



# 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:

*The validity of this certificate is mandated through ongoing surveillance.*

Tracy Szerszen  
President/Operations Manager

Perry Johnson Laboratory  
Accreditation, Inc. (PJLA)  
26555 Evergreen, Suite 1325  
Southfield, Michigan 48076

*Initial Accreditation Date:*

June 06, 2003

*Issue Date:*

May 12, 2009

*Expiration Date:*

May 11, 2011

*Accreditation No.:*

59289

*Certificate No.:*

L09-36

*Page No.:*

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# 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)	BEST MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	REMARKS
Gage Blocks	0.012 7 $\mu$ m to 20.32 cm (0.50 $\mu$ in to 8 in)	(0.12 + 0.05L) $\mu$ m [(4.4 + 1.7L) $\mu$ in]	Lab Master
	20.32 cm to 33.02 cm (8 in to 13 in)	(0.34 + 0.04L) $\mu$ m [(13.0 + 1.5L) $\mu$ in]	Lab Master
Length Standards Super Micrometer	2.54 cm to 25.4 cm (1 in to 10 in)	(0.64 + 0.04L) $\mu$ m [(25.0 + 1.2L) $\mu$ in]	Super Micrometer
	25.4 cm to 60.94 cm (10 in to 24 in)	(0.89 + 0.06L) $\mu$ m [(35.0 + 2.0L) $\mu$ in]	Super Micrometer
Cylindrical Rings	0.050 8 cm to 33.02 cm (0.02 in to 13 in)	(0.77 + 0.07D) $\mu$ m [(30.1 + 2.4D) $\mu$ in]	Lab Master
Cylindrical Plugs Lab Master	0.025 4 cm to 35.56 cm (0.01 in to 14 in)	(0.51 + 0.02D) $\mu$ m [(19.8 + 0.5D) $\mu$ in]	Lab Master
Threaded Rings Pitch	0.025 4 cm to 25.4 cm (0.01 in to 10 in)	3.87 + 0.08D) $\mu$ m [(152 + 3.0D) $\mu$ in]	Lab Master
	0.254 cm to 25.4 cm (0.100 in to 10 in)	(1.58 + 0.15D) $\mu$ m [(62 + 5.9D) $\mu$ in]	Lab Master
Threaded Rings Minor	0.076 2 cm to 10.16 cm (0.03 in to 4 in)	(3.08 + 0.12D) $\mu$ m [(121 + 4.4D) $\mu$ in]	Lab Master
Threaded Plugs Pitch	0.025 4 cm to 25.4 cm (0.01 in to 10 in)	(1.83 + 0.03D) $\mu$ m [(72 + 1.1D) $\mu$ in]	Super Micrometer
Threaded Plugs Major	0.025 4 cm to 25.4 cm (0.01 in to 10 in)	(0.77 + 0.08D) $\mu$ m [(30.1 + 3.0D) $\mu$ in]	Super Micrometer
NPT Rings	0.158 7 cm to 15.24 cm (0.062 5 in to 6 in)	4.25 $\mu$ m (170 $\mu$ in)	Plugs and Lab Master
NPT Plugs	0.158 7 cm to 15.24 cm (0.062 5 in to 6 in)	7.32 $\mu$ m (290 $\mu$ in)	Rings and Lab Master
Profilometer Specimens	2.54 nm to 7.62 $\mu$ m (0.10 $\mu$ in to 300 $\mu$ in)	0.077 $\mu$ m (3 $\mu$ in)	Profilometer
Surface Plate Flatness	Up to 101.6 cm (Up to 40 in)	(1.66 + 0.09D) $\mu$ m [(65.2 + 3.2D) $\mu$ in]	Planekator
Thread Wires	0.012 7 cm to 0.127 cm (0.005 in to 0.05 in)	(0.46 + 0.02D) $\mu$ m [(18.1 + 0.5D) $\mu$ in]	Lab Master
Height Gages	Up to 101.6 cm (Up to 40 in)	(5.14 + 0.36L) $\mu$ m [(202 + 14L) $\mu$ in]	Gage Blocks
Indicators	Up to 0.254 cm (Up to 0.1 in)	(2.49 + 0.31L) $\mu$ m [(98 + 12L) $\mu$ in]	Gage Blocks
Calipers	Up to 101.6 cm (Up to 40 in)	(6.00 + 0.36L) $\mu$ m [(236 + 14L) $\mu$ in]	Gage Blocks
Micrometers	Up to 60.94 cm (Up to 24 in)	(1.40 + 0.15L) $\mu$ m [(55 + 5.7L) $\mu$ in]	Gage Blocks



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Profilometers	0.050 8 $\mu\text{m}$ to 7.62 $\mu\text{m}$ (2 $\mu\text{in}$ to 300 $\mu\text{in}$ )	0.11 $\mu\text{m}$ (4 $\mu\text{in}$ )	Roughness Specimen
Optical Comparators	Up to 30.48 cm (Up to 12 in)	5.08 $\mu\text{m}$ (200 $\mu\text{in}$ )	Glass Scale & Precision Balls
Glass Scale Masters	Up to 30.48 cm (Up to 12 in)	3.099 $\mu\text{m}$ (120 $\mu\text{in}$ )	Video CMM (non contact)
CMM Calibration Repeatability	Up to 101.6 cm (Up to 40 in)	2.77 $\mu\text{m}$ (110 $\mu\text{in}$ )	Ball Bars
CMM Calibration Linearity	Up to 101.6 cm (Up to 40 in)	2.88 $\mu\text{m}$ (110 $\mu\text{in}$ )	Step Gage
CMM Calibration Volumetric	Up to 101.6 cm (Up to 40 in)	3.099 $\mu\text{m}$ (120 $\mu\text{in}$ )	Test Sphere
Surface Flatness	Up to 5.08 cm (Up to 2 in)	0.13 $\mu\text{m}$ (5 $\mu\text{in}$ )	Optical Flat

## Mass, Force, and Weighing Devices

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	BEST MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	REMARKS
Bench and Floor Scales	0.272 1 kg to 2.267 t (0.6 lb to 5 000 lb)	0.25 % of reading	Handbook 44
Force – Load Cells	Up to 4.535 t (Up to 10 000 lb)	0.25 % of reading	Load cells and weights

## Mechanical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	BEST MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	REMARKS
Pressure Gages – Transducers	-89.631 kPa to 2.068 MPa (-13 psi to 10 000 psi)	0.1 % of reading	Pressure tester & transducer
Torque - Generate	Up to 25.284 N·m (Up to 600 lbf·ft)	0.1 % of range	Torque arm & dead weight
Torque - Measure	Up to 25.284 N·m (Up to 600 lbf·ft)	1.0 % of reading	Torque arm & dead weight
Tachometers	Up to 6 000 RPM	0.1 % of reading	Tachometer calibrator



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Rockwell Hardness Tester HRA	Low	0.7 HRA	ASTM E18
	Middle	0.7 HRA	
	High	1.0 HRA	
Rockwell Hardness Tester HRB	Low	1.3 HRB	ASTM E18
	Middle	1.3 HRB	
	High	1.3 HRB	
Rockwell Hardness Tester HRC	Low	0.7 HRC	ASTM E18
	Middle	0.8 HRC	
	High	1.0 HRC	
Rockwell Hardness Tester HR15N	Low	1.3 HR15N	ASTM E18
	Middle	1.0 HR15N	
	High	1.0 HR15N	
Rockwell Hardness Tester HR15T	Low	1.4 HR15T	ASTM E18
	Middle	1.2 HR15T	
	High	1.1 HR15T	
Durometers Video CMM Indenter Angle	20° to 40°	0.05°	ASTM A2240
Durometers Indenter Length	0.00124 $\mu\text{m}$ to 0.005 029 $\mu\text{m}$ (0.049 in to 0.198 in)	8.078 $\mu\text{m}$ (320 $\mu\text{in}$ )	ASTM A2240
Durometers Indenter Radius	0.00127 $\mu\text{m}$ to 0.00254 $\mu\text{m}$ (0.050 in to 0.100 in)	8.078 $\mu\text{m}$ (320 $\mu\text{in}$ )	ASTM A2240

## Chemical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	BEST MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	REMARKS
pH Meters	4.00 pH	0.020 pH	pH Buffer Solutions
	7.00 pH	0.020 pH	
	10.00 pH	0.020 pH	
Conductivity Meters 13.5 $\mu\text{S}/\text{cm}$	12.85 mS/cm	0.13 mS/cm	Conductivity Solutions
	1408 $\mu\text{S}/\text{cm}$	0.13 mS/cm	



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Temperature Measure	-30 °C to 600 °C	0.1 °C	Omega & Drywell
Temperature Ovens (TUS)	100 °F to 2 000 °F	1 °C	AMS 2750 D
Temperature	50 °C to 500 °C	0.5 °C	IR Calibrator Infrared
Relative Humidity	0 % RH to 90 % RH	1.4 % RH	Vaisala

## Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE (AND SPECIFICATION WHERE APPROPRIATE)	BEST MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	REMARKS
Frequency (Source)	0.5 Hz to 10 MHz	25 $\mu$ Hz	Wavetek
Capacitance (Source)	I Hi 4.000 1 mF to 40 mF	0.1 % of Output	Multimeter
	I Lo 4.000 1 mF to 40 mF	0.1 % of Output	
	I Hi 40.001 $\mu$ F to 4 mF	0.05 % of Output	
	I Lo 40.001 nF to 4 mF	0.05 % of Output	
	I Lo 0.5 nF to 40 nF	0.05 % of Output + 3 pF of Output	
DC Current (Source)	32.001 mA to 320 mA	230 $\mu$ A	
	3.200 1 mA to 32 mA	180 $\mu$ A	
	0.320 01 mA to 3.2 mA	180 $\mu$ A	
	0 $\mu$ A to 320 $\mu$ A	70 $\mu$ A	
AC Current (Source) @ 10 Hz to 3 kHz	32.001 $\mu$ A to 3.2 mA	260 $\mu$ A	
AC Current (Source) @ 3 kHz to 10 kHz	32.001 $\mu$ A to 3.2 mA	260 $\mu$ A	
AC Current (Source) @ 10 kHz to 20 kHz	32.001 $\mu$ A to 3.2 mA	460 $\mu$ A	
AC Current (Source) @ 20 kHz to 30 kHz	32.001 $\mu$ A to 3.2 mA	520 $\mu$ A	
AC Current (Source) @ 10 Hz to 3 kHz	32.001 $\mu$ A to 32 mA	250 $\mu$ A	
AC Current (Source) @ 3 kHz to 10 kHz	32.001 $\mu$ A to 32 mA	450 $\mu$ A	



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## Electrical

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AC Current (Source) @ 10 kHz to 20 kHz	32.001 $\mu$ A to 32 mA	460 $\mu$ A	
AC Current (Source) @ 20 kHz to 30 kHz	32.001 $\mu$ A to 32 mA	520 $\mu$ A	
AC Current (Source) @ 10 Hz to 3 kHz	32.001 $\mu$ A to 320 mA	280 $\mu$ A	
AC Current (Source) @ 3 kHz to 10 kHz	32.001 $\mu$ A to 320 mA	390 $\mu$ A	
AC Current (Source) @ 10 kHz to 20 kHz	32.001 $\mu$ A to 320 mA	410 $\mu$ A	
AC Current (Source) @ 20 kHz to 30 kHz	32.001 $\mu$ A to 320 mA	480 $\mu$ A	
AC Current (Source) @ 10 Hz to 3 kHz	0.320 01 mA to 3.2 mA	210 $\mu$ A	
AC Current (Source) @ 3 kHz to 10 kHz	0.320 01 mA to 3.2 mA	460 $\mu$ A	
AC Current (Source) @ 10 Hz to 3 kHz	3.200 1 mA to 10.50 mA	180 $\mu$ A	
AC Current (Source) @ 3 kHz to 10 kHz	32.00 1 mA to 10.50 mA	590 $\mu$ A	
AC Current (Source) @ 10 Hz to 100 Hz	3.200 1 mA to 32 mA	210 $\mu$ A + 0.2 % of Output	
AC Current (Source) @ 100 Hz to 440 Hz	3.200 1 mA to 32 mA	210 $\mu$ A + 0.2 % of Output	
AC Current (Source) @ 10 Hz to 100 Hz	32.00 1 mA to 200 mA	180 $\mu$ A + 0.2 % of Output	
AC Current (Source) @ 100 Hz to 440 Hz	32.00 1 mA to 200 mA	180 $\mu$ A + 0.2 % of Output	
AC Current (Source) @ 10 Hz to 100 Hz	16.001 mA to 160 mA	210 $\mu$ A + 0.2 % of Output	
AC Current (Source) @ 10 Hz to 100 Hz	160.01 mA to 1 000 mA	180 $\mu$ A + 0.2 % of Output	
AC Current (Read) @ 10 Hz to 5 kHz	1.001 mA to 10 mA	1 800 $\mu$ A/A + 100 $\mu$ A	
AC Current (Read) @ 10 Hz to 5 kHz	10.001 mA to 100 mA	1 800 $\mu$ A/A + 100 $\mu$ A	



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DC Current (Read)	100.01 $\mu$ A to 10 mA	20 $\mu$ A/A + 60 $\mu$ A	
	0 $\mu$ A to 100.0 $\mu$ A	35 $\mu$ A/A + 60 $\mu$ A	
Resistance (Read)	10 $\Omega$ (True)	15 $\mu\Omega/\Omega$ + 6.0 $\mu\Omega$	
	100 $\Omega$ (Normal)	7.5 $\mu\Omega/\Omega$ + 5.0 $\mu\Omega$	
	1 k $\Omega$ (Normal)	6.0 $\mu\Omega/\Omega$ + 5.0 $\mu\Omega$	
	10 k $\Omega$ (Normal)	5.5 $\mu\Omega/\Omega$ + 5.0 $\mu\Omega$	
	100 k $\Omega$ (Normal)	10 $\mu\Omega/\Omega$ + 5.0 $\mu\Omega$	
	1 M $\Omega$ (Normal)	20 $\mu\Omega/\Omega$ + 7.5 $\mu\Omega$	
	10 M $\Omega$ (Normal)	30 $\mu\Omega/\Omega$ + 10 $\mu\Omega$	
	100 M $\Omega$ (Normal)	140 $\mu\Omega/\Omega$ + 100 $\mu\Omega$	
	1 G $\Omega$ (Normal)	350 $\mu\Omega/\Omega$ + 1 000 $\mu\Omega$	
	100 $\Omega$ (Low Current)	7.5 $\mu\Omega/\Omega$ + 6.0 $\mu\Omega$	
	1 k $\Omega$ (Low Current)	6.0 $\mu\Omega/\Omega$ + 6.0 $\mu\Omega$	
	10 k $\Omega$ (Low Current)	5.5 $\mu\Omega/\Omega$ + 7.5 $\mu\Omega$	
	100 k $\Omega$ (Low Current)	10 $\mu\Omega/\Omega$ + 12.5 $\mu\Omega$	
	1 M $\Omega$ (Low Current)	20 $\mu\Omega/\Omega$ + 100 $\mu\Omega$	
DC Voltage 50 $\Omega$	0 V to 6.6 V	16 mV + 40 $\mu$ V/V	
DC Voltage 1 M $\Omega$	0 V to 130 V	32 mV + 25 $\mu$ V/V	
AC Voltage 50 $\Omega$	0.001 V to 6.6 V	16 mV + 40 $\mu$ V/V	
AC Voltage 1 M $\Omega$	0.001 V to 130 V	64 mV + 5 $\mu$ V/V	
Edge (Amplitude)	0.004 V to 2.5 V	50 mV + 200 $\mu$ V/V	
Leveled Sine Wave < 600 MHz	0.005 V to 5.5 V	330 mV + 300 $\mu$ V/V	
Leveled Sine Wave > 600 MHz	0.005 V to 3.5 V	280 mV + 300 $\mu$ V/V	
Wave Generator	0.001 8 V to 55 V	16 mV + 100 $\mu$ V/V	
	0.001 8 V to 2.5 V	7.5 mV + 100 $\mu$ V/V	
Pulse Generator	1.5 V to 15 mV	25 mS + 200 pS	



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## Time and Frequency

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Frequency (Read) @ 1000 V Range	30 kHz to 100 kHz	700 $\mu$ Hz/Hz + 250 $\mu$ Hz	
Frequency (Read) @ 1000 V Range	10 kHz to 30 kHz	250 $\mu$ Hz/Hz + 75 $\mu$ Hz	
Frequency (Read) @ 1000 V Range	40 Hz to 10 kHz	75 $\mu$ Hz/Hz + 50 $\mu$ Hz	
Frequency (Read) @ 1 V to 100 V Range	300 kHz to 1 MHz	1 400 $\mu$ Hz/Hz + 500 $\mu$ Hz	
Frequency (Read) @ 1 V to 100 V Range	100 kHz to 300 kHz	180 $\mu$ Hz/Hz + 375 $\mu$ Hz	
Frequency (Read) @ 1 V to 100 V Range	30 kHz to 100 kHz	70 $\mu$ Hz/Hz + 250 $\mu$ Hz	
Frequency (Read) @ 1 V to 100 V Range	10 kHz to 30 kHz	50 $\mu$ Hz/Hz + 75 $\mu$ Hz	
Frequency (Read) @ 1 V to 100 V Range	40 kHz to 10 kHz	75 $\mu$ Hz/Hz + 50 $\mu$ Hz	
Frequency (Read) @ 100 mV Range	30 kHz to 100 kHz	430 $\mu$ Hz/Hz + 250 $\mu$ Hz	
Frequency (Read) @ 100 mV Range	10 kHz to 30 kHz	220 $\mu$ Hz/Hz + 100 $\mu$ Hz	
Frequency (Read) @ 100 mV Range	40 Hz to 10 kHz	155 $\mu$ Hz/Hz + 75 $\mu$ Hz	
Time Marker	20 mS to 2 nS	3.3 $\mu$ S/S	
Time GPS Receiver	1 s to 86 400 s	0.000 45 s	

1. Remarks: This column shall include pertinent information about the calibration of the Measured Instrument or parameter. The information should include the type of standards used and any pertinent information about the measurement method. This column is not to be used for commercial advertisement of laboratory services
2. The term L represents length in inches or millimeters as appropriate to the uncertainty statement.
3. The term D represents diameter in inches or millimeters as appropriate to the uncertainty statement