Laboratory	Intech Calibrations Private Limited (ICPL), No. 7/9, 28 th Cross, Avvai Nagar, Lawspet, Puducherry				
Accreditation Standard	ISO/IEC 17025: 2005				
Certificate Number	CC-2715 (in lieu of C-1071, C-1072 & C-1073)	Page	1 of 16		
Validity	22.05.2018 to 21.05.2020	Last Ame	nded on 28.05.2018		

SI.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
		ELECTRO-TECHNIC	AL CALIBRATION	
I.	SOURCE		***************************************	
1.	DC Voltage ^{\$}	1 mV to 330 mV 330 mV to 3.3 V 3.3 V to 1000 V	0.75 % to 0.008 % 0.008 % to 0.019 % 0.019 % to 0.009 %	Using Multi Product Calibrator Fluke 5502E by Direct Method
2.	DC Current [®]	0.2 mA to 330 mA 330 mA to 10A 10 A to 20 A 20 A to 1000 A	0.42 % to 0.007 % 0.007 % to 0.05 % 0.05 % to 0.35 % 1.2 % to 0.94 %	Using Multi Product Calibrator Fluke 5502E by Direct Method Using Multi Product Calibrator Fluke 5502E with Current coil by Direct Method
3.	AC Voltage ^s	@45 Hz to 10 kHz 3 mV to 33 V 33 V to 1000 V @10 kHz to 100 kHz 30 mV to 30 V	0.97 % to 0.19 % 0.19 % to 0.11 % 0.53 % to 0.33 %	Using Multi Product Calibrator Fluke 5502E by Direct Method
4.	AC Current*	@45 Hz to 1 kHz 190 μA to 20 A @50 Hz 20 A to 1000 A	0.44 % to 0.27 % 1.45 % to 1.0 %	Using Multi Product Calibrator Fluke 5502E by Direct Method Using Multi Product Calibrator Fluke 5502E with Current coil by Direct Method

Laboratory	Intech Calibrations Private Limited (ICPL), No. 7/9, 28 th Cross, Avvai Nagar, Lawspet, Puducherry			
Accreditation Standard	ISO/IEC 17025: 2005			
Certificate Number	CC-2715 (in lieu of C-1071, C-1072 & C-1073)	Page	2 of 16	
Validity	22.05.2018 to 21.05.2020	Last Ame	nded on 28.05.2018	

SI.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
5.	DC Resistance [≸]	2 Ω to 30 MΩ 30 MΩ to 100 MΩ 100 MΩ to 300MΩ 300 MΩ to 1 GΩ	0.67 % to 0.14 % 0.14 % to 0.70 % 0.70 % to 0.62 % 0.62% to 1.80%	Using Multi Product Calibrator Fluke 5502E by Direct Method
6.	Capacitance ^{\$}	@ 1 kHz 350 pF to 300 nF @ 100 Hz 300 nF to 30 μF	3.95 % to 0.31 % 0.31 % to 0.61 %	Using Multi Product Calibrator Fluke 5502E by Direct Method
7.	Frequency ^{\$}	119 Hz to 100 kHz	0.17 % to 0.08 %	Using Multi Product Calibrator Fluke 5502E by Direct Method
8.	Inductance*	1 kHz 100 uH to 1 mH 1 mH to 10 H	3.6 % 3.6 %	Using Decade Inductance Box by Direct Method
9.	Temperature Simulation (Controllers/ Indicators/	n ^{\$} /Simulators without Sensors	3)	
	Thermocouple Types K J R S T N	(-) 200 °C to 1370 °C (-) 200 °C to 600 °C 0 °C to 1760 °C 0 °C to 1760 °C (-) 150 °C to 400 °C (-) 100 °C to 1300 °C	0.5 °C 0.5 °C 0.7 °C 0.7 °C 0.4 °C 0.5 °C	Using Multi Product Calibrator Fluke 5502E by Direct Method
	RTD pt-100	(-) 200°C to 800 °C	0.08 °C to 0.3 °C	
10.	Digital Timer/ Stopwatch ^{\$}	1 s to 24 Hrs	0.16 s to 16.4 s	Using Timer Calibrator (Autonics) by Comparison method

LaboratoryIntech Calibrations Private Limited (ICPL), No. 7/9, 28th Cross, Avvai
Nagar, Lawspet, PuducherryAccreditation StandardISO/IEC 17025: 2005Certificate NumberCC-2715 (in lieu of C-1071, C-1072 &
C-1073)Page 3 of 16Validity22.05.2018 to 21.05.2020Last Amended on 28.05.2018

SI.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
11.	Digital Timer / Stopwatch [◆]	1 s to24 Hrs	0.16 s to 16.4 s	Using Timer Calibrator (Autonics) by Comparison Method
12.	Temperature Simulation (Controllers/ Indicators/	n* / Simulators without Senso	ors)	
	Thermocouple Types K J R S T	(-) 200 °C to 1370 °C (-) 200 °C to 1200 °C 0 to 1760 °C 0 to 1760 °C (-) 200 °C to 400 °C	0.61 °C 0.5 °C 1.3 °C 1.8 °C 0.82 °C	Using Temperature/ Electrical Calibrator by Direct Method
	RTD pt-100	(-) 200 °C to 800 °C	0.24 °C to 0.41 °C	
II.	MEASURE			
1.	DC Voltage ^{\$}	1 mV to 10 V 10V to 1000 V	0.01 % to 0.004 % 0.004 % to 0.01 %	Using 6½ Digit DMM Fluke 8846 A by Direct Method
2.	DC Current [®]	100 μA to 1 A 1 A to 10 A	0.1 % 0.1 % to 0.2 %	Using 6½ Digit DMM Fluke 8846 A by Direct Method
3.	AC Voltage [≸]	10 Hz to 50 kHz 100 mV to 10 V 50 Hz to 10 kHz 10 V to 1000 V 10 kHz to 50 kHz 1V to 100 V	1.0 %	Using 6½ Digit DMM Fluke 8846 A by Direct Method
4.	AC Current [®]	1 kHz 100 μA to 10 A	0.53 % to 0.3 %	Using 6½ Digit DMM Fluke 8846 A by Direct Method

Laboratory	Intech Calibrations Private Limited (ICPL), No. 7/9, 28 th Cross, Avva Nagar, Lawspet, Puducherry			
Accreditation Standard	ISO/IEC 17025: 2005			
Certificate Number	CC-2715 (in lieu of C-1071, C-1072 & C-1073)	Page	4 of 16	
Validity	22.05.2018 to 21.05.2020	Last Ame	ended on 28.05.2018	

SI.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
5.	DC Resistance [≸]	1 Ω to 1 ΜΩ 1 ΜΩ to 10 ΜΩ 10 ΜΩ to 100 ΜΩ 100 ΜΩ to 1 GΩ	0.45 % to 0.014 % 0.014 % to 0.05 % 0.05 % to 0.94 % 0.94 % to 2.32 %	Using 6½ Digit DMM Fluke 8846 A by Direct Method
6.	Frequency ^{\$}	10 Hz to 1 MHz	0.08 % to 0.02 %	Using 6½ Digit DMM Fluke 8846 A by Direct Method
7.	Temperature Simulation (Controllers/ Indicators/ Thermocouple types K J R S T N	 ^{n⁵} / Simulators without Sensor (-) 190 °C to 1300 °C (-) 200 °C to 1100 °C 0 °C to 1700 °C 0 °C to 1700 °C (-) 150 °C to 300 °C (-) 100 °C to 1000 °C 	s) 0.39 °C 0.39 °C 1.0 °C 1.35 °C 0.31 °C 0.41 °C	Using Multi Product Calibrator Fluke 5502E (In Measure Mode) by Direct Method
8.	Temperature Simulation ^{\$} (Controllers/ Indicators/ Simulators without Sensors)			
	RTD pt-100	(-) 200 °C to 600 °C	0.1 °C to 0.26° C	Using 6½ Digit DMM Fluke 8846 A by Direct Method

Laboratory	Intech Calibrations Private Limited (ICPL), No. 7/9, 28 th Cross, Avvai Nagar, Lawspet, Puducherry			
Accreditation Standard	ISO/IEC 17025: 2005			
Certificate Number	CC-2715 (in lieu of C-1071, C-1072 & C-1073)	Page	5 of 16	
Validity	22.05.2018 to 21.05.2020	Last Ame	nded on 28.05.2018	

SI.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
Ι.	DIMENSION (BASIC N	IEASURING INSTRUMEN	Γ, GAUGE ETC.)	
1.	Vernier Caliper ^{\$} L.C.: 0.01 mm	0 to 600 mm	9.25 µm	Using Slip Gauge Set Grade '0', Caliper Checker IS 3651 (Part 1 & 2)
2.	External Micrometer ^{\$} L.C.: 0.001 mm	0 to 100 mm	1.30 µm	Using Slip Gauge Set Grade ' 0', Optical Flat & Parallels as per IS 2967
3.	Height Gauge [≸] LC.: 0.01 mm	0 to 600 mm	8.0 µm	Using Caliper Checker as per IS 2921
4.	Plunger Dial Gauge ^{\$} LC.: 0.001 mm LC.: 0.01 mm	0 to 10 mm 0 to 50 mm	1.1 μm 5.82 μm	Using ULM as per IS 2092
5.	Lever Dial Gauge ^{\$} LC.: 0.001 mm LC.: 0.01 mm	0 to 0.14 mm 0 to 0.8 mm	1.1 μm 5.80 μm	Using ULM as per IS 11498
6.	Bore Gauge ^{\$} (Only For Transmission error) LC.: 0.001 mm	0 to 2 mm	1.0 μm	Using ULM
7.	Plain Ring Gauge ^{\$}	10 mm to 100 mm	2.26 µm	Using ULM & Master Setting Ring as per IS 3485

Laboratory	Intech Calibrations Private Limited (ICPL), No. 7/9, 28 th Cross, Avvai Nagar, Lawspet, Puducherry			
Accreditation Standard	ISO/IEC 17025: 2005			
Certificate Number	CC-2715 (in lieu of C-1071, C-1072 & C-1073)	Page	6 of 16	
Validity	22.05.2018 to 21.05.2020	Last Ame	nded on 28.05.2018	

SI.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
8.	Coating Thickness Gauge [®] L.C.: 0.0001 mm	0 to 1035 μm	2.45 μm	Using Master Foils by Comparison Method
9.	Thread Ring Gauge ^{\$}	5 mm to 100 mm	2.26 µm	Using ULM & Master Setting Ring as per IS 4218, IS 2334
10.	Plain Plug Gauge ^{\$}	4.80 mm to 100 mm	1.05 μm	Using ULM as per IS 3455 & IS 7859
11.	Thread Plug Gauge ^{\$}	14 to 100 mm	1.50µm	Using ULM, Thread Measuring Wire as per IS 2334, IS 4218 (Part I to IV)
12.	Feeler Gauge ^⁵	Upto 2 mm	0.53 μm	Using ULM as per IS 3179
13.	Foils ^{\$}	Upto 1035 µm	0.53 µm	Using ULM
14.	Measuring Scale ^{\$} L.C.: 0.5 mm	0 to 1000 mm	24.46 µm	Using Scale & Tape Calibrator as per IS 1481
15.	Measuring Tape ^{\$} L.C.: 1 mm	0 to 30 m	32√N µm	Using Scale & Tape Calibrator as per IS 1269 (Part 1 & 2)
16.	Depth Micrometer ^{\$} L.C.: 0.001 mm	0 to 25 mm	4.91 µm	Using Slip Gauge Set Grade '0' as per BS 6468
17.	Dial Thickness Gauge ^{\$} L.C.: 0.01 mm	0 to 10 mm	5.80 µm	Using Slip Gauge Set Grade ' 0' as per IS 2092

Laboratory	Intech Calibrations Private Limited (ICPL), No. 7/9, 28 th Cross, Avva Nagar, Lawspet, Puducherry			
Accreditation Standard	ISO/IEC 17025: 2005			
Certificate Number	CC-2715 (in lieu of C-1071, C-1072 & C-1073)	Page	7 of 16	
Validity	22.05.2018 to 21.05.2020	Last Ame	ended on 28.05.2018	

SI.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
18.	Gap / Snap Gauge ^{\$}	Upto 100 mm	1.02 μm	Using Slip Gauge Set Grade ' 0' as per IS 3455, IS 7859 & IS 3477
19.	Test Sieves ^{\$}	150 μm to 10 mm	6.6 μm	Using Profile Projector as per IS 460
		10 mm to 100 mm	27.2 μm	Using Digital Vernier Caliper as per IS 460
20.	Radius Gauge ^{\$}	1 mm to 25 mm	8.9 μm	Using Profile Projector as per IS 5273
21.	Surface Table*	Upto 2500 mm x 1600 mm	1.22 $\sqrt{\frac{L+W}{100}}$ µm	Using Electronic Level as per IS 7327, IS 2285, IS 12937 (L & M is in mm)
22.	Depth Gauge ^{\$} L.C.: 0.01 mm	0 to 300 mm	12.72 μm	Using Slip Gauge Set Grade '0', Caliper Checker as per IS 4213
23.	Thread Measuring Wire ^{\$} (2/3 Wire)	0.17 mm to 6.35 mm	1.00 μm	Using ULM as per IS 6311
24.	Setting Rod ^{\$}	25 mm to 100 mm	1.27 μm	Using Slip Gauge "0" & Electronic comparator
25.	LVDT Probe with DRO ^{\$} L.C.: 0.001 mm	0 to 100 mm	1.00 µm	Using Slip Gauge Set Grade ' 0' by Comparison Method
26.	Extensometer	0 to 3 mm	4.0 μm	Using Electronic Probe as per ASTM E83-10a, IS 12872

Intech Calibrations Private Limited (ICPL), No. 7/9, 28th Cross, Avvai Laboratory Nagar, Lawspet, Puducherry ISO/IEC 17025: 2005 Accreditation Standard **Certificate Number** Page 8 of 16 CC-2715 (in lieu of C-1071, C-1072 & C-1073)

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22.05.2018 to 21.05.2020

Last Amended on 28.05.2018

SI.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
II.	DIMENSION (PRECIS	ON INSTRUMENTS)		
1.	Universal Length Measuring Machine ^{\$} L.C.: 0.0001 mm	0 to 100 mm	0.86 µm	Using Slip Gauge Set Grade '0' by Comparison Method
III.	ACOUSTICS			
1.	Sound Level Meter ^{\$}	94 dB & 114 dB	0.77 dB	Using Sound Level Calibrator
IV.	ACCELERATION & SP	PEED		
1.	RPM ^{\$} (Contact Type) Tachometers	60 rpm to 3000 rpm	0.13 %	Using Digital Tachometer By Comparison method
2.	RPM ^{\$} (Non Contact Type) Tachometers	120 rpm to 36000 rpm	2.31 %	Using Digital Laser Tachometer By Comparison method
V.	PRESSURE INDICATI	NG DEVICES		
1.	Vacuum, Digital And Analog, Gauges And Transmitters [#]	(-) 0.90 bar to 0 bar	1.01%	Using Twin mode Druck, Pneumatic Pump & Digital Indicator by Comparison method
2.	Pneumatic Pressure Digital And Analog, Gauges And Transmitters / Hydraulic Pressure	0 bar to 35 bar	0.16%	Using Pneumatic Pump and Digital Pressure Gauge by Comparison method
	Digital And Analog, Gauges And Transmitters [#]	0 bar to 200bar 0 bar to 700 bar	0.13% 0.12%	Using Hydraulic Pressure Pump and Digital Pressure Gauge by Comparison method

LaboratoryIntech Calibrations Private Limited (ICPL), No. 7/9, 28th Cross, Avvai
Nagar, Lawspet, PuducherryAccreditation StandardISO/IEC 17025: 2005Certificate NumberCC-2715 (in lieu of C-1071, C-1072 &
C-1073)Page9 of 16Validity22.05.2018 to 21.05.2020Last Amended on 28.05.2018

SI.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
3.	Low Pressure Indicator, Magnehelic Gauge, Manometers, BP Apparatus (Electronic, Mercury, Analog) [#]	Upto 10000 mmwc	0.06 %	Using Screw Pump with Pressure Gauge by Comparison method
4.	Pressure Switch [#]	0 bar to 35 bar	3.08 %	Using Digital Pressure Calibrator by Comparison Method
VI.	WEIGHTS			
1.	Calibration of M1Accuracy Class and coarser ^{\$} Calibration of F2 Accuracy Class and Coarser ^{\$}	1 mg 2 mg 5 mg 10 mg 20 mg 50 mg 100 mg 200 mg 500 mg 1 g 2 g 5 g	0.1 mg 0.1 mg 0.1 mg 0.1 mg 0.2 mg	Using E1 Class Standard Weights and Electronic Weighing Balance (d: 0.1mg, Cap:220g) As per OIML R111-1 : 2004 ABBA Cycle Substitution Method Using E1 Class Standard Weights and Electronic Weighing Balance (d:0.1mg
		5 g	0.2 mg	Cap:220g) As per OIML R111-1 : 2004 ABBA Cycle Substitution Method
		10 g 20 g 50 g 100 g 200 g	0.2 mg 0.2 mg 0.2 mg 0.2 mg 0.2 mg	Using E2 Accuracy Class Standard Weights and Balance d: 0.1 mg Cap. 220 g as per OIML R111-1:2004 ABBA Cycle Substitution Method

Laboratory	Intech Calibrations Private Limited (ICPL), No. 7/9, 28 th Cross, Avvai Nagar, Lawspet, Puducherry		
Accreditation Standard	ISO/IEC 17025: 2005		
Certificate Number	CC-2715 (in lieu of C-1071, C-1072 & C-1073)	Page	10 of 16
Validity	22.05.2018 to 21.05.2020	Last Ame	ended on 28.05.2018

SI.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
	Calibration of M1 Accuracy Class and Coarser ^{\$}	500 g 1 kg 2 kg 5 kg	10 mg 20 mg 20 mg 20 mg	Using E2 Accuracy Class Standard Weights and Balance d: 0.01 g Cap. 5 kg As per OIML R111-1 : 2004 ABBA Cycle Substitution Method
	Calibration of M2 Accuracy Class and Coarser ^{\$}	10 kg 20 kg 50 kg	1 g 1 g 2 g	Using F1 Accuracy Class Standard Weights and Balance d: 1 g Cap. 50 kg As per OIML R111-1 : 2004 ABBA Cycle Substitution Method
VII.	WEIGHING SCALE AN	ND BALANCE		
1.	Weighing Balance / Scale Weighing Balance [*] Class I (d: 0.001 mg)	0 to 10 g	0.010 mg	Using E1 Accuracy Class Standard Weights As per OIML R76-1 :2006
2.	Weighing Balance [*] Class I (d: 0.1 mg)	0 to 200 g	0.1 mg	Using E2 Accuracy Class Standard Weights As per OIML R76-1 :2006
3.	Weighing Balance [*] Class I (d: 0.01 g)	0 to 5 kg	10 mg	Using E2 Accuracy Class Standard Weights As per OIML R76-1 :2006

Laboratory	Intech Calibrations Private Limited (ICPL), No. 7/9, 28 th Cross, Avvai Nagar, Lawspet, Puducherry		
Accreditation Standard	ISO/IEC 17025: 2005		
Certificate Number	CC-2715 (in lieu of C-1071, C-1072 & C-1073)	Page	11 of 16
Validity	22.05.2018 to 21.05.2020	Last Ame	ended on 28.05.2018

SI.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
4.	Weighing Balance [*] Class I (d: 1 g)	0 to 50 kg	1 g	Using E2 & F1 Accuracy Class Standard Weights As per OIML R76-1 :2006
5.	Weighing Balance [*] Class I (d: 10 g)	0 to 300 kg	10 g	Using E2, F1& M1 Accuracy Class Standard Weights as per OIML R76-1 :2006
VIII.	VOLUME			
1.	Glass Pipette ^{\$}	1 ml to 10 ml >10 ml to 25 ml >25 ml to 50 ml	0.004 ml 0.008 ml 0.012 ml	Using Weighing Balance with d: 0.1 mg Cap.220g and distilled water of known density as per IS/ISO 4787 : 2010
2.	Burette [®]	1 ml to 100 ml	0.12 ml	Using Weighing Balance with d:0.1 mg Cap. 220g and distilled water of known density as per IS/ISO4787 : 2010
3.	Volumetric Flask ^{\$}	5 ml to 100 ml >100 ml to 2000 ml	0.04 ml 0.23 ml	Using Weighing Balance with d:0.1 mg Cap. 220g and distilled water of known density as per IS/ISO4787: 2010
4.	Measuring Cylinder ^{\$}	5 ml to 100 ml	0.2 ml	Using Weighing Balance with d: 0.1mg Cap.220 g and distilled water of known density As per IS/ISO4787 : 2010

Laboratory	Intech Calibrations Private Limited (ICPL), No. 7/9, 28 th Cross, Avvai Nagar, Lawspet, Puducherry		
Accreditation Standard	ISO/IEC 17025: 2005		
Certificate Number	CC-2715 (in lieu of C-1071, C-1072 & C-1073)	Page	12 of 16
Validity	22.05.2018 to 21.05.2020	Last Ame	nded on 28.05.2018

SI.	Quantity Measured /	Range/Frequency	*Calibration Measurement Capability (+)	Remarks
			Supusity (_)	
		>100 ml to 2000 ml	0.7 ml	Using Weighing Balance with d:10mg Cap.5 kg and distilled water of known density as per IS/ISO4787 : 2010
IX.	UTM, TENSION CREE	P AND TORSION TEST	ING MACHINE	
1.	Universal Testing Machine [*] (Compression and Tension)	200 N to 300 kN	0.96 %	Using Load Cell/Proving Ring with display unit As per IS 1828(Part-I), ISO 7500:(Part I) ASTM E74
2.	Universal Testing Machine [*] (Compression)	300 kN to 3000 kN	0.66 %	Using Load Cell/Proving Ring with display unit As Per IS 1828 (Part-I), ISO 7500:(Part - 1) ASTM E74
3.	Verification of Displacement Measuring System in Material Testing Machine [•]	0 to 1000 mm	0.7 mm	Using Height Gauge As per ASTM 2309 -05
Х.	HARDNESS TESTING	MACHINES		
1.	Verification of Rockwell Hardness Testing Machine*	HRA HRB HRC	1.50 HRA 2.00 HRB 1.86 HRC	Using Standard Hardness Blocks HRA,HRB & HRC as per IS:1586:2012
2.	Verification of Brinell Hardness Testing Machine [*]	HBW 2.5/187.5 HBW 5/750 HBW 10/3000	3 % 3 % 3 %	Using Standard Hardness Blocks HBW 2.5/ 187.5, HBW 5/750,

Laboratory	Intech Calibrations Private Limited (ICPL), No. 7/9, 28 th Cross, Avvai Nagar, Lawspet, Puducherry		
Accreditation Standard	ISO/IEC 17025: 2005		
Certificate Number	CC-2715 (in lieu of C-1071, C-1072 & C-1073)	Page	13 of 16
Validity	22.05.2018 to 21.05.2020	Last Ame	nded on 28.05.2018

SI.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
				HBW 10/3000 as per IS:1500:2013
3.	Verification of Vickers Hardness Testing Machine [*]	HV 5 HV 10 HV 30	3 % 3 % 3 %	Using Standard Hardness Blocks HV 5, HV 10 & HV 30 as per IS:1500:2013
XI.	IMPACT TESTING MA	CHINES		
1.	Verification of Charpy/ Izod Impact Testing Machine*	300 J	0.60 %	Load Cell, Linear Measuring Instruments & Gauges as per IS 3766, ISO 148 -2 & ASTM E23
XII.	TORQUE GENERATIN	IG DEVICES		
1.	Torque Wrench ^{\$} (Type II-Class A, B & C)	25 Nm to 135 Nm	2.20 %	Torque Transducer with Display Unit with Uncertainty of 0.33 % as per ISO 6789

Laboratory	Intech Calibrations Private Limited (ICPL), No. 7/9, 28 th Cross, Avvai Nagar, Lawspet, Puducherry		
Accreditation Standard	ISO/IEC 17025: 2005		
Certificate Number	CC-2715 (in lieu of C-1071, C-1072 & C-1073)	Page	14 of 16
Validity	22.05.2018 to 21.05.2020	Last Ame	nded on 28.05.2018

SI.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks		
	THERMAL CALIBRATION					
I.	TEMPERATURE					
1.	Liquid in Glass Thermometer ^{\$}	(-) 70 °C to 200 °C	1.25 ℃	Using PRT Sensor with readout using Alcohol & Oil Bath As per ITS – 90 Scale by Comparison Method		
2.	RTD's With or Without Temperature Indicators/ Controllers / Data Loggers /Bath's ^{\$}	(-) 70 °C to 600 °C	0.6 °C	Using PRT Sensor with readout using, Oil Bath & Dry Block Calibrator by Comparison method		
3.	Temperature Indicator / Thermostat/Digital Thermometer, Pen Type Thermometer ^{\$}	(-) 40 °C to 300 °C	0.50 °C	Using PRT Sensor with readout using & Dry Block Calibrator by Comparison method		
4.	Thermocouple With or Without Temperature Indicators / Controllers/ Data Loggers /Bath's ^{\$}	0 °C to 1200 °C	1.7 °C to 2.12 °C	Using S Type T/C With Thermometer Readout Using Dry block Bath by Comparison method		
5.	Temperature Switch/ Temperature Gauge ^{\$}	(-) 40 °C to 600 °C	1.25 ℃	Using PRT Sensor with Readout Using Dry Block Calibrator by Comparison method		

LaboratoryIntech Calibrations Private Limited (ICPL), No. 7/9, 28th Cross, Avvai
Nagar, Lawspet, PuducherryAccreditation StandardISO/IEC 17025: 2005Certificate NumberCC-2715 (in lieu of C-1071, C-1072 &
C-1073)PageValidity22.05.2018 to 21.05.2020Last Amended on 28.05.2018

SI.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
6.	Temperature / Humidity Indicators With Probe or Inbuilt Sensor ^{\$}	15 °C to 45 °C @ 50 % RH 30 % RH to 85 % RH @ 25 °C	1.35 °C 3.25 % RH	Using Temperature / Humidity indicators With Probe Using Humidity Chamber by Comparison method
7.	RTD's With or Without Temperature Indicators / Controllers / Data Loggers [*]	0°C to 600 °C	0.85 °C	Using PRT Sensor with readout using Dry Block Calibrator by Comparison method
8.	Thermocouple With or Without Temperature Indicators/ Controllers / Data Loggers [*]	0 to 1200 °C	2.2 °C	Using S Type T/C With Thermometer Readout Using Dry block Calibrator by Comparison method
9.	Calibration of Ovens, Furnace, Chambers (Mapping)*	(-) 70 °C to 250 °C	2.1 °C	RTD With Indicator (9 Nos) by multipoint calibration
		250 °C to 1200 °C	8.0 °C	N- Type Thermocouple With Indicator (9 Nos) by Multipoint Calibratior
10.	Humidity Indicators of Chamber, Environmental Chamber, Climatic Chamber [*]	30 % RH to 85 % RH @ 25 ℃	4.2 %	Using Humidity indicators With Probe in Single Position Calibration (Measured Location in DUC)
11.	Thermostat/ Temperature Indicator with Sensor/ Temperature Switch*	(-) 40 °C to 250 °C	0.6 °C	Using PRT Sensor with readout using Dry Block Calibrator by Comparison method

Laboratory	Intech Calibrations Private Limited (ICPL), No. 7/9, 28 th Cross, Avva Nagar, Lawspet, Puducherry		
Accreditation Standard	ISO/IEC 17025: 2005		
Certificate Number	CC-2715 (in lieu of C-1071, C-1072 & C-1073)	Page	16 of 16
Validity	22.05.2018 to 21.05.2020	Last Ame	ended on 28.05.2018

SI.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
12.	Temperature Gauge [*]	(-) 40 °C to 600 °C	1.5 °C	Using PRT Sensor with readout using Dry Block Calibrator by Comparison method
13.	Environmental Chamber, Cold Chamber, Freezer, Incubator, Autoclave, Oven, Water Bath, Furnace (Single Point Calibration) *	(-) 70 °C to 300 °C 0 to 1200 °C	1 ℃ 6.5 ℃	Using RTD With indicator in Single Position Using N – Type With Indicator

* Measurement Capability is expressed as an uncertainty (±) at a confidence probability of 95% *Only for Site Calibration *The laboratory is also capable for site calibration however, the uncertainty at site depends on the

prevailing actual environmental conditions and master equipment used.