PYLON ELECTRONICS INC.
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STATEMENT OF MEASUREMENT CAPABILITIES

FOREWORD

The following is a summarized list of measurement parameters available at this location. For measurement parameters not shown in this list, please contact customer service for technical support. We can support your calibration requirement from another Pylon laboratory or from our network of qualified sub-contractors.

For a list of Pylon Ottawa's ISO/IEC 17205 accredited parameters, please refer to our ISO/IEC 17025 accreditation certificate and scope.

ELECTRICAL

DC/LOW FREQUENCY

Measured Quantity	***Units***	***Range***	***Best Measurement Uncertainty ±***	***Capability***
DC Voltage	Volts (V)	1µV to 10KV	-	*Generate*
		1µV to 200mV	0.00072%	*Measure*
		100mV to 2V	0.00038%	*Measure*
		2.0V to 1KV	0.00045%	*Measure*
		1KV to 10KV	0.03%+0.03V	*Measure*
		10KV to 140KV	0.08%+0.7V	*Measure*
		10 Volt Reference Standard	1 ppm	*Measure*
DC Current	Amperes (A)	0A to 100A	-	*Generate*
		0A to 100A	0.01%	*Measure*
		100A to 1000A	0.25%	*Measure*
Resistance Four Terminal	Resistance (Ω)	0.001 to 0.1	0.0210%	*Measure*
		0.1 to 1	0.0008%	*Measure*
		1	0.0005%	*Measure*
		1 to 1M	0.0003%	*Measure*
		1M to 10M	0.0006%	*Measure*
		10M to 100M	0.0030%	*Measure*
Two Terminal up to 1000 Volts	-	100M to 1T	1%	*Measure*
		1T to 10T	2%	*Measure*
Capacitance Fixed Standards	Farads (F)	10pF to 1.0µF	-	*Generate*
		1000pF @ 1KHz	0.002%	*Measure*
Variable	-	5pF to 1150pF	-	*Generate*
		0.01pF to 1.2µF	0.01%	*Measure*
		Up to 0.2F	3%	*Measure*
Inductance	Henries (H)	1mH to 10mH		*Generate*
Fixed Standards		10µH to 100µH	1%	*Measure*
		100µH to 1mH	0.1%	*Measure*
		1mH to 100mH	0.028%	*Measure*
		100mH to 10H	0.1%	*Measure*

DC/LOW FREQUENCY (Continued)

Measured Quantity	***Units***	***Range***	***Best Measurement Uncertainty ±***	***Capability***
AC Voltage	Volts (V)	1mV (10Hz to 50KHz) (50KHz to 1.2MHz)	≤0.038% ≤0.110%	*Measure*
		10mV (10Hz to 50KHz) (50KHz to 1.2MHz)	≤0.024% ≤0.099%	*Measure*
		100mV (10Hz to 50KHz) (50KHz to 1.2MHz)	≤0.019% ≤0.099%	*Measure*
		1V (10Hz to 50KHz) (50KHz to 1.2MHz)	≤0.004% ≤0.059%	*Measure*
		10V (10Hz to 50KHz) (50KHz to 1.2MHz)	≤0.004% ≤0.056%	*Measure*
		100V (10Hz to 50KHz) (50KHz to 200KHz)	≤0.004% ≤0.024%	*Measure*
		1000V (10Hz to 30KHz)	≤0.008%	*Measure*
		700V (30KHz to 100KHz)	≤0.035%	*Measure*
		0.7 to 10kV @ 60Hz 10 to 100kV @ 60Hz	0.12%+0.1V 0.5%+1V	*Measure* *Measure*
		1mV to 1000V (5Hz to 1MHz)	-	*Generate*
Differential DC/AC Voltage	Volts (V)	7000Vp (5000Vrms) (DC to 70 MHz)	2%	*Measure*

DC/LOW FREQUENCY (Continued)

Measured Quantity	***Units***	***Range***	***Best Measurement Uncertainty ±***	***Capability***
AC Current	Amperes (A)	10µA to 20A	-	*Generate*
		10µA (50Hz to 1KHz)	0.08%	*Measure*
		100µA		
		(10Hz to 5KHz)	≤0.016%	*Measure*
		(5KHz to 30KHz)	≤0.090%	*Measure*
		1mA		
		(10Hz to 5KHz)	≤0.014%	*Measure*
		(5KHz to 30KHz)	≤0.090%	*Measure*
		10mA to 100mA		
		(10Hz to 5KHz)	≤0.022%	*Measure*
		(5KHz to 50KHz)	0.03%	*Measure*
		(50KHz to 100KHz)	0.05%	*Measure*
		1A		
		(10Hz to 5KHz)	≤0.035%	*Measure*
		(5KHz to 50KHz)	0.03%	*Measure*
		(50KHz to 100KHz)	0.05%	*Measure*
		1A to 5A		
		(5Hz to 20KHz)	0.02%	*Measure*
		(20KHz to 50KHz)	0.03%	*Measure*
		(50KHz to 100KHz)	0.05%	*Measure*
		5A to 20A		
		(5Hz to 20KHz)	0.03%	*Measure*
		(20KHz to 50KHz)	0.05%	*Measure*
		20A to 400A (60Hz)	0.50%	*Measure*

DC/LOW FREQUENCY (Continued)

Measured Quantity	***Units***	***Range***	***Best Measurement Uncertainty ±***	***Capability***
Ratio, AC	ACV	-0.0111111 to 1.111111 (50Hz to 1KHz) (1KHz to 5KHz) (5KHz to 10KHz)	 2 ppm 15 ppm 60 ppm	 *Ratio* *Ratio* *Ratio*
Ratio, HV AC	ACV	0.00000 to 1.00000 (60Hz)	0.006%	*Ratio*
Ratio, DC	DCV	0 to 1.0	0.2 ppm	*Ratio*
Low Frequency	(db)	40 Vpk-pk (1µHz to 100KHz)	0.1db	*Generate*
Frequency	Hz	1mHz to 18.0GHz	3×10^{-7} to 2×10^{-9}	*Measure*
Time Base Standard	Hz	1, 5, and 10MHz	1×10^{-12}	*Measure*
Time	Seconds	10 to 10^4 sec	0.001 sec	*Measure*
Phase Angle **0 Degrees to 360 Degrees, 1Hz to 100KHz**	Degrees (°)	Equal Amplitude 50mV to 120V (1Hz to 1KHz) (1KHz to 6.25KHz) (6.25KHz to 50KHz) (50KHz to 100KHz) Amplitude Ratio=500 50mV to 100V (1Hz to 1KHz) (1KHz to 6.25KHz) (6.25KHz to 50KHz) (50KHz to 100KHz) Amplitude 100V to 120V (1Hz to 1KHz) (1KHz to 6.25KHz) (6.25KHz to 50KHz)	 0.005° 0.005° 0.010° 0.020° 0.030° 0.060° 0.090° 0.240° 0.060° 0.120° 0.180° 0.600°	 *Measure/ Generate*

DC/LOW FREQUENCY (Continued)

Measured Quantity	***Units***	***Range***	***Best Measurement Uncertainty ±***	***Capability***
Magnetism Fixed Standards	Gauss	500 gauss 2000 gauss	0.04% 0.04%	*Measure*
pH Simulation	pH	4.00 7.00 10.00	0.01 0.01 0.02	*Generate*
Electrical Conductivity	Siemens/ meter	84µS/cm 1413µS/cm 12880µS/cm	0.5%	*Generate*
Video Generator	Return Loss	0 to 5 MHz	>46 dB	*Measure*
	Hum Rejection	Fast Slow	>24 dB <1 dB	
	Residual Noise Level	0 to 5 MHz	Better than -80 dB with respect to 0.714Vp-p active video	
	Anti-aliasing filter attenuation	7.16 MHz (NTSC) 8.86 MHz (PAL)	>35 dB >40 dB	

RF/MICROWAVE FREQUENCY

Measured Quantity	***Units***	***Range***	***Best Measurement Uncertainty ±***	***Capability***
RF/Microwave Power (50 OHM)	Watts (W)	up to 200W (30MHz, 100MHz, 300MHz, 400MHz, 500MHz)	1.25%	*Generate*
	(dbm)	+19dbm (500KHz to 512MHz)	N/A	*Generate*
		+13dbm (512MHz to 1024MHz)	N/A	*Generate*
		+12dbm (10MHz to 20GHz)	N/A	*Generate*
		+2.5dbm (20GHz to 50GHz)	N/A	*Measure*
		0dbm (50MHz)	2.4%	*Measure*
		-30dbm to +20dbm (100KHz to 4GHz)	3.3%	*Measure*
		-70dbm to -30dbm (10MHz to 18GHz)	2.4%	*Measure*
		-30dbm to +20dbm (10MHz to 18GHz)	2.0%	*Measure*
		(18GHz to 26.5GHz)	3.9%	*Measure*
		(26.5GHz to 40GHz)	4.2%	
Pulse Power	Watts (W)	5KW (950 to 1220MHz)	0.85db	*Measure*
		5KW < 2350MHz	0.2%	*Generate*
		4KW < 3100MHz	0.2%	*Generate*
		500W @ 6100MHz	0.2%	*Generate*

RF/MICROWAVE FREQUENCY (Continued)

Measured Quantity	***Units***	***Range***	***Best Measurement Uncertainty ±***	***Capability***
Attenuation 600 OHM	(db)	0 to 111db 0.1db steps (DC to 1MHz)	0.02db ±0.25%	*Generate*
Attenuation 50 OHM	(db)	0 to 110db (DC to 18GHz)	4%	*Generate*
		0 to 100db (DC to 1 KHz)	1.0db	*Measure*
		0 to 80db (1KHz to 2.5MHz)	0.3db	*Measure*
		0 to 127dbm (2.5MHz to 1300 MHz)	0.05db +0.25/10db	*Measure*
		0 to 70dbm (1300MHz to 18GHz)	0.02db +0.02/10db	*Measure*
		70 to 85 dbm (1300 MHz to 18GHz)	0.05db +0.02/10db	*Measure*
		85 to 95 dbm (1300MHz to 18GHz)	0.10db +0.02/10db	*Measure*
		95 to 100 dbm (1300MHz to 18GHz)	0.20db +0.02/10db	*Measure*
		100 to 110 dbm (1300MHz to 18GHz)	0.6db	*Measure*

RF/MICROWAVE FREQUENCY (Continued)

Measured Quantity	***Units***	***Range***	***Best Measurement Uncertainty ±***	***Capability***
Return Loss (50 OHM) Type "**N**" connector	(db)	5 MHz to 18 GHz		*Measure*
Return Loss (50 OHM) Type "**A**" connector		2 GHz to 18 GHz	Directivity >35db	*Measure*
Return Loss (50 OHM) Type "**K/SMA**" connector		10 MHz to 40 GHz		*Measure*
(50 OHM) Airline Bridge **Directivity**	(db)	Test Port Connectors K male & Female (up to 40 GHz)	> 45db Directivity	*Measure*
		APC (up to 18 GHz)	> 45db Directivity	*Measure*
		N female (up to 18 GHz)	> 45db Directivity	*Measure*
TDR Length (Ethernet)	meters	50m	±0.05m	*Measure*

PHYSICAL PROPERTIES

PHYSICAL/DIMENSIONAL

Measured Quantity	***Units***	***Range***	***Best Measurement Uncertainty ±***
Gauge Blocks Length	Inches mm	0.010" to 1" 1" to 4" 0.5 to 25mm 25 to 100mm	4 µinch (4 + 1L)µin 0.1µm (0.1+0.025L)µm L=length in UOM
Length Standards	Inches mm	to 12" 12" to 32" to 300mm 300 to 800mm	20 µinch Consult Lab 0.0005mm Consult Lab
External Dimensions External Measurements Thread Gauge Plugs	Inches mm	Up to 12" Up to 300mm 12" to 48" 300 to 1200mm 48 to 4tpi	20 µinch 0.0005mm Consult Lab. Consult Lab.
Internal Dimensions Cylindrical Ring Gauges Internal Measurements	Inches mm	Up to 5.0" Up to 125mm 5.0" to 12" 125 to 300mm Up to 48" Up to 1200mm	20 µinch 0.0005mm Consult Lab. Consult Lab.
Straightness	Inches/mm	Consult Lab.	50 µin / 0.0013mm
Surface Plate	Inches/mm	Consult Lab.	Grade "A" for most common sizes.
Parallels	Inches/mm	-	50 µin / 0.0013mm
Indicator dial	Inches/mm	up to 12" Up to 300mm	25 µinch 0.0006mm

PHYSICAL/DIMENSIONAL (Continued)

Measured Quantity	***Units***	***Range***	***Best Measurement Uncertainty ±***
Calipers, Micrometers Outside Inside Depth	Inches mm	Up to 48″ Up to 1200mm Up to 48" Up to 1200mm Up to 48" Up to 1200mm	(44 +2L)µin (0.0011+0.05L)µm L = length of measurement in UOM
Hardness Testers Rockwell	Rockwell units	HRB 60 HRC 30,60,90	1 unit
Flatness	Inches mm	Area covered by 10" diameter optical flat	5.0µin 0.13µm
Acoustics Sensitivity	Decibels (db)	Microphone 1/8" to 1" 250Hz	0.17db
Acceleration	pC/ms^{-2}	10Hz to 5KHz	2.6%
Load Cells Compression and Tension	Lbs (kg)	1000 (500) 5000 (2200) 20000 (9000) 50000 (22000) 60000 (37500)	0.1% F.S. " " " "
Torque	-	0.5 to 215inoz 36gcm to 15.5kgcm 10inlb to 5000 ftlb 1.0 to 575 kgcm	0.3% of Indicated Reading 0.05% of Indicated Reading
Tensiometer	Lbs (kg)	up to 600Lb(300kg)	Consult Lab.

PHYSICAL/DIMENSIONAL (Continued)

Measured Quantity	***Units***	***Range***	***Best Measurement Uncertainty ±***
Balance and scales	Lbs grams	To 500Lbs To 500Kg	Class "S" Mass Comparison
[1]Mass Imperial Metric	Lbs grams	1/16 oz. to 70 lbs 5 mg to 32 Kg	Class 'Q' Class 'Q'

1 Better class available for specific mass values. Consult lab.

THERMAL/ENVIRONMENTAL/PRESSURE

Measured Quantity	***Units***	***Range***	***Best Measurement Uncertainty ±***
Temperature	Celsius °C (°F)		
Triple Point of Water		0.01°C (32.018°F)	0.0005°C (0.0009°F)
Thermometry		-50 to 660°C (-58 to 1220°F)	0.012°C at 0 °C 0.033°C at 420 °C 0.046°C at 600 °C
PRT Probe		-200 to 661°C (-328 to 1221.8°F)	0.006°C at -200°C (0.0108°F at -328°F) 0.006°C at 0°C (0.0108°F at -32°F) 0.015°C at 420°C (0.027°F at 788°F) 0.022°C at 661°C (0.0396°F at 1221.8°F)
Infrared Thermometry		-30°C to 650°C (-22°F to 1202°F)	-10°C to 0°C:±2.0°C -30°C to -10°C:±3.0°C ±1.0 °C or ±1.0% of reading, whichever is greater
Humidity – %RH	%RH	Ambient Condition	2.0% of IV*

THERMAL/ENVIRONMENTAL/PRESSURE (Continued)

Measured Quantity	***Units***	***Range***	***Best Measurement Uncertainty ±***
Pressure			
Absolute Pressure (air)		0.3 to 15 psia 2 to 105kPa	0.02% of IV*
Gauge Pressure (air)		0.3 to 50 psig 2 to 345kPa	0.02% of IV*
Gauge Pressure (air)		15 to 500 psig 105 to 3450kPa	0.02% of IV*
Gauge Pressure (air)		0 to 10000 psig 0 to 70000kPa	0.05% of IV*
Gauge Pressure (oil)		0 to 15000 psig 2 to 103000kPa	0.02% of IV* * Indicated Value

FIBER OPTICS

FIBER OPTICS

Measured Quantity	Units	Range	Best Measurement Uncertainty	Capability
Wavelength	λ	***LASER*** 1600.600 nm 1520 – 1570 nm 1310.000 nm	N/A	Generate
		LED 850 nm 1300 nm	N/A	Generate
		LASER 1250 -1625 nm	±1.5 pm	Measure
		LED 1250 -1310 nm	±1.5 pm	Measure
Power	**dBm**	***LASER*** 850 – 1600 nm	>10 dBm	Generate
		LED 850 nm 1300 nm	> -17 dBm	Generate
		LASER 800 – 1650 nm (+27 dBm–40 dBm)	± 2.5%	Measure
		LED 800 – 1300 nm (+10 dBm–40 dBm)	± 2.5%	Measure
Attenuation	**dB**	***LASER*** - 1600 nm	(0 to -40 dB) ±2.5% (–40 to -90 dB) ±0.1dB	Generate
		LASER 1310 nm (-40 dB) 1550 nm (-40 dB)	± 2.5%	Measure
Length	**Meters**	*15000 m*	±3 m	Generate