



PERRY JOHNSON LABORATORY ACCREDITATION, INC.

Certificate of Accreditation

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

RMS Quality Services, Inc.

1500 S. 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 Chemical, Dimensional, Electrical, Mass, Force & Weighing, Mechanical, Thermodynamic, Time and Frequency
(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:

Initial Accreditation Date:

Issue Date:

Expiration Date:

June 6, 2003

June 1, 2017

June 30, 2019

Accreditation No.:

Certificate No.:

59289

L17-218

Tracy Szerszen
President/Operations Manager

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

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

RMS Quality Services, Inc.

1500 S. Sylvania Avenue, Suite 115, Sturtevant, WI 53177
Rick Brion Phone: 262-554-4740

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

Chemical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
pH Meters Fixed points ^{FO}	4 pH	0.02 pH	pH Buffer Solutions
	7 pH	0.02 pH	
	10 pH	0.02 pH	
Conductivity Meters ^{FO}	12.85 mS/cm	0.13 mS/cm	Conductivity Solutions

Dimensional

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Gage Blocks ^F	0.05 in to 8 in	(4.4 + 1.7L) μ in	Lab Master
	8 in to 13 in	(13 + 1.5L) μ in	
Length Standards ^F	1 in to 10 in	(25 + 1.2L) μ in	Super Micrometer
	10 in to 24 in	(35 + 2.0L) μ in	
Cylindrical Rings ^F	0.04 in to 13 in	(30.1 + 2.4D) μ in	Lab Master
Cylindrical Plugs ^F	0.01 in to 14 in	(19.8 + 1.1D) μ in	
Threaded Rings - Pitch ^F	2-56 to 10-7	(152 + 5.9D) μ in	Lab Master & Set Plugs
Threaded Rings - Minor ^F	2-56 to 10-7	(121 + 4.4D) μ in	Lab Master
Threaded Plugs - Pitch ^F	0-96 to 10-4	120 μ in	Super Micrometer & Thread Wires
Threaded Plugs - Major ^F	0-96 to 10-4	(30.1 + 3.0D) μ in	Super Micrometer
NPT Rings ^F	1/16-27 to 6-8	170 μ in	Master Plugs and Super Micrometer or Lab Master
NPT Plugs ^F	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 ^F	15 μ in to 300 μ in	3 μ in	Profilometer
Surface Plate ^{FO} Flatness	12 in to 192 in	(65.2 + 3.2D) μ in	Laser Planekator
Surface Plate ^{FO} Repeat Reading	200 μ in	45 μ in	Rahn Repeat-o-Meter
Thread Wires ^F	0.005 in to 0.05 in	(18.1 + 0.5D) μ in	Super Micrometer
Height Gages ^{FO}	0.05 in to 40 in	(202 + 14L) μ in	Gage Blocks
Indicators ^{FO}	0.05 in to 0.1 in	(98 + 12L) μ in	
Calipers ^{FO}	0.05 in to 40 in	(236 + 14L) μ in	
Micrometers ^{FO}	0.05 in to 24 in	(55 + 5.7L) μ in	



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Dimensional

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Profilometers ^{FO} Fixed points	115.6 μ in	4 μ in	Roughness Specimen
	19 μ in	4 μ in	
	12 μ in	4 μ in	
Optical Comparators ^{FO} X length	12 in maximum	470 μ in	Glass Scale
	Y length	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 ^{FO}	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 ^F	12 in Maximum	130 μ in	Video CMM (non contact)
CMM Calibration ^{FO} Repeatability	18 in to 40 in	110 μ in	Ball Bars ASME B89.4.10360.2
CMM Calibration ^{FO} Linearity	18 in to 40 in	120 μ in	Step Gage ASME B89.4.10360.2
CMM Calibration ^{FO} Volumetric	18 in to 40 in	130 μ in	Test Sphere ASME B89.4.10360.2
Surface Flatness ^{FO}	0.38 in to 2 in	5 μ in	Optical Flat

Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Equipment to Measure Frequency ^{FO}	0.5 Hz to 10 MHz	0.0025%	Wavetek 9100
Equipment to Measure Capacitance ^{FO}	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	1.0% of reading +32.0nF	
	40.001 μ F to 400.00 μ F	1.0% of reading +320nF	
	400.01 μ F to 4.0000 mF	1.0% of reading +3.2 μ F	
4.0001 mF to 40.000 mF	2.0% of reading +120 μ F		



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Equipment to Measure Frequency ^{FO}	0.5 Hz to 10 MHz	0.0025 %	Wavetek 9100
Equipment to Measure Capacitance ^{FO}	0.5 nF to 4 nF	0.6 % of reading +30.0 pF	
	4.0001 nF to 40 nF	0.6 % of reading +60.0 pF	
Equipment to Measure Resistance ^{FO}	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	2.4 k Ω	
	40.001 M Ω to 400 M Ω	110 k Ω	
Equipment to Measure DC Current ^{FO}	0.320 01 A to 3.2 A	2 mA	
	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 ^{FO}	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 ^{FO}			
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 ^{FO}			
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	



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Equipment to Measure AC Current At the listed frequencies ^{FO}			Wavetek 9100
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 ^{FO}			
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	
Equipment to Measure AC Current At the listed frequencies ^{FO}			
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 ^{FO}			
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 ^{FO}			
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 ^{FO}			
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 ^{FO}			
10 Hz to 100 Hz	16 A to 160 A	0.35 A	



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Equipment to Output AC Current At the listed frequencies ^{FO}			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 ^{FO}	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	
Equipment to Output Resistance ^{FO}	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 ^{FO}	10 μ V to 999 μ V	0.5 μ V/V + 3.0 μ V	Agilent 3458A
	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 ^{FO}			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	



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Electrical^{FO}

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Edge (Amplitude) ^{FO}	0.15 V to 2.5 V	200 μ V/V + 50 mV	Wavetek 9100 and Fluke 5820 A
Leveled Sine Wave < 600 MHz ^{FO}	1 V to 5.5 V	300 μ V/V + 330 mV	
Leveled Sine Wave > 600 MHz ^{FO}	0.9 V to 3.5 V	300 μ V/V + 280 mV	
Wave Generator ^{FO}	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 ^{FO}	4 000 ns to 55 000 s	0.002 5 % of reading	
Equipment to Read ^{FO} Frequency @ 100 mV	30 kHz to 100 kHz	430 μ Hz/Hz + 250 μ Hz	Wavetek 9100
	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 ^{FO} 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 ^{FO} 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	

Mass, Force, and Weighing Device

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Bench and Floor Scales ^O	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 ^{FO}	10 lb to 50 000 lb	($2.31 + 7.82 \times 10^{-5}Wt$) lb	Load Cells and Class F Weights



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Mechanical

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Pressure Gages – Transducers ^{FO}	-13 psi to 10 000 psi	0.1 % of reading	Pressure Tester & Transducer
Torque - Generate ^{FO}	5 lbf·ft to 600 lbf·ft	0.6 lbf·ft	Torque Arm & Dead Weight
Torque - Measure ^{FO}	5 lbf·ft to 600 lbf·ft	1.0 % of reading	Torque Arm & Dead Weight
Tachometers ^{FO}	5 rpm to 6 000 rpm	0.1 % of reading	Tachometer Calibrator
Indirect Verification of Rockwell Hardness HRA ^{FO}	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 ^{FO}	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 ^{FO}	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 ^{FO}	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 ^{FO}	74 HR15T to 80 HR15T	1.4 HR15T	
	81 HR15T to 86 HR15T	1.2 HR15T	
	87 HR15T to 93 HR15T	1.1 HR15T	
Direct Verification of Durometer Hardness ^{FO} 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	Video Comparator 20X
		8.1 μ m	Video Comparator 20X
		8.1 μ m	Video Comparator 20X
		0.06°	Video Comparator 20X
Durometer Indentor Spring Types A, B, E & O Types C, D & DO	0.55 N to 8.05 N	1.7 N	Load Cell
	4.445 N to 44.45 N	1.7 N	Load Cell



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Thermodynamic

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Temperature Measure ^{FO}	-30 °C to 600 °C	0.1 °C	Omega & Drywell
Temperature Ovens (TUS) ^{FO}	100 °F to 2 000 °F	1 °F	AMS 2750 D
Temperature Infrared Thermometer ^{FO}	50 °C to 500 °C	0.5 °C	Altek Calibrator Model 211
Relative Humidity Measurement Equipment ^{FO}	5 % RH to 90 % RH	1.4 % RH	Vaisala Salts

Time and Frequency

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Time Marker ^{FO}	150 μ s to 20 ms	50 μ s	O-Scope Calibrator
Time ^{FO}	12 800 s to 86 400 s	640 ms	Direct Comparison Method: NISR Publication 960-12

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 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 term D represents diameter in inches or millimeters appropriate to the uncertainty statement.
4. The term L represents length in inches or millimeters as appropriate to the uncertainty statement.
5. The term Wt represents weight in pounds or grams (including SI multiple and submultiple units) appropriate to the uncertainty statement.
6. The presence of a superscript F and/or O means that the laboratory performs calibration of the indicated parameter at its fixed location and/or on-site. Example: Outside Micrometer^F would mean that the laboratory performs this calibration at its fixed location The presence of a superscript FO means that the laboratory performs calibration of the indicated parameter both at its fixed location and onsite at customer locations and Micrometer^O would mean that the laboratory performs this calibration at onsite at customer locations.



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(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):

Dimensional Inspection
(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:

Initial Accreditation Date: *Issue Date:* *Expiration Date:*
June 6, 2003 June 1, 2017 June 30, 2019

Accreditation No.: *Certificate No.:*

Tracy Szerszen
President/Operations Manager

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Certificate of Accreditation: Supplement

RMS Quality Services, Inc.

1500 Sylvania Avenue, Suite 115, Sturtevant, WI 53117
Rick Brion Phone: 262-554-4740

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
Dimensional Inspection ^F	Gages, Molds, Dies & Manufactured Parts	Volumetric CMM	ASME Y14.5M	66.04 cm x 106.68 cm x 66.04 cm (26 in x 42 in x 26 in) DL = 10 μin
	Gages, Molds, Dies & Manufactured Parts	Linear Video CMM (non-contact)		0 cm to 20.32 cm (0 in to 8 in) DL = 10 μin

- 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.

