



SCOPE OF ACCREDITATION

IAS Accreditation Number	CL-101
Accredited Entity	INyMET
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MEASUREMENT AREA	RANGE & RESOLUTION	CALIBRATION & MEASUREMENT CAPABILITY ¹ (CMC) (±)	TECHNIQUE, REFERENCE STANDARD, EQUIPMENT
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<i>Dimensional</i>			
Calipers (Vernier and dial)	Up to 100 mm/0.02 mm Up to 1000 mm/0.02 mm	11 µm 20 µm	Gauge blocks
Calipers (Digital-electronic)	Up to 150 mm/0.01 mm Up to 300 mm/0.01 mm Up to 600 mm/0.01 mm	8 µm 10 µm 12 µm	Gauge blocks
Outside Micrometers	Up to 25 mm/0.001 mm Up to 50 mm/0.001 mm	0.7 µm 0.8 µm	Gauge blocks
	Up to 25 mm/0.01 mm Up to 50 mm/0.01 mm Up to 300 mm/0.01mm	6 µm 9 µm 12 µm	
Inside Micrometer	5 to 25 mm/0.01 mm 10 to 30 mm/0.01 mm 50 to 300 mm/0.01 mm	8 µm 8 µm 10 µm	Gauge blocks & gauge block holder
Depth Micrometer	Up to 100 mm/0.01 mm	7.5 µm	Gauge blocks
Micrometer Head (Mechanical)	Up to 25 mm/0.01 mm Up to 50 mm/0.01 mm Up to 25 mm/0.002 mm Up to 50 mm/0.005 mm	7 µm 9 µm 1.5 µm 3.5 µm	Gauge blocks
Height Gauges (Vernier & dial type)	Up to 300 mm/0.02 mm Up to 600 mm/0.02 mm Up to 1000 mm/0.02 mm	15 µm 18 µm 20 µm	Gauge blocks, long gauge blocks and electronic pick-up
Height Gauges (Digital-electronic)	Up to 600 mm/0.001 mm Up to 1.000 mm/0.001 mm	2 µm 3.5 µm	Gauge blocks



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Dial Indicators (Plunger Type)	Up to 25 mm/0.001 mm (Electronic) Up to 10 mm/0.01 mm (Mechanical) Up to 100 mm/0.001 mm (Electronic)	1.0 µm 8 µm 2.6 µm	Gauge blocks Grade '0'
Dial Indicator (Lever Type)	Up to 2 mm/0.01 mm Up to 0.2 mm/0.002 mm Up to 0.14 mm/0.001 mm	8 µm 1.5 µm 1 µm	Gauge blocks Electrical comparator
Electrical Comparator (Analogue/Digital Display)	Up to 50 mm/0.0001 mm	0.4 µm	Gauge blocks
End Standards	up to 25 mm >25 mm to 50 mm >50 mm to 100 mm >100 mm to 200 mm >200 mm to 500 mm >500 mm to 1000 mm	1 µm 1.5 µm 2 µm 2.5 µm 3.8 µm 7 µm	Gauge blocks, long gauge blocks Grade '0' and electronic pick-up
Scales/Steel Rules/Steel Tapes	Up to 50 m	(0.5 + 0.02L) mm Where L is in meters	Standard glass scale & reticles Vernier Caliper 1m
Feeler Gauges	Up to 1 mm >1 to 2 mm	1.2 µm 2.0 µm	Micrometer (digital)
Bevel Protractor Analogue Digital	Up to 360°/5 min Up to 360°/0.1°	8 min 5 min	Angle Gauges Angle Gauges
Surface Plate	up to 1600 mm x 1000 mm	10 µm	Using precision level of 0.02 mm/m sensitivity
<i>Mechanical</i>			
Pressure Gauges Absolute	Up to 62.16 kPa Up to 250 in. H2O	0.025% Reading 0.025% Reading	Pressure Balance, PRESSUREMENTS T9000
	Up to 5 kPa Up to 20 in. H2O	0.05% F.S. 0.05% F.S.	Pressure Transducer DRUCK LPE9400 Pressure Calibrator DRUCK DPI 610LP
	21 kPa to 689.47 kPa (3 psig to 100 psig)	0.015% Reading	Pressure Balance, PRESSUREMENTS T2400/3
	70 kPa to 6894.7 kPa (10 psig to 1000 psig)	0.015% Reading	Pressure Balance, Fluke PPA 9649 DWT
	1380 kPa to 68947.5 kPa (200 psig to 10000 psig)	0.015% Reading	Pressure Balance, PRESSUREMENTS



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			M2200/3P
	1380 kPa to 13789.5 kPa (200 psig to 2000 psig)	0.025% F.S.	Pressure Transducer, DRUCK PDCR2200-A145
	7000 kPa to 68947.5 kPa (1000 psig to 10000 psig)	0.025% F.S.	Pressure Transducer, DRUCK PDCR220-A145
	206.84 kPa to 2068.4 kPa (30 psig to 300 psig)	0.025% F.S.	Pressure Calibrator DRUCK 610
	10 kPa to 110 kPa	0.005% F.S.	Pressure Calibrator DH Instruments RPM4
Vacuum and Pressure	Up to -100 kPa Up to -1 Bar	0.005% F.S.	Pressure Calibrator DHI RPM4
	-101 kPa to 207 kPa (-14 psi to 30 psi)	0.025% F.S.	Pressure Calibrator DRUCK DPI610
Volume – Glass	>100 µL to 5 mL	0.30% Reading	Electronic Balance, Ohaus Explorer, Mettler- Toledo AB-104 (Automatic Micropipette)
	>1 mL to 150 mL	0.07% Reading	Electronic Balance, Ohaus Explorer, Mettler- Toledo AB-104 (Glassware)
	>150 mL to 4000 mL	0.16% Reading	Electronic Balance, Sartorius BA4100S (Glassware)
	>4L to 20 L	0.16% Reading	Electronic Balance, Sartorius LC34000P (Glassware)
Volume – Metal	>2L to 20 L	0.017% Reading	Electronic Balance, Sartorius LC34000P
	>20 L to 500 L	0.02% Reading	Electronic Balance, Sartorius LC34000P Electronic Balance, Avery Weigh- Tronix E1010
	>20 L to 50 L	0.023% Reading	Volumetric Standard of 20 L, Seraphin E37915 Volumetric Standard of 10 L, Volaimex V008.04
	>50 L to 200 L	0.03% Reading	Volumetric Standard of 50 L, Volumex V008.05
	>200 L to 5000 L	0.03% Reading	Volumetric Standard of 200 L, INYMET 200 L



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			V008.02
	>5000 L to 1,000,000 L	0.12% Reading	Dual Rotor Turbine Meter, Exact Flow EFM32DR-W-CAN-B-Y
	200,000 L to 50,000,000 L	0.5% Reading	Petroleum Measurement Standards, chap 4 Steel Tape Measure LUFKIN 25 m Square STANLEY 45-600
Flow Liquid Flow			
By Total Mass	10 Kg to 20 Kg 20 Kg to 200 Kg 200 Kg to 500 Kg Up to 15000 Kg Up to 5 x 10 ⁶ Kg	0.10% I.R. Not Certified 0.10% I.R. 0.15% I.R. 0.15% I.R.	Gravimetric No Reference Standard Balance Gravimetric Against Ref Std. (In lab) Against Ref Std. (In field)
By Total Volume	10 L to 20 L 20 L to 200 L 200 L to 500 L Up to 15000 L Up to 5 x 10 ⁶ L	0.12% I.R. Not Certified 0.12% I.R. 0.20% I.R. 0.20% I.R.	Gravimetric No Reference Standard Balance Gravimetric Against Ref Std. (In lab) Against Ref Std. (In field)
Flow Rate Mass per Unit Time Volume per Unit Time	1 Kg/min to 1000 Kg/min 1 L/min to 1000 L/min	0.15% I.R. 0.20% I.R.	Against Ref Std. Against Ref Std.
Gas Flow By Total Mass	Up to 500 g Up to 1000 Kg Up to 5E6 Kg	0.30% I.R. 0.40% I.R. 0.40% I.R.	Gravimetric Against Ref Std. (In lab) Against Ref Std. (In field)
By Total Volume	Up to 500 L Up to 10000 L Up to 5 x 10 ⁶ L	0.35% I.R. 0.40% I.R. 0.40% I.R.	Gravimetric Against Ref Std. (In lab) Against Ref Std. (In field)
Flow Rate Mass per Unit	Up to 5 g/min	0.35% I.R.	Gravimetric



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Time	5 g/min to 10 g/min 10 g/min to 100 g/min 2 Kg/min to 20 Kg/min	Not Certified 0.35% I.R. 0.40% I.R.	No Storage Tank Gravimetric Against Ref Std.
Volume per Unit Time	Up to 5 Liters/min 5 L/min to 10 L/min 10 L/min to 100 L/min Up to 1500 L/min Up to 20000 L/min	0.35% I.R. Not Certified 0.35% I.R. 0.40% I.R. 0.40% I.R.	Gravimetric No Storage Tank Gravimetric Against Ref Std. (In lab) Against Ref Std. (In field)
Torque Wrenches	0 Nm to 25 Nm >25 Nm to 160 Nm >160 Nm to 1000 Nm	0.075 Nm 0.48 Nm 3.0 Nm	25 Nm Transducer 160 Nm Transducer 1000 Nm Transducer Balance Arms: 1m, 0,5m, 0,1m & Wheel: 0,1m 1000 Nm Transducer
Torque Analyzer and Torque Transducer	0 Nm to 10 Nm/0.001 Nm 10 Nm to 100 Nm/ 0.01Nm 100 Nm to 1000 Nm / 0.1 Nm	0.006 Nm 0.04 Nm 0.5 Nm	Balance Arms: 1m & Wheel: 0,1m Mass sets: 1g to 5kg & 10 to 100 kg
Vibration Transducer Sensitivity or Vibration of Meter 10 Hz to 10kHz	Up to 98 m/s ²	1% Reading	Endevco 28959F
<i>Thermal</i>			
PRT	-80°C to 660°C	0.01°C	Super Thermometer II HART SCIENTIFIC 1590 with RTD ROSEMOUNT 162CE and Precision Thermometry Bridge ASL F300 with RTD ROSEMOUNT 162CE
Thermocouples (J,K,R,S,T,B)	0°C to 1000°C	0.5°C	Au-Pt Thermocouple HART 5629 and Digital Multimeter PREMA 6001 or Digital Thermometer Hart 1560
Forced convection ovens & furnaces	up to 300°C	1.5°C	ASTM D 5423 & D 5374



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IR Thermometers	-38°C to 500°C	0.3% Reading	Standards (Reapproved 2005), NMX-J-417-ANCE-2005 Standard; Energy Meter SOAR 2720 and Digital Thermometer HART 1560 with 12 T Thermocouples/Energy Meter Amprobe DM-II-PLUS and Digital Thermometer Hart 1560 with 12 T Thermocouples
Thermocouples type J, K, T, R, S, B or RTD or Thermistor with Digital or Analogue Readouts	-80°C to 600°C/0.01°C -80°C to 600°C/0.1°C	0.03°C 0.07°C	IR Calibrator HART 4181, Digital Thermometer HART 1560 and RTD HART 5618-9 or Thermocouple J
Liquid in Glass Thermometer	-38°C to 250°C / 0.10°C -38°C to 250°C / 0.20°C -38°C to 250°C / 0.50°C -38°C to 250°C / 1.0°C -38°C to 250°C / 2.0°C	0.07°C 0.15°C 0.30°C 0.40°C 0.60°C	Thermometer ASL F150 or Thermometer ASL F250 or Digital Thermometer Hart Scientific 1560 or similar Thermometer ASL F150 or Thermometer ASL F250 or Fluke Hart Scientific 7103 or Hart Scientific 7102 or Hart Scientific 6102 or similar
<i>Humidity</i>			
Humidity – Measure and Generate	5 to 95% R.H./1% H.R. 5 to 95% R.H./0.1% H.R. 5 to 95% R.H./0.01% H.R.	0.70% R.H. 0.40% R.H. 0.38% R.H.	Dew Point Analyzer General Eastern Optical
<i>Electrical/D.C./Low Frequency</i>			
DC Voltage – Generate	1 V 10 V	0.5 ppm 0.5 ppm	Fluke 732A Fluke 732A



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	0 mV to 220 mV >220 mV to 2.2 V >2.2 V to 11 V >11 V to 22 V >22 V to 220 V >220 V to 1100 V 0 mV to 12 V	(8 ppm + 0.6 µV) (7 ppm + 1 µV) (7 ppm + 3.5 µV) (7 ppm + 6.5 µV) (8 ppm + 80 µV) (9 ppm + 500 µV) (0.004% Reading + 0.004% RNG)	Fluke 5700A Fluke 5700A Fluke 5700A Fluke 5700A Fluke 5700A Fluke 5700A UNOMAT MCX
DC Voltage – Measure	0 mV to 100 mV >100 mV to 1 V >1 V to 10 V >10 V to 100 V >100 V to 1000 V 0 mV to 100 mV >100 mV to 60 V	(ppm Reading + ppm RNG) (9 mV + 3 mV) (8 mV + 0.3 mV) (8 mV + 0.05 mV) (10 mV + 0.3 mV) (10 mV + 0.1 mV) (0.004% Reading + 0.004% RNG) (0.01% Reading + 0.006% RNG)	HP 3458A HP 3458A HP 3458A HP 3458A HP 3458A UNOMAT MCX UNOMAT MCX
DC Current – Generate	0.1 nA to 2.2 mA >2.2 mA to 22 mA >22 mA to 220 mA >220 mA to 2.2 A >2.2 A to 11 A >20 A to 1000 A 0 mA to 24 mA	(50 ppm + 8 nA) (50 ppm + 80 nA) (60 ppm + 0.8 µA) (80 ppm + 25 µA) (600 ppm + 330 µA) 0.6% Reading 0.025% F.S.	Fluke 5700A Fluke 5700A Fluke 5700A Fluke 5700A Fluke 5500A Fluke 5500A W/100 turn coil UNOMAT MCX
DC Current – Measure	0 nA to 100 nA >100 nA to 1 µA >1 µA to 100 µA >100 µA to 10 mA	(ppm Reading + ppm RNG) (30 + 400) (20 + 40) (ppm Reading + ppm RNG) (20 + 10) (20 + 8)	HP 3458A HP 3458A HP 3458A HP 3458A HP 3458A HP 3458A



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	>10 mA to 100 mA >100 mA to 1 A	(35 + 5) (110 + 10)	
DC Current – Measure	>1 A to 75 A	0.01% Reading	Guideline 9230/15 + HP 3458A
	0 to 52 mA	(0.005% Reading + 0.01% RNG)	Guideline 9230/100 + HP 3458A UNOMAT MCX
AC Current – Generate	1 nA to 220 µA 40 Hz to 1 kHz >1 kHz to 5 kHz >5 kHz to 10 kHz	(140 ppm + 16 nA) (600 ppm + 40 nA) (0.16% + 80 nA)	Fluke 5700A Fluke 5700A Fluke 5700A
	220 µA to 2.2 mA 40 Hz to 1 kHz >1 kHz to 5 kHz >5 kHz to 10 kHz	(140 ppm + 35 nA) (600 ppm + 400 nA) (0.16% + 800 nA)	Fluke 5700A Fluke 5700A Fluke 5700A
	>2.2 mA to 22 mA 40 Hz to 1 kHz >1 kHz to 5 kHz >5 kHz to 10 kHz	(140 ppm + 350 nA) (600 ppm + 4 µA) (0.16% + 8 µA)	Fluke 5700A Fluke 5700A Fluke 5700A
	>22 mA to 220 mA 40 Hz to 1 kHz >1 kHz to 5 kHz >5 kHz to 10 kHz	(140 ppm + 3.5 µA) (600 ppm + 40 µA) (0.16% + 80 µA)	Fluke 5700A Fluke 5700A Fluke 5700A
	>220 mA to 2.2 A 20 Hz to 1 kHz >1 kHz to 5 kHz >5 kHz to 10 kHz	(650 ppm + 35 µA) (750 ppm + 80 µA) (0.85% + 160 µA)	Fluke 5700A Fluke 5700A Fluke 5500A Fluke 5500A
	2.2 A to 11 A 45 Hz to 500 Hz >500 Hz to 1 kHz 20 A to 750 A @ 50/60 Hz	(0.10% + 2 mA) (0.33% + 2 mA) 1% output	Fluke 5500A w/100 turn coil



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AC Current – Measure	100 µA 45 Hz to 5 kHz	(% Reading + % RNG) (0.06% + 0.03%)	WAVETEK DATRON 1281	
	1 mA to 100 mA 45 Hz to 5 kHz	(0.03% + 0.01%)	WAVETEK DATRON 1281	
	>100 mA to 1 A 45 Hz to 1 kHz >1 kHz to 5 kHz	(0.06% + 0.02%) (0.2% + 0.04%)	WAVETEK DATRON 1281 WAVETEK DATRON 1281	
AC Voltage – Generate	2.2 mV to 22 mV 40 Hz to 20 kHz >20 kHz to 50 kHz >50 kHz to 100 kHz >100 kHz to 300 kHz >300 kHz to 500 kHz >500 kHz to 1 MHz	(105 ppm + 5 µV) (370 ppm + 5 µV) (850 ppm + 7 µV) (0.11% + 13 µV) (0.17% + 25 µV) (0.34% + 25 µV)	Fluke 5700A Fluke 5700A Fluke 5700A Fluke 5700A Fluke 5700A Fluke 5700A	
	220 mV 40 Hz to 20 kHz >20 kHz to 50 kHz >50 kHz to 100 kHz >100 kHz to 300 kHz >300 kHz to 500 kHz >500 kHz to 1 MHz	(105 ppm + 8 µV) (320 ppm + 8 µV) (850 ppm + 25 µV) (0.11% + 25 µV) (0.17% + 35 µV) (0.34% + 80 µV)	Fluke 5700A Fluke 5700A Fluke 5700A Fluke 5700A Fluke 5700A Fluke 5700A	
	2.2 V 40 Hz to 20 kHz >20 kHz to 50 kHz >50 kHz to 100 kHz >100 kHz to 300 kHz >300 kHz to 500 kHz >500 kHz to 1 MHz	(75 ppm + 6 µV) (120 ppm + 16 µV) (250 ppm + 70 µV) (430 ppm + 130 µV) (0.105% + 350 µV) (0.22% + 850 µV)	Fluke 5700A Fluke 5700A Fluke 5700A Fluke 5700A Fluke 5700A Fluke 5700A	
	22 V 40 Hz to 20 kHz >20 kHz to 50 kHz >50 kHz to 100 kHz >100 kHz to 300 kHz >300 kHz to 500 kHz	(75 ppm + 60 µV) (120 ppm + 160 µV) (250 ppm + 350 µV) (500 ppm + 1.5 mV) (0.125% + 4.3 mV)	Fluke 5700A Fluke 5700A Fluke 5700A Fluke 5700A Fluke 5700A	
				Fluke 5700A



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	>500 kHz to 1 MHz	(0.27% + 8.5 mV)	Fluke 5700A
	220 V		Fluke 5700A
	40 Hz to 20 kHz	(80 ppm + 0.8 mV)	Fluke 5700A
	>20 kHz to 50 kHz	(220 ppm + 3.5 mV)	Fluke 5700A
	>50 kHz to 100 kHz	(500 ppm + 8 mV)	
	>100 kHz to 300 kHz	(0.15% + 90 mV)	Fluke 5700A
	>300 kHz to 500 kHz	(0.47% + 90 mV)	
	>500 kHz to 1 MHz	(1.15% + 190 mV)	
	1100 V		
	50 Hz to 1 kHz	(80 ppm + 3.5 mV)	
AC Voltage – Measure		(% Reading + % range)	
	1 µV to 100 mV		WAVETEK DATRON 1281
	40 Hz to 100 Hz	(0.02% + 0.002%)	WAVETEK DATRON 1281
	>100 Hz to 2 kHz	(0.02% + 0.001%)	WAVETEK DATRON 1281
	>2 kHz to 10 kHz	(0.02% + 0.002%)	WAVETEK DATRON 1281
	>10 kHz to 30 kHz	(0.04% + 0.004%)	WAVETEK DATRON 1281
	>30 kHz to 100 kHz	(0.07% + 0.01%)	WAVETEK DATRON 1281
	>100 mV to 100 V		WAVETEK DATRON 1281
	40 Hz to 100 Hz	(0.015% + 0.001%)	WAVETEK DATRON 1281
	>100 Hz to 2 kHz	(0.013% + 0.001%)	WAVETEK DATRON 1281
	>2 kHz to 10 kHz	(0.015% + 0.001%)	WAVETEK DATRON 1281
	>10 kHz to 30 kHz	(0.025% + 0.001%)	WAVETEK DATRON 1281
	>30 kHz to 100 kHz	(0.05% + 0.01%)	WAVETEK DATRON 1281
	>100 mV to 100 V		WAVETEK DATRON 1281
	>100 kHz to 300 kHz	(0.3% + 0.1%)	WAVETEK DATRON 1281
	>300 kHz to 1 MHz	(1% + 1%)	WAVETEK DATRON 1281
	>100 V to 1000 V		WAVETEK DATRON 1281
	40 Hz to 10 kHz	(0.015% + 0.002%)	
	>10 kHz to 30 kHz	(0.025% + 0.004%)	
	>30 kHz to 100 kHz	(0.05% + 0.02%)	



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Resistance – Generate	1 Ω	(ppm Reading) 8.02 ppm	Fluke 742A-1
	10 Ω	2 ppm	Fluke 742A-10
	1 kΩ	2 ppm	Fluke 742A-1k
	10 kΩ	2 ppm	Fluke 742A-10k
	100 μΩ	30 ppm	Burster 1240-0,0001
	1 mΩ	10 ppm	Burster 1240-0,001
	10 mΩ	10 ppm	Burster 1240-0,01
	100 mΩ	3 ppm	Burster 1240-0,1
	1 Ω	2 ppm	Burster 1240-1
	10 Ω	2 ppm	Burster 1240-10
	100 Ω	2 ppm	Burster 1240-100
	1 kΩ	2 ppm	Burster 1240-1k
	10 kΩ	2 ppm	Burster 1240-10k
	Resistance – Generate (continued)	(0.1 Ω to 1 Ω)	(ppm Reading) 200 ppm
(1 Ω to 10 Ω)		35 ppm	HP 3458A w/Decade Resistors: Guildline 9347/1 MΩ
(10 Ω to 100 Ω)		26 ppm	HP 3458A w/Decade Resistors: Guildline 9347/1 MΩ
(100 Ω to 100 kΩ)		15 ppm	HP 3458A w/Decade Resistors: Guildline 9347/1 MΩ
(100 kΩ to 1 MΩ)		22 ppm	HP 3458A w/Decade Resistors: Guildline 9347/1 MΩ
(1 MΩ to 10 MΩ)		80 ppm	HP 3458A w/Decade Resistors: Guildline 9347/1 MΩ
(10 MΩ to 100 MΩ)		550 ppm	HP 3458A w/Decade Resistors: Guildline 9347/1 MΩ
(100 MΩ to 1 GΩ)		0.6%	HP 3458A w/Decade Resistors: Guildline 9343/1 GΩ
(0.1 Ω to 1 Ω)		1% setting	HP 3458A w/Decade Resistors: Guildline 9343/1 GΩ
(1 Ω to 10 Ω)		0.1% setting	HP 3458A w/Decade Resistors: Guildline 9343/1 GΩ
(10 Ω to 100 Ω)		0.01% setting	HP 3458A w/Decade Resistors: Guildline 9343/1 GΩ
(100 Ω to 1 kΩ)		0.03% setting	HP 3458A w/Decade Resistors: Guildline 9343/1 GΩ
(1 kΩ to 1 MΩ)		0.01% setting	HP 3458A w/Decade Resistors: Guildline 9343/1 GΩ



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	(0.01 Ω to 0.1 Ω) (0.1 Ω to 1 Ω) (1 Ω to 10 Ω) (10 Ω to 100 Ω) (100 Ω to 10 MΩ)	7% setting 0.7% setting 0.10% setting 0.04% setting 0.03% setting	(range is per decade) Decade Resistors: Guildline 9347/1 MΩ Decade Resistors: Guildline 9347/1 MΩ Decade Resistors: Guildline 9347/1 MΩ Decade Resistors: Guildline 9347/1 MΩ Decade Resistors: Guildline 9347/1 MΩ Decade Resistors ESI DB62 (0,01 Ω to 10 kΩ) Decade Resistors ESI DB62 (0,01 Ω to 10 kΩ) Decade Resistors ESI DB62 (0,01 Ω to 10 kΩ) Decade Resistors ESI DB62 (0,01 Ω to 10 kΩ)
Resistance – Measure	0.1 Ω to 10 Ω >10 Ω to 100 Ω >100 Ω to 100 kΩ >100 kΩ to 1 MΩ >1 MΩ to 10 MΩ >10 MΩ to 100 MΩ >100 MΩ to 1 GΩ	20 ppm 17 ppm 11 ppm 17 ppm 60 ppm 510 ppm 6000 ppm	HP 3458A HP 3458A HP 3458A HP 3458A HP 3458A HP 3458A HP 3458A
<i>Time and Frequency</i>			
Frequency – Measure Pulse Signal	>100 Hz to 500 MHz >100 Hz to 500 MHz	4.7 x 10 ⁻¹¹ proportional parts (pp) 2.0 x 10 ⁻⁹ pp	EPI 548 or HP 5335A or HP 5345A + HP 58503A Frequency Counters + GPS Time Base EPI 548 or HP 5335A or HP 5345A + HP 105B Frequency Counters + Quartz Oscillator
Frequency – Measure Sine, Square Pulse	1 mHz to <10 Hz 1 mHz to <10 Hz	1.5 x 10 ⁻⁴ pp 2.5 x 10 ⁻⁵ pp	EPI 548 or HP 5335A or HP 5345A + HP 58503A Frequency Counters + GPS Time Base
Frequency – Measure, Square	>10 Hz to 1 kHz	3.7 X 10 ⁻⁷ pp	EPI 548 or HP 5335A or HP 5345A + HP 58503A



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Signal	>1 kHz to 500 MHz	4.7×10^{-11} pp	Frequency Counters + GPS Time Base EPI 548 or HP 5335A or HP 5345A + HP 58503A
	1 mHz to 1 Hz	3.0×10^{-6} pp	Frequency Counters + GPS Time Base EPI 548 or HP 5335A or HP 5345A + HP 105B
	>1 Hz to 1 kHz	3.7×10^{-7} pp	Frequency Counters + Quartz Oscillator
	>1 kHz to 500 MHz	2.0×10^{-9} pp	EPI 548 or HP 5335A or HP 5345A + HP 105B Frequency Counters + Quartz Oscillator EPI 548 or HP 5335A or HP 5345A + HP 105B Frequency Counters + Quartz Oscillator
Frequency – Measure, Sinusoidal Signal	>100 Hz to 1 kHz	1.9×10^{-9} pp	EPI 548 or HP 5335A or HP 5345A + HP 58503A Frequency Counters + GPS Time Base
	>1 kHz to 1 MHz	4.3×10^{-10} pp	EPI 548 or HP 5335A or HP 5345A + HP 58503A Frequency Counters + GPS Time Base
	>1 to MHz 100 MHz	1.9×10^{-11} pp	
	>100 MHz to 500 MHz	3.7×10^{-11} pp	EPI 548 or HP 5335A or HP 5345A + HP 58503A Frequency Counters + GPS Time Base
1 mHz to 1 Hz	3.0×10^{-3} pp	EPI 548 or HP 5335A or HP 5345A + HP 105B Frequency Counters + Quartz Oscillator	
Frequency – Measure, Sinusoidal Signal (continued)	>1 Hz to 1 kHz	3.0×10^{-6} pp	EPI 548 or HP 5335A or HP 5345A + HP 105B Frequency Counters + Quartz Oscillator
	>1 kHz to 500 MHz	4.7×10^{-9} pp	EPI 548 or HP 5335A or HP 5345A + HP 105B



SCOPE OF ACCREDITATION

MEASUREMENT AREA	RANGE & RESOLUTION	CALIBRATION & MEASUREMENT CAPABILITY ¹ (CMC) (±)	TECHNIQUE, REFERENCE STANDARD, EQUIPMENT
			Frequency Counters + Quartz Oscillator
Frequency – Generate Pulse, Sinusoidal and Square Signals	1 MHz to 500 MHz	4.3×10^{-11} pp	HP 8673B or HP 3325A or HP 3325B or HP 8663A or Tek TG501 + HP 58503A Synthesized Frequency/Waveform Generator/Time Mark Generator + GPS Time Base HP 8673B or HP 3325A or HP 3325B or HP 8663A or Tek TG501 + HP 105 B Synthesized Frequency/Waveform Generator/Time Mark Generator + Quartz Oscillator
	1 MHz to 500 MHz	3.0×10^{-10} pp	
Period – Measure Pulse Signal	1.25 ns to 1000 s	4.7×10^{-11} pp	HP 5345A or HP 5335A + HP 58503A Period Counters + GPS Time Base HP 5345A or HP 5335a + HP 105B Period Counters + Quartz Oscillator
	1.25 ns to 1000 s	2.0×10^{-9}	
Period – Measure Square Signal	>1 s to 1.000 s	3.0×10^{-4} pp	HP 5345A or HP 5335A + HP 58503A Period Counters + GPS Time Base
	> 1 ms to 1 s	3.0×10^{-7} pp	
	1.25 ns to 1 ms	4.7×10^{-11} pp	HP 5345A or HP 5335A + HP 58503A Period Counters + GPS Time Base
	>1 s to 1.000 s	3.0×10^{-4} pp	HP 5345A or HP 5335A + HP 58503A Period Counters + GPS Time Base
	>1 ms to 1 s	3.0×10^{-7} pp	HP 5345A or HP 5335A + HP 105B Period Counters + Quartz Oscillator



SCOPE OF ACCREDITATION

MEASUREMENT AREA	RANGE & RESOLUTION	CALIBRATION & MEASUREMENT CAPABILITY ¹ (CMC) (±)	TECHNIQUE, REFERENCE STANDARD, EQUIPMENT
	1.25 ns to 1 ms	2.0×10^{-9} pp	HP 5345A or HP 5335A + HP 105B Period Counters + Quartz Oscillator HP 5345A or HP 5335A + HP 105B Period Counters + Quartz Oscillator
Period – Measure Sinusoidal Signal	>1 s to 1,000 s	2.8×10^{-3} pp	HP 5345A or HP 5335A + HP 58503A Period Counters + GPS Time Base
	>1 ms to 1 s	3.0×10^{-6} pp	HP 5345A or HP 5335A + HP 58503A Period Counters + GPS Time Base
	1.25 ns to 1 ms	6.1×10^{-11} pp	HP 5345A or HP 5335A + HP 58503A Period Counters + GPS Time Base
	>1 ms to 1,000 s	3.0×10^{-3} pp	HP 5345A or HP 5335A + HP 58503A Period Counters + GPS Time Base
	>1 ms to 1 s	3.0×10^{-6} pp	HP 5345A or HP 5335A + HP 58503A Period Counters + GPS Time Base
	1.25 ns to 1 ms	2.0×10^{-9} pp	HP 5345A or HP 5335A + HP 105B Period Counters + Quartz Oscillator HP 5345A or HP 5335A + HP 105B Period Counters + Quartz Oscillator HP 5345A or HP 5335A + HP 105B Period Counters + Quartz Oscillator
Period – Generate Pulse, Sinusoidal and Square Signals	1 ns to 1,000 s	4.3×10^{-11} pp	HP 3325A or HP 3325B or HP 8673B or Tek TG50-1 + HP 58503A Synthesized Frequency/Waveform Generator/Time Mark Generator + GPS Time Base
	1000 s to 1 ns	3.0×10^{-10} pp	HP 3325A or HP 3325B or HP 8663A or Tek



SCOPE OF ACCREDITATION

MEASUREMENT AREA	RANGE & RESOLUTION	CALIBRATION & MEASUREMENT CAPABILITY ¹ (CMC) (±)	TECHNIQUE, REFERENCE STANDARD, EQUIPMENT
			TG501 + HP 105B Synthesized Frequency/Waveform Generator/Time Mark Generator + Quartz Oscillator
Time Interval – Measure	1.25 ns to 86400 s	5.8×10^{-11} pp	HP 5345A or HP 5335A + HP 58503A TI Counters + GPS Time Base
	1.25 ns to 86400 s	2.5×10^{-9} pp	HP 5345A or HP 5335A + HP 105B TI Counters + Quartz Oscillator
Time Interval – Generate	1.25 ns to 86400 s	4.3×10^{-11} s pp	HP 3325A or HP 3325B or HP 8673B or Tek TG501 or HP8753D + HP 58503A Synthesized Frequency/Waveform Generator/Time Mark Generator/ Network Analyzer + GPS time Base
	1.25 ns to 86400 s	3.0×10^{-10} s pp	HP 3325A or HP 3325B or HP 8673B or Tek TG501 or HP8753D + HP 105B Synthesized Frequency/Waveform Generator/Time Mark Generator/ Network Analyzer + Quartz Oscillator
Timers – Measure	Up to 86,400 s	0.58 ms	HP 5335A or 5345A + HP 58503A GPS
Power at Low Frequency – Measure	-40 dBm to 30 dBm 10 Hz to 1 MHz @ 50 Ω	0.01 dB	Fluke 8842A Datron 1281
	-40 dBm to 30 dBm 10 Hz to 1 MHz @ 75 Ω	0.01 dB	Fluke 8842A Datron 1281
	-40 dBm to 30 dBm 10 Hz to 1 MHz @ 600Ω	0.01 dB	Fluke 8842A



SCOPE OF ACCREDITATION

MEASUREMENT AREA	RANGE & RESOLUTION	CALIBRATION & MEASUREMENT CAPABILITY ¹ (CMC) (±)	TECHNIQUE, REFERENCE STANDARD, EQUIPMENT
			Datron 1281
Power at Low Frequency – Generate	-40 dBm to 30 dBm 10 Hz to 1 MHz @ 50Ω	0.01 dB	Fluke 5500A Fluke 5100B
	-40 dBm to 30 dBm 10 Hz to 1 MHz @ 75Ω	0.01 dB	Fluke 5500A Fluke 5100B
	-40 dBm to 30 dBm 10 Hz to 1 MHz @ 600Ω	0.01 dB	Fluke 5500A Fluke 5100B
Bandwidth – Measure	DC to 500 MHz	0.18 dB	Tek CG5011 or Tek PG506 or Tek SG503 or Tek SG504 + HP 5335A Calibration Generators/Wide Band Generators + Frequency Counter
<i>RF/Microwave and Electromagnetics</i>			
Frequency – Measure, Pulse Signal	>500 MHz to 1.3 GHz >1.3 GHz to 18 GHz	4.7×10^{-11} pp	EPI 548 or HP 5335A or HP 5345A + HP 58503A Frequency Counters + GPS Time Base
	>500 MHz to 1.3 GHz >1.3 GHz to 18 GHz	2.0×10^{-9} pp	EPI 548 or HP 5335A or HP 5345A + HP 105B Frequency Counters + Quartz Oscillator
Frequency – Measure, Square Signal	>500 MHz to 1.3 GHz >1.3 GHz to 18 GHz	4.7×10^{-11} pp	EPI 548 or HP 5335A or HP 5345A + HP 58503A Frequency Counters + GPS Time Base
	>500 MHz to 1.3 GHz >1.3 GHz to 18 GHz	2.0×10^{-9} pp	EPI 548 or HP 5335A or HP 5345A + HP 105B Frequency Counters + Quartz Oscillator
Frequency – Measure, Sinusoidal Signal	>500 MHz to 1.3 GHz >1.3 GHz to 18 GHz	4.7×10^{-11} pp	EPI 548 or HP 5335A or HP 5345A + HP 58503A Frequency Counters + GPS Time Base
	>500 MHz to 1.3 GHz >1.3 GHz to 18 GHz	2.0×10^{-9} pp	EPI 548 or HP 5335A or HP 5345A + HP 105B Frequency Counters + Quartz Oscillator
Frequency –	>500 MHz to 18 GHz	4.3×10^{-11} pp	HP 8753D or HP 3325A



SCOPE OF ACCREDITATION

MEASUREMENT AREA	RANGE & RESOLUTION	CALIBRATION & MEASUREMENT CAPABILITY ¹ (CMC) (±)	TECHNIQUE, REFERENCE STANDARD, EQUIPMENT
Generate Pulse, Sinusoidal and Square Signals	>500 MHz to 18 GHz	3.0×10^{-10} pp	or HP3325B or HP 8673B or Tek TG501 + HP 58503A Synthesized Frequency/Waveform Generator/Time Mark Generator + GPS Time Base HP 8753D or HP 3325A or HP 3325B or HP 8673B or Tek TG501 + HP 105B Synthesized Frequency/Waveform Generator/Time Mark Generator + Quartz Oscillator
RF Power – Measure	-60 dBm to -30 dBm 10 MHz to 18 GHz -20 dBm to 20 dBm 10 MHz to 4.2 GHz -30 dBm to 20 dBm 50 MHz to 18 GHz	0.32 dB 0.1 dB 0.2 dB	HP 8901B + HP 8481D Power Meter + Sensor Head or 8901B + 8481D HP 8901B + HP 8482A Power Meter + Sensor Head HP 8901B + HP 8485A Power Meter + Sensor Head
Bandwidth – Measure	>500 MHz to 1 GHz >1 GHz to 18 GHz > 1 GHz to 2.5 GHz	0.3 dB 0.3 dB 0.2 dB	Tek CG5011 or Tek PG506 or Tek SG503 or Tek SG504 + HP 5335A Calibration Generators/Wide Band Generators + Frequency Counter HP 8753D + HP 8673B + HP8901B+ HP 8482A Network Analyzer + Synthesizer + Power Meter + Sensor Head

¹“Calibration and Measurement Capability” is the smallest uncertainty of measurement that a laboratory can achieve within its scope of accreditation when performing more or less routine calibrations of nearly ideal measurement standards or of nearly ideal measuring instruments. Calibration and Measurement Capabilities are expressed as uncertainties at approximately the 95% level of confidence, usually using a coverage factor of $k=2$. The measurement uncertainty of a



SCOPE OF ACCREDITATION

MEASUREMENT AREA	RANGE & RESOLUTION	CALIBRATION & MEASUREMENT CAPABILITY¹ (CMC) (±)	TECHNIQUE, REFERENCE STANDARD, EQUIPMENT
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specific calibration performed by the laboratory may be greater than the least uncertainty due to the behavior of the customer's device, to the environment (if the calibration is performed in the field), and to influences from the circumstances of the specific calibration.