRC	20 HRC to 34 HRC	0.7 HRC	ASTM E18 and calibrated Rockwell Hardness Test Blocks
	35 HRC to 54 HRC	0.8 HRC	
	55 HRC to 65 HRC	1.0 HRC	
Indirect Verification of Rockwell Hardness HR15N	70 HR15N to 77 HR15N	1.3 HR15N	
	78 HR15N to 88 HR15N	1.0 HR15N	
	90 HR15N to 92 HR15N	1.0 HR15N	
Indirect Verification of Rockwell Hardness HR15T	74 HR15T to 80 HR15T	1.4 HR15T	
	81 HR15T to 86 HR15T	1.2 HR15T	
	87 HR15T to 93 HR15T	1.1 HR15T	



Certificate of Accreditation: Supplement

RMS Quality Services, Inc.
 1500 Sylvania Avenue, Suite #115
 Sturtevant, WI 53177

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

Mechanical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Direct Verification of Durometer Hardness Tester Types A, B, C, D, E, O & DO Extension at zero reading	2.46 mm to 2.54 mm	8.0 μ m	ASTM D-2240 Video Comparator 20x
Indentor Shape (Not all parameters apply to all of Durometer Types) Indentor Diameter Indentor Tip Diameter Indentor Tip Radius Indentor Tip Angle		8.1 μ m 8.1 μ m 8.1 μ m 0.06°	Video Comparator 20X Video Comparator 20X Video Comparator 20X Video Comparator 20X
Durometer Indentor Spring Types A, B, E & O Types C, D & DO	0.55 N to 8.05 N 4.445 N to 44.45 N	1.7 N 1.7 N	Load Cell Load Cell

Thermodynamic

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Temperature Measure	-30 °C to 600 °C	0.1 °C	Omega & Drywell
Temperature Ovens (TUS)	100 °F to 2 000 °F	1 °F	AMS 2750 D
Temperature Infrared Thermometer	50 °C to 500 °C	0.5 °C	Altek Calibrator Model 211-
Relative Humidity Measurement Equipment	5 % RH to 90 % RH	1.4 % RH	Vaisala Salts



Certificate of Accreditation: Supplement

RMS Quality Services, Inc.
 1500 Sylvania Avenue, Suite #115
 Sturtevant, WI 53177

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

Time and Frequency

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Time Marker	150 μ s to 20 ms	50 μ s	O-Scope Calibrator
Time	12 800 s to 86 400 s	636 ms	Direct Comparison Method: NISR Publication 960-12

Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Equipment to Measure Frequency	0.5 Hz to 10 MHz	0.0025%	Wavetek 9100
Equipment to Measure Capacitance	0.5 nF to 4 nF	0.6% of reading +30.0pF	
	4.0001 nF to 40 nF	0.6% of reading +60.0pF	
	40.001 nF to 400 nF	0.6% of reading +320pF	
	400.01 nF to 4 μ F	0.8% of reading +3.2nF	
	4.0001 μ F to 40.000 μ F 40.001 μ F to 400.00 μ F 400.01 μ F to 4.0000 mF 4.0001 mF to 40.000 mF	1.0% of reading +32.0nF 1.0% of reading +320nF 1.0% of reading +3.2 μ F 2.0% of reading +120 μ F	
Equipment to Measure Frequency	0.5 Hz to 10 MHz	0.0025%	
Equipment to Measure Capacitance	0.5 nF to 4 nF	0.6% of reading +30.0pF	
	4.0001 nF to 40 nF	0.6% of reading +60.0pF	
Equipment to Measure Resistance	660 m Ω to 40 Ω	220 m Ω	
	40.001 Ω to 400 Ω	240 m Ω	
	0.400 01 k Ω to 4 k Ω	1.6 Ω	
	40.001 k Ω to 400 k Ω	120 Ω	
	0.400 01 M Ω to 4 M Ω	1 700 Ω	
	4.000 1 M Ω to 40 M Ω 40.001 M Ω to 400 M Ω	2.4 k Ω 110 k Ω	



Certificate of Accreditation: Supplement

RMS Quality Services, Inc.
 1500 Sylvania Avenue, Suite #115
 Sturtevant, WI 53177

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

Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Equipment to Measure DC Current	0.320 01 A to 3.2 A	2 mA	Wavetek 9100
	3.200 1 A to 10.5 A	6.7 mA	
	32.001 mA to 320 mA	5.4 μ A	
	3.200 1 mA to 32 mA	5.4 μ A	
	0.320 01 mA to 3.2 mA	0.53 μ A	
	0.17 μ A to 320 μ A	56 nA	
Equipment to Measure DC Voltage	72 μ V to 320 mV	24 μ V	
	0.320 01 V to 3.2 V	240 μ V	
	3.200 1 V to 32.0 V	2.5 mV	
	32.001 V to 320.0 V	26 mV	
	320.01 V to 1 050.0 V	83 mV	
Equipment to Measure AC Current At the listed frequencies			
10 Hz to 3 kHz	32 μ A to 3.2 mA	260 μ A	
3 kHz to 10 kHz	32 μ A to 3.2 mA	260 μ A	
Equipment to Measure AC Current At the listed frequencies			
10 kHz to 20 kHz	32 μ A to 32 mA	260 μ A	
20 kHz to 30 kHz	32 μ A to 32 mA	260 μ A	
Equipment to Measure AC Current At the listed frequencies			
10 Hz to 3 kHz	32 mA to 320 mA	280 μ A	
3 kHz to 10 kHz	32 mA to 320 mA	390 μ A	
10 kHz to 20 kHz	32 mA to 320 mA	410 μ A	
20 kHz to 30 kHz	32 mA to 320 mA	480 μ A	
Equipment to Measure AC Current At the listed frequencies			
10 Hz to 3 kHz	0.32 A to 3.2 A	3.7 mA	
3 kHz to 10 kHz	0.32 A to 3.2 A	11 mA	



Certificate of Accreditation: Supplement

RMS Quality Services, Inc.
 1500 Sylvania Avenue, Suite #115
 Sturtevant, WI 53177

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

Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Equipment to Measure AC Current At the listed frequencies			Wavetek 9100
10 Hz to 3 kHz	3.2 A to 10.50 A	3.7 mA	
3 kHz to 10 kHz	3.2 A to 10.50 A	11 mA	
Equipment to Measure AC Current At the listed frequencies			
10 Hz to 100 Hz	3.2 A to 32 A	24 mA	
100 Hz to 440 Hz	3.2 A to 32 A	63 mA	
Equipment to Measure AC Current At the listed frequencies			
10 Hz to 100 Hz	32 A to 200 A	65 mA	
100 Hz to 440 Hz	32 A to 200 A	280 mA	
Equipment to Measure AC Current At the listed frequencies			
10 Hz to 100 Hz	32 A to 200 A	510 mA	
100 Hz to 440 Hz	32 A to 200 A	1.6 A	
Equipment to Measure AC Current At the listed frequencies			
10 Hz to 100 Hz	16 A to 160 A	0.35 A	
Equipment to Output AC Current At the listed frequencies			Agilent 3458A
10 Hz to 5 kHz	6 mA to 100 mA	2 mA	
10 Hz to 5 kHz	100.1 mA to 1A	2 mA	
Equipment to Output DC Current	100 μ A to 10 mA	32 μ A	
	10.01 mA to 100 mA	64 μ A	
	100.01 mA to 1 A	190 μ A	



Certificate of Accreditation: Supplement

RMS Quality Services, Inc.
 1500 Sylvania Avenue, Suite #115
 Sturtevant, WI 53177

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

Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Equipment to Output Resistance	468 $\mu\Omega$ to 10 Ω	15 $\mu\Omega/\Omega$ + 6.0 $\mu\Omega$	Agilent 3458A - True
	10.01 Ω to 100 Ω	7.5 $\mu\Omega/\Omega$ + 5.0 $\mu\Omega$	Agilent 3458A - Normal
	100.01 Ω to 1 k Ω	6.0 $\mu\Omega/\Omega$ + 5.0 $\mu\Omega$	
	1.01 k Ω to 10 k Ω	5.5 $\mu\Omega/\Omega$ + 5.0 $\mu\Omega$	
	10.01 k Ω to 100 k Ω (10 $\mu\Omega/\Omega$ + 5.0 $\mu\Omega$	
	100.01 k Ω to 1 M Ω	20 $\mu\Omega/\Omega$ + 7.5 $\mu\Omega$	
	1.1 M Ω to 10 M Ω (30 $\mu\Omega/\Omega$ + 10 $\mu\Omega$	
	10.1 M Ω to 100 M Ω	140 $\mu\Omega/\Omega$ + 100 $\mu\Omega$	
	100.1 M Ω to 1 G Ω	350 $\mu\Omega/\Omega$ + 1 000 $\mu\Omega$	
	25 $\mu\Omega$ to 100 Ω	7.5 $\mu\Omega/\Omega$ + 6.0 $\mu\Omega$	Agilent 3458A – Low Current
	100.01 Ω to 1 k Ω	6.0 $\mu\Omega/\Omega$ + 6.0 $\mu\Omega$	
	1.01 k Ω to 10 k Ω	5.5 $\mu\Omega/\Omega$ + 7.5 $\mu\Omega$	
	10.01 k Ω to 100 k Ω	10 $\mu\Omega/\Omega$ + 12.5 $\mu\Omega$	
	100.01 k Ω to 1 M Ω	20 $\mu\Omega/\Omega$ + 100 $\mu\Omega$	
	Equipment to Output DC Voltage	10 μ V to 999 μ V	0.5 μ V/V + 3.0 μ V
1.0 mV to 9.999 V		3.5 μ V/V + 3.0 μ V	
10.0 V to 99.999 9 V		3.5 μ V/V + 4.0 μ V	
100.0 V to 1 000.1 V		3.5 μ V/V + 4.0 μ V	
Oscilloscopes At the listed frequencies			Oscilloscope Calibrator Fluke 5820 A and Wavetek 9100
DC Voltage 50 Ω	0.001 V to 6.6 V	40 μ V/V + 16 mV	
DC Voltage 1 M Ω	0.001 V to 130 V	25 μ V/V + 32 mV	
AC Voltage 50 Ω	0.001 V to 6.6 V	40 μ V/V + 16 mV	
AC Voltage 1 M Ω	0.001 V to 130 V	5 μ V/V + 64 mV	



Certificate of Accreditation: Supplement

RMS Quality Services, Inc.
 1500 Sylvania Avenue, Suite #115
 Sturtevant, WI 53177

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

Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Edge (Amplitude)	0.15 V to 2.5 V	200 μ V/V + 50 mV	Wavetek 9100 and Fluke 5820 A
Leveled Sine Wave < 600 MHz	1 V to 5.5 V	300 μ V/V + 330 mV	
Leveled Sine Wave > 600 MHz	0.9 V to 3.5 V	300 μ V/V + 280 mV	
Wave Generator	0.05 V to 55 V	100 μ V/V + 16 mV	
	0.025 V to 2.5 V	100 μ V/V + 7.5 mV	
Pulse Generator	4 000 ns to 55 000 s	0.002 5 % of reading	Wavetek 9100
Equipment to Read Frequency @ 100 mV	30 kHz to 100 kHz	430 μ Hz/Hz + 250 μ Hz	
	10 kHz to 30 kHz	220 μ Hz/Hz + 100 μ Hz	
	40 Hz to 10 kHz	155 μ Hz/Hz + 75 μ Hz	
Equipment to Read Frequency 1 V to 100 V	300 kHz to 1 MHz	1 400 μ Hz/Hz + 500 μ Hz	
	100 kHz to 300 kHz	180 μ Hz/Hz + 375 μ Hz	
	30 kHz to 100 kHz	70 μ Hz/Hz + 250 μ Hz	
	10 kHz to 30 kHz	50 μ Hz/Hz + 75 μ Hz	
	40 kHz to 10 kHz	75 μ Hz/Hz + 50 μ Hz	
Equipment to Read Frequency @ 1 000 V	30 kHz to 100 kHz	700 μ Hz/Hz + 250 μ Hz	
	10 kHz to 30 kHz	250 μ Hz/Hz + 75 μ Hz	
	40 Hz to 10 kHz	75 μ Hz/Hz + 50 μ Hz	

1. The CMC (Calibration and Measurement Capability) stated for calibrations included on this scope of accreditation represent the smallest measurement uncertainties attainable by the laboratory when performing a more or less routine calibration of a nearly ideal device under nearly ideal conditions. It is 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.
2. The term L represents length in inches or millimeters appropriate to the uncertainty statement.
3. The term D represents diameter in inches or millimeters appropriate to the uncertainty statement.