National Accreditation Board for Testing and Calibration Laboratories

SCOPE OF ACCREDITATION

Laboratory Name : ALFATEK SERVICES, TC 98/539 (1), SAPTHAGIRI, THRIPADAPURAM HILL, THIRUVANANTHAPURAM, KERALA, INDIA

Accreditation Standard ISO/IEC 17025:2017

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S.No	Discipline / Group	Measurand or Reference Material/Type of instrument or material to be calibrated or measured / Quantity Measured /Instrument	Calibration or Measurement Method or procedure	Measurement range and additional parameters where applicable(Range and Frequency)	* Calibration and Measurement Capability(CMC)(±)
Permanent Facility					
1	MECHANICAL-DIMENSION (BASIC MEASURING INSTRUMENT, GAUGE ETC.)	Calibration of Rapid Plastimeter LVDT (length)	Using O grade Gauge Blocks by Comparison Method Based on ASTMD3194-04	0.25 mm to 1 mm	1.9µm
2	MECHANICAL-DIMENSION (BASIC MEASURING INSTRUMENT, GAUGE ETC.)	Calipers (Vernier/Dial/Digital) L.C.:10 µm	Using Gauge Blocks/caliper checker by Comparison Method	0 to 600 mm	11.9µm
3	MECHANICAL-DIMENSION (BASIC MEASURING INSTRUMENT, GAUGE ETC.)	External Micrometer (Mech./Dial/Digital) L.C.: 1 µm	Using Gauge Blocks by Comparison Method	0 to 25 mm	3µm
4	MECHANICAL-DIMENSION (BASIC MEASURING INSTRUMENT, GAUGE ETC.)	Height Gauge (Dial/Digital) LC : 10 µm	Using Gauge Blocks /caliper checker by Comparison Method	0 to 300 mm	9.0µm

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5	MECHANICAL-DIMENSION (BASIC MEASURING INSTRUMENT, GAUGE ETC.)	Thickness Gauge (Dial/Digital) L.C:1 µm	Using Gauge Blocks by Comparison Method	0 to 12 mm	1.2µm
6	MECHANICAL-DIMENSION (BASIC MEASURING INSTRUMENT, GAUGE ETC.)	Thickness Gauge (Dial/Digital), LC: 10um	Using K Grade gauge blocks by comparison method	0 to 25 mm	9 µm
7	MECHANICAL-DUROMETER	Calibration of Shore – A Durometer Indenter Extension	Using Slip Gauges as per ASTM D 2240 -05 / ISO 18898-2006	0 to 100 Shore A	0.25Shore A
8	MECHANICAL-DUROMETER	Calibration of Shore – A Durometer Spring Force	Using Durocalibrator as per ASTM D 2240 -05 ISO 18898-2006:	0 to 100 Shore A	0.46 Shore A
9	MECHANICAL-HARDNESS TESTING MACHINES	Calibration of Time Indicator for Rapid Plastimeter , PRI Ageing Chamber IRHD Micro , IRHD (N) Hardness Tester and Digital Shore-A/M hardness tester	Using digital Stopwatch Based on ASTM D 3194-04, ISO 18898 -2016 by comparison method	0 to 60 min	0.62s

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10	MECHANICAL-PRESSURE INDICATING DEVICES	Hydraulic Pressure Dial & digital pressure gauges, pressure transmitters with indicator.	Using Hydraulic Hand pump and Master gauge Comparison Method DKD-R 6-1	> 200 bar to 700 bar	0.88%
11	MECHANICAL-PRESSURE INDICATING DEVICES	Hydraulic Pressure Dial & digital pressure gauges, pressure transmitters with indicator.	Using Hydraulic Hand pump and Master gauge (DKD-R 6-1)Comparison Method	0 to 200 bar	0.04%
12	MECHANICAL-PRESSURE INDICATING DEVICES	Pneumatic Pressure Dial & digital pressure gauges, pressure transmitters with indicator	Using Digital Pressure Calibrator Druck DPI 611(DKD-R 6-1)Comparison Method	0 to 20 bar	0.02%
13	MECHANICAL-VOLUME	Calibration of Volumetric Measures (Micro pippet,Glass Pipette, Burette, Specific Gravity Bottle, Flask, Measuring Cylinder, Jars, Bottle Top Dispenser)	Using Triple Distilled water& Electronic Weighing Balance of Readability 0.01mg ,by Gravimetric Method As per ISO 4787	1 ml to 5 ml	0.1ml

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14	MECHANICAL-VOLUME	Calibration of Volumetric Measures (Micro pippet,Glass Pipette, Burette, Specific Gravity Bottle, Flask, Measuring Cylinder, Jars, Bottle Top Dispenser)	Using Triple Distilled water& Electronic Weighing Balance of Readability 0.01mg ,by Gravimetric Method As per ISO 4787	10 ml to 200 ml	0.05ml
15	MECHANICAL-VOLUME	Calibration of Volumetric Measures (Micro pippet,Glass Pipette, Burette, Specific Gravity Bottle, Flask, Measuring Cylinder, Jars, Bottle Top Dispenser)	Using Triple Distilled water& Electronic Weighing Balance of Readability 0.01mg ,by Gravimetric Method As per ISO 4787	250 ml to 500 ml	0.1ml
16	MECHANICAL-VOLUME	Micropippettes	Using Triple Distilled water& Electronic Weighing Balance of Readability 0.01mg ,by Gravimetric Method As per ISO 8655-6	100 µl to 1000 µl	0.8µl
17	MECHANICAL-WEIGHTS	Calibration of Weights Accuracy E2 or coarser	Using E1 Class Standard weights and Electronic balance (Readability 0.01mg) As per OIML R111	1 g	0.02mg

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18	MECHANICAL-WEIGHTS	Calibration of Weights Accuracy E2 or coarser	Using E1 Class Standard weights and Electronic balance (Readability 0.01mg) As per OIML R111	1 mg	0.01mg
19	MECHANICAL-WEIGHTS	Calibration of Weights Accuracy E2 or coarser	Using E1 Class Standard weights and Electronic balance (Readability 0.01mg) As per OIML R111	10 g	0.03mg
20	MECHANICAL-WEIGHTS	Calibration of Weights Accuracy E2 or coarser	Using E1 Class Standard weights and Electronic balance (Readability 0.01mg) As per OIML R111	10 mg	0.03mg
21	MECHANICAL-WEIGHTS	Calibration of Weights Accuracy E2 or coarser	Using E1 Class Standard weights and Electronic balance (Readability 0.1mg) As per OIML R111	100 g	0.14mg
22	MECHANICAL-WEIGHTS	Calibration of Weights Accuracy E2 or coarser	Using E1 Class Standard weights and Electronic balance (Readability 0.01mg) As per OIML R111	2 g	0.02mg

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23	MECHANICAL-WEIGHTS	Calibration of Weights Accuracy E2 or coarser	Using E1 Class Standard weights and Electronic balance (Readability 0.01mg) As per OIML R111	2 mg	0.01mg
24	MECHANICAL-WEIGHTS	Calibration of Weights Accuracy E2 or coarser	Using E1 Class Standard weights and Electronic balance (Readability 0.01mg) As per OIML R111	20 g	0.02mg
25	MECHANICAL-WEIGHTS	Calibration of Weights Accuracy E2 or coarser	Using E1 Class Standard weights and Electronic balance (Readability 0.01mg) As per OIML R111	20 mg	0.01mg
26	MECHANICAL-WEIGHTS	Calibration of Weights Accuracy E2 or coarser	Using E1 Class Standard weights and Electronic balance (Readability 0.1mg) As per OIML R111	200 g	0.17mg
27	MECHANICAL-WEIGHTS	Calibration of Weights Accuracy E2 or coarser	Using E1 Class Standard weights and Electronic balance (Readability 0.01mg) As per OIML R111	200 mg	0.02mg

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28	MECHANICAL-WEIGHTS	Calibration of Weights Accuracy E2 or coarser	Using E1 Class Standard weights and Electronic balance (Readability 0.01mg) As per OIML R111	5 g	0.03mg
29	MECHANICAL-WEIGHTS	Calibration of Weights Accuracy E2 or coarser	Using E1 Class Standard weights and Electronic balance (Readability 0.01mg) As per OIML R111	5 mg	0.01mg
30	MECHANICAL-WEIGHTS	Calibration of Weights Accuracy E2 or coarser	Using E1 Class Standard weights and Electronic balance (Readability 0.01mg) As per OIML R111	50 g	0.1mg
31	MECHANICAL-WEIGHTS	Calibration of Weights Accuracy E2 or coarser	Using E1 Class Standard weights and Electronic balance (Readability 0.01mg) As per OIML R111	50 mg	0.02mg
32	MECHANICAL-WEIGHTS	Calibration of Weights Accuracy E2 or coarser	Using E1 Class Standard weights and Electronic balance (Readability 0.01mg) As per OIML R111	500 mg	0.02mg

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33	MECHANICAL-WEIGHTS	Calibration of Weights Accuracy E2 or coarser	Using E1 Class Standard weights and Electronic balance (Readability 0.01mg) As per OIML R111	100 mg	0.02mg
34	THERMAL-SPECIFIC HEAT & HUMIDITY	Calibration of Humidity Thermo Hygrometers, RH Meters with sensor	using digital humidity indicators & sensors by comparison method	23 %RH to 83 %RH @25°C	1%RH
35	THERMAL-SPECIFIC HEAT & HUMIDITY	Calibration of Temperature of Analog/Digital Thermo Hygrometers/ Thermo Hyrographs/Humidity Sensors/Data Loggers/Transmitters	Using digital Thermometer with RTD sensor by Comparison method	0 °C to 50 °C @ 50%RH	0.43°C
36	THERMAL-TEMPERATURE	Temperature Gauges,Analog - Digital Thermometer/Temperature controller-indicator with sensor (Rtd ,Thermo couple)	Using Liquid bath, Digital Thermometer with RTD sensor By comparison Method.	-70 °C to 50 °C	0.35°C

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37	THERMAL-TEMPERATURE	Glass Thermometer	Using Oil bath, Digital Thermometer with RTD sensor By comparison Method.	50 °C to 250 °C	0.6°C
38	THERMAL-TEMPERATURE	Glass Thermometer	Using Liquid bath, Digital Thermometer with RTD sensor By comparison Method.	-70 °C to 50 °C	0.6°C
39	THERMAL-TEMPERATURE	Temperature Gauges Analog - Digital Thermometer/Temperature controller-indicator with sensor (Rtd ,Thermo couple)	Using Dry Block source, Digital Thermometer with R type Sensor by comparison Method	250 °C to 600 °C	1.72°C
40	THERMAL-TEMPERATURE	Temperature Gauges Analog - Digital Thermometer/Temperature controller-indicator with sensor (Rtd ,Thermo couple)	Using Dry Block source, Digital Thermometer R type Sensor by comparison Method	600 °C to 1200 °C	1.9°C

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41	THERMAL-TEMPERATURE	Temperature Gauges,Analog - Digital Thermometer/Temperature controller /indicator with sensor (Rtd ,Thermo couple)	Using oil bath , Digital Thermometer with RTD sensor By comparison Method	50 °C to 250 °C	0.1°C

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Site Facility					
1	MECHANICAL-ACCELERATION AND SPEED	Calibration of Speed(Rotational) (Non-Contact type)	Using Non-contact Digital Tachometer. SANAS TR 45-01	> 10000 rpm to 25000 rpm	2.3 rpm
2	MECHANICAL-ACCELERATION AND SPEED	Drum speed of tyre endurance testing machine, centrifuge, RPM indicator (Non-Contact type)	Using Non-contact Digital Tachometer. SANAS TR 45-01 by comparison method	10 rpm to 100 rpm	0.69 rpm
3	MECHANICAL-ACCELERATION AND SPEED	Drum speed of tyre endurance testing machine, centrifuge, RPM indicator (Non-Contact type)	Using Non-contact Digital Tachometer. SANAS TR 45-01 by comparison method:	100 rpm to 10000 rpm	1 rpm
4	MECHANICAL-ACCELERATION AND SPEED	Verification of Test Speed of UTM /Material Testing Machines(Universal testing Machine-tensile tester, Plunger tester-vertical speed, Tyre static characteristics machine-vertical)	Using Digital height gauge and Stop Watch ASTM E 2658-15	6 mm/min to 500 mm/min	0.44%
5	MECHANICAL-DIMENSION (BASIC MEASURING INSTRUMENT, GAUGE ETC.)	Calibration of Rapid Plastimeter LVDT (length)	Using O grade Gauge Blocks by Comparison Method Based on ASTMD3194-04	0.25 mm to 1 mm	1.9µm

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6	MECHANICAL-DIMENSION (BASIC MEASURING INSTRUMENT, GAUGE ETC.)	Height Gauge (Dial/Digital) LC : 10 µm	Using Gauge Blocks /caliper checker by Comparison Method	0 to 300 mm	9.0µm
7	MECHANICAL-DIMENSION (BASIC MEASURING INSTRUMENT, GAUGE ETC.)	Verification of Displacement Measuring Systems and Devices Used in Material Testing Machines / UTM	Using Digital height gauge by comparison method	5 mm to 300 mm	0.2mm
8	MECHANICAL-HARDNESS TESTING MACHINES	Calibration of incremental Indentation Depth of IRHD Dead load Hardness Tester(Method N) and verification of Metrological Requirement as per ISO18898	Using Dimensional slips as per ISO 18898/ISO48 by comparison method	30 IRHD to 100 IRHD	0.18 IRHD
9	MECHANICAL-HARDNESS TESTING MACHINES	Calibration of incremental Indentation Depth of IRHD Micro Hardness Tester(Method M) and verification of Metrological Requirement as per ISO18898	Using dimensional slips as per ISO 18898/ISO48 by comparison method	30 IRHD to 100 IRHD	0.18 IRHD

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10	MECHANICAL-HARDNESS TESTING MACHINES	Calibration of Shore-AM, Micro hardness tester indentor extension	Uisng Grade-O gauge blocks as per ISO18898	0 to 100 Shore-A	0.25Shore-A
11	MECHANICAL-HARDNESS TESTING MACHINES	Calibration of spring force for Shore-AM Micro hardness tester in Shore-A scale	Using electronic weighing balance of 0.01 g readability as per ISO18898	0 to 100 Shore-A	0.25Shore AM
12	MECHANICAL-HARDNESS TESTING MACHINES	Calibration of Time Indicator for Rapid Plastimeter , PRI Ageing Chamber IRHD Micro , IRHD (N) Hardness Tester and Digital Shore-A/M hardness tester	Using digital Stopwatch Based on ASTM D 3194-04, ISO 18898 -2016 by comparison method	0 to 60 min	0.62s
13	MECHANICAL-HARDNESS TESTING MACHINES	Verification of Contact force Requirement as per ISO18898 of IRHD micro hardness tester	Using weighing Balance as per ISO 18898 by comparison method	8.3 mN	0.08mN
14	MECHANICAL-HARDNESS TESTING MACHINES	Verification of Total force on indentor as per ISO18898 of IRHD micro hardness tester	Using weighing Balance as per ISO 18898	153.3 mN	0.12mN

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15	MECHANICAL-PRESSURE INDICATING DEVICES	Hydraulic Pressure Dial & digital pressure gauges, pressure transmitters with indicator.	Using Hydraulic Hand pump and Master gauge Comparison Method DKD-R 6-1	> 200 bar to 700 bar	0.88%
16	MECHANICAL-PRESSURE INDICATING DEVICES	Hydraulic Pressure Dial & digital pressure gauges, pressure transmitters with indicator.	Using Hydraulic Hand pump and Master gauge (DKD-R 6-1)Comparison Method	0 to 200 bar	0.04%
17	MECHANICAL-PRESSURE INDICATING DEVICES	Pneumatic Pressure Dial & digital pressure gauges, pressure transmitters with indicator	Using Digital Pressure Calibrator Druck DPI 611(DKD-R 6-1)Comparison Method	0 to 20 bar	0.02%
18	MECHANICAL-TORQUE GENERATING DEVICES	Calibration of Mooney Viscometer by known Torque (8.3 N-m single torque (100 MU))	Using Certified weights, dimensional measurement as per ASTM D1646 clause 9	100 Mooney Units	0.084Mooney Units
19	MECHANICAL-TORQUE GENERATING DEVICES	Calibration of Moving Die Rheometer by Known Torque EKT1284R @0.5 degree Arc of oscillation	Using Certified MDR Torque Standard based on ASTM D5289-07a Clause – 6.5	23.8 /21.06 dN-m/lbf-in	0.20dN-m

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20	MECHANICAL-TORQUE GENERATING DEVICES	Calibration of Moving Die Rheometer by Known Torque EKT1284R @1 degree Arc of oscillation	Using Certified MDR Torque Standard based on ASTM D5289-07a Clause – 6.5	47.61/42.13 dN-m/lbf-in	0.20dN-m
21	MECHANICAL-TORQUE GENERATING DEVICES	Calibration of Moving Die Rheometer by Known Torque EKT1495 @0.5 degree Arc of oscillation	Using Certified MDR Torque Standard based on ASTM D5289-07a Clause – 6.5	20.73/18.35 dN-m/lbf-in	0.20dN-m
22	MECHANICAL-TORQUE GENERATING DEVICES	Calibration of Moving Die Rheometer by Known Torque EKT1495 @1 degree Arc of oscillation	Using Certified MDR Torque Standard based on ASTM D5289-07a Clause – 6.5	41.43/36.66 dN-m/lbf-in	0.20dN-m
23	MECHANICAL-TORQUE GENERATING DEVICES	Calibration of Moving Die Rheometer by Known Torque IGKA0039P @0.5 degree Arc of oscillation	Using Certified MDR Torque Standard based on ASTM D5289-07a Clause – 6.5	20.84 lbf-in /23.55 dNm	0.20dNm

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24	MECHANICAL-TORQUE GENERATING DEVICES	Calibration of Moving Die Rheometer by Known Torque IGKA0039P @1 degree Arc of oscillation	Using Certified MDR Torque Standard based on ASTM D5289-07a Clause – 6.5	41.68 lbf-in / 47.10 dNm	0.20dNm
25	MECHANICAL-TORQUE GENERATING DEVICES	Calibration of Moving Die Rheometer by Known Torque Sl.No. 130906 @1 degree Arc of oscillation	Using Certified MDR Torque Standard based on ASTM D5289-07a Clause – 6.5	41.69/36.89 dN-m/lbf-in	0.20dN-m
26	MECHANICAL-TORQUE GENERATING DEVICES	Calibration of Moving Die Rheometer by Known Torque Sl.No.130906 @0.5 degree Arc of oscillation	Using Certified MDR Torque Standard based on ASTM D5289-07a Clause – 6.5	20.86/18.46 dN-m/lbf-in	0.20dN-m
27	MECHANICAL-TORQUE GENERATING DEVICES	Calibration of Oscillating Disk Rheometer by Known Torque 12S593R @1 degree Arc of oscillation	Using Certified ODR Torque Standard based on ASTM D2084-clause 10.	15.31/13.55 dN-m/lbf-in	0.21dN-m

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28	MECHANICAL-TORQUE GENERATING DEVICES	Calibration of Oscillating Disk Rheometer by Known Torque 12S593R @3 degree Arc of oscillation	Using Certified ODR Torque Standard based on ASTM D2084-clause 10.	45.66/40.41 dN-m/lbf-in	0.21dN-m
29	MECHANICAL-TORQUE GENERATING DEVICES	Calibration of Oscillating Disk Rheometer by Known Torque 14601TQ @1 degree Arc of oscillation	Using Certified ODR Torque Standard based on ASTM D2084-clause 10.	20.71/18.33 dN-m/lbf-in	0.21 dN-m to 0.20 dN-m
30	MECHANICAL-TORQUE GENERATING DEVICES	Calibration of Oscillating Disk Rheometer by Known Torque 14601TQ @3 degree Arc of oscillation	Using Certified ODR Torque Standard based on ASTM D2084-clause 10.	62.07/54.93 dN-m/lbf-in	0.21dN-m
31	MECHANICAL-UTM, TENSION CREEP AND TORSION TESTING MACHINE	calibration of force of UTM in compression mode	Using Calibrated Integral Ring with dial gauge and compression pads as per IS1828-Part-1 2022	200 kN to 2000 kN	0.75 %
32	MECHANICAL-UTM, TENSION CREEP AND TORSION TESTING MACHINE	Calibration of Force of UTM in Tension mode	Using Certified Load cell with Indicator as per ISO 7500 / IS1828- Part-1 2022	100 N to 1000 N	0.30%

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33	MECHANICAL-UTM, TENSION CREEP AND TORSION TESTING MACHINE	Calibration of Force of UTM in Tension mode	Using Certified Load cell with Indicator as per ISO 7500 / IS1828- Part-1 2022	1 kN to 10 kN	0.30%
34	MECHANICAL-UTM, TENSION CREEP AND TORSION TESTING MACHINE	Calibration of Force of Plunger Tester/ UTM in Compression mode	Using Certified Load cell with Indicator as per ISO 7500 / IS1828- Part-1 2022	100 N to 10 kN	0.35%
35	MECHANICAL-UTM, TENSION CREEP AND TORSION TESTING MACHINE	Calibration of Force of Plunger Tester/ UTM in Compression mode	Using Certified Load cell with Indicator as per ISO 7500 / IS1828- Part-1 2022	2.5 kN to 100 kN	0.3%
36	MECHANICAL-UTM, TENSION CREEP AND TORSION TESTING MACHINE	Calibration of Force of Plunger Tester/ UTM in Compression mode	Using Certified Load cell with Indicator as per ISO 7500 / IS1828- Part-1 2022	2.5 kN to 200 kN	0.3%
37	MECHANICAL-WEIGHING SCALE AND BALANCE	Mass calibration of Electronic Balance/ Digital Weighing Machine Readability: 5 g	Using F1 class Weights as per OIML R76	1 kg to 20 kg	4g

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38	MECHANICAL-WEIGHING SCALE AND BALANCE	Mass calibration of Electronic Balance of Densimeter & Digital Weighing Machine (Readability= 0.000001gm)	Using E1 class Weights as per OIML R76	1 mg to 200 g	0.24mg
39	MECHANICAL-WEIGHING SCALE AND BALANCE	Mass calibration of Electronic Balance/ Digital Weighing Machine Readability 0.001g	Using E2 class Weights as per OIML R76	200 g to 1 kg	3mg
40	THERMAL-SPECIFIC HEAT & HUMIDITY	Calibration of Humidity of Climatic / Environmental chambers (Mutiposition Calibration)	Using digital Thermo Hygrometer and Thermo Logger with RTD Sensor by comparison method	23 %RH to 83 %RH @25°C	3.85%RH
41	THERMAL-SPECIFIC HEAT & HUMIDITY	Calibration of Temperature of Climatic / Environmental chambers	Using Multi point calibrator with PT100 sensors(min 9 sensor) by comparison method	-70 °C to 200 °C	2.01°C

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42	THERMAL-TEMPERATURE	Calibration of Temperature of chambers, Hot air ovens, furnaces, Water Bath, Auto claves (Non Medical purposes) ,Incubators(Non Medical purposes) and Deep Freezers (Single Position calibration)	Using Digital Thermometer with PT100 sensor by comparison method	-70 °C to 300 °C	0.85°C
43	THERMAL-TEMPERATURE	Calibration of Temperature of chambers, Hot air ovens, furnaces, Water Bath, Auto claves ,Incubators and Deep Freezers (Non Medical Purpose) (Multi Position calibration)	Using Multi point calibrator with PT100 (minimum 9 sensors) by comparison method	-70 °C to 300 °C	2.2°C

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44	THERMAL-TEMPERATURE	Calibration of Temperature Indicator with Rtd Sensor of Mooney Shearing Disc Viscometer,Moving Die Rheometer ,Oscillating Disk Rheometer, Rapid Plastimeter & PRI Ageing Chamber	Using Digital Thermometer with RTD Sensor by comparison method	100 °C to 200 °C	0.16°C
45	THERMAL-TEMPERATURE	Furnaces (Single position calibration)	Using Digital Thermometer with R Type Thermo Couple by comparison method	300 °C to 1200 °C	2.3°C
46	THERMAL-TEMPERATURE	Temperature Gauges Analog - Digital Thermometer/Temperature controller-indicator with sensor (Rtd ,Thermo couple)	Using Dry Block source, Digital Thermometer with R type Sensor by comparison Method	250 °C to 600 °C	1.72°C

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47	THERMAL-TEMPERATURE	Temperature Gauges Analog - Digital Thermometer/Temperature controller-indicator with sensor (Rtd ,Thermo couple)	Using Dry Block source, Digital Thermometer R type Sensor by comparison Method	600 °C to 1200 °C	1.9°C
48	THERMAL-TEMPERATURE	Temperature Gauges,Analog - Digital Thermometer/Temperature controller /indicator with sensor (Rtd ,Thermo couple)	Using oil bath , Digital Thermometer with RTD sensor By comparison Method	50 °C to 250 °C	0.1°C

*** CMCs represent expanded uncertainties expressed at approximately the 95% level of confidence, using a coverage factor of k = 2.**