

Schedule

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LABORATORY LOCATION/ CENTRAL OFFICE: 	Sendi Mahir Sdn Bhd No. 6,8,10 & 12 Jalan Kapar 27/89, Megah Industrial Park, 40400 Shah Alam, Selangor , 40400, SELANGOR MALAYSIA
ACCREDITED SINCE :	12 DECEMBER 2025
FIELD(S) OF TESTING:	MECHANICAL
FIELD(S) OF CALIBRATION:	FORCE TORQUE DIMENSIONAL MASS PRESSURE FLOW HEAT & TEMPERATURE VOLUME ELECTRICAL OPTICAL & PHOTOMETRIC

This laboratory has demonstrated its technical competence to operate in accordance with MS ISO/IEC 17025:2017 (ISO/IEC 17025:2017).

This laboratory's fulfillment of the requirements of ISO/IEC 17025 means the laboratory meets both the technical competence requirements and management system requirements that are necessary for it to consistently deliver technically valid test results and calibrations. The management system requirements in ISO/IEC 17025 are written in language relevant to laboratory operations and operate generally in accordance with the principles of ISO 9001 (see Joint ISO-ILAC-IAF Communiqué dated April 2017).

*** The uncertainty covered by the CMC is expressed as the expanded uncertainty corresponding to a coverage probability of approximately 95 % and have a coverage factor of k=2 unless stated otherwise.**

CENTRAL LOCATION:	Sendi Mahir Sdn Bhd No. 6,8,10 & 12 Jalan Kapar 27/89, Megah Industrial Park, 40400 Shah Alam, Selangor , 40400, Selangor
FIELD(S) OF TESTING :	MECHANICAL,

SCOPE OF TESTING : MECHANICAL

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Material / Product Tested	Type Of Test / Properties Measured / Range Of Measurement	Standard Test Methods / Equipment / Techniques
Reinforcement Bar	Tensile Test (Yield strength, Ratio of tensile strength/ yield strength, Percentage of total elongation at maximum force)	Based on MS 146:2014 (Cl. 7.3.3) BS 4449:2005+A3:2016 (Clause 7.2.3) ISO 6892- 1:2019

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FIELD(S) OF CALIBRATION :	FORCE, TORQUE, DIMENSIONAL, MASS, PRESSURE, FLOW, HEAT & TEMPERATURE, VOLUME, ELECTRICAL, OPTICAL & PHOTOMETRIC

SCOPE OF CALIBRATION : FORCE

Instrument Calibrated/Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty (\pm)*	Remarks
Push-pull Gauge	0 kgf to 100 kgf	0.5 % of reading	Calibrated using Deadweight Standard Weight with reference to ISO 376:2011
Tension Gauge	0 kgf to 100 kgf	0.5 % of reading	Calibrated using Deadweight Standard Weight with reference to ISO 376:2011
Shore Hardness Tester (spring Load) 1. Type A, B, E, O	0 to 100 shore hardness index	0.24 shore hardness index	Calibrated using Durometer tester with reference to ASTM D 2240:2015
Shore Hardness Tester (spring Load) 2. Type C, D, Do	0 to 100 shore hardness index	0.23 shore hardness index	Calibrated using Durometer tester with reference to ASTM D 2240:2015
Shore Hardness Tester (spring Load) 3. Type Oo	0 to 100 shore hardness index	0.23 shore hardness index	Calibrated using Durometer tester with reference to ASTM D 2240:2015
Adhesion Tester (pressure)	0 N/mm ² to 25 N/mm ²	0.14 N/mm ²	Calibrated using Load Cell with reference to ASTM D 4541:2017

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Tension	0 kgf to 500 kgf 500 kgf to 1 tonf 1 tonf to 5 tonf 5 tonf to 10 tonf 10 tonf to 30 tonf	15 gf 0.58 kgf 1.7 kgf 7 kgf 28 kgf	Calibrated using Load Cell, Proving Ring and Tension/ Compression Testing Machine with reference to ISO 376:2011
Load Measuring Device	0 kgf to 500 kgf 500 kgf to 1 tonf 1 tonf to 5 tonf 5 tonf to 10 tonf 10 tonf to 30 tonf	15 gf 0.58 kgf 1.7 kgf 7 kgf 28 kgf	Calibrated using Load Cell, Proving Ring and Tension/ Compression Testing Machine with reference to ISO 376:2011
	0 kgf to 500 kgf 500 kgf to 1 tonf 1 tonf to 5 tonf 5 tonf to 10 tonf 10 tonf to 30 tonf 30 tonf to 40 tonf	15 gf 0.56 kgf 1.7 kgf 7 kgf 28 kgf 28 kgf	Calibrated using Load Cell, Proving Ring and Tension/ Compression Testing Machine with reference to ISO 376:2011
Compression	0 kgf to 500 kgf 500 kgf to 1 tonf 1 tonf to 5 tonf 5 tonf to 10 tonf 10 tonf to 30 tonf 30 tonf to 40 tonf	15 gf 0.56 kgf 1.7 kgf 7 kgf 28 kgf 28 kgf	Calibrated using Load Cell, Proving Ring and Tension/ Compression Testing Machine with reference to ISO 376:2011

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SCOPE OF CALIBRATION : TORQUE

Instrument Calibrated/Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty (\pm)*	Remarks
Torque Measuring Device	0 N.m to 10 N.m	0.49 % of reading	Calibration using a double-ended torque beam with reference to BS 7882:2017.
	2 N.m to 10 N.m	0.62 % of reading	Calibration using reference torque transducers with reference to BS 7882:2017.
	Above 10 N.m to 100 N.m	0.18 % of reading	
	Above 100 N.m to 500 N.m	0.38 % of reading	
	Above 500 N.m to 1,000 N.m	0.22 % of reading	
Hand Torque Tools	0.2 N.m to < 10 N.m	0.9 % of reading	Calibration using reference torque transducers with reference to ISO 6789-2:2017.
	10 N.m to < 100 N.m	1.0 % of reading	
	100 N.m to < 500 N.m	1.0 % of reading	
	500 N.m to < 1,000 N.m	0.5 % of reading	
	1,000 N.m to 3,000 N.m	0.3 % of reading	

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SCOPE OF CALIBRATION : DIMENSIONAL

Instrument Calibrated/Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty (\pm)*	Remarks
Plain Plug Gauge / Pin Gauge (diameter)	0 mm to 10 mm 10 mm to 100 mm 100 mm to 300 mm	0.6 μ m 1.0 μ m 1.7 μ m	Calibrated using ULM
Plain Ring Gauge (diameter)	1.7 mm to 10 mm 10 mm to 100 mm 100 mm to 300 mm	0.4 μ m 0.6 μ m 1.0 μ m	Calibrated using ULM
External Micrometer Up To 25 Mm 50 Mm Frame 100 Mm Frame 150 Mm Frame 200 Mm Frame 300 Mm Frame 400 Mm Frame 500 Mm Frame 600 Mm Frame	25 mm traverse 25 mm traverse	0.5 μ m 1.1 μ m 1.3 μ m 1.3 μ m 1.5 μ m 2.0 μ m 2.0 μ m 2.3 μ m 2.5 μ m	Calibrated using Gauge Blocks based on BS EN ISO 3611:2010
Caliper Checker	0 mm to 300 mm 300 mm to 600 mm	3 μ m 3 μ m	Calibrated using Gauge Blocks based on ISO 7863:1984
Dial / Digimatic & Vernier Caliper	0 mm to 200 mm 200 mm to 450 mm 450 mm to 1,000 mm 1,000 mm to 1,500 mm 1,500 mm to 2,000 mm	6 μ m 7 μ m 8 μ m 17 μ m 23 μ m	Calibrated using Gauge Blocks based on BS EN ISO 13385-1:2019
Dial Gauge	0 mm to 50 mm	1.5 μ m	Calibrated using Dial Gauge Calibrator based on BS EN ISO 463:2006
Dial Test Indicator	0 mm to 50 mm	1.5 μ m	Calibrated using Dial Gauge Calibrator based on BS EN ISO 9493:2010
Dial / Digimatic & Vernier Height Gauge	0 mm to 450 mm 450 mm to 600 mm 600 mm to 1,000 mm	6 μ m 8 μ m 9 μ m	Calibrated using Gauge Blocks based on BS EN ISO 13225:2012
Height Setting Micrometer & Riser Block	0 mm to 600 mm	4 μ m	Calibrated using Gauge Blocks based on ISO 7863:1984
Screw Plug (simple Pitch Diameter)	0 mm to 20 mm 20 mm to 100 mm	0.6 μ m 1.1 μ m	Calibrated using ULM

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Instrument Calibrated/Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty (\pm)*	Remarks
Gauge Block Set Grade - $\bar{0}$ -™ And Below	0 mm to 10 mm 10 mm to 25 mm 25 mm to 50 mm 50 mm to 75 mm 75 mm to 100 mm	0.10 μ m 0.10 μ m 0.11 μ m 0.12 μ m 0.13 μ m	Calibrated using Gauge Blocks based on ISO 3650:1998
Steel Rulers	0 mm to 1,000 mm 1,000 mm to 3,000 mm	0.2 mm 0.3 mm	Calibrated using Standard Scale based on JIS B 7516:2005
Vee Blocks	220 mm x 160 mm x 80 mm	3 μ m	Calibrated using Dial Test Indicator based on JIS B 7540:1972
Bubble Levelling Gauge	Height in respect to length 0.02 mm/m to 0.25 mm/m	6 μ m/m	Calibrated using Bubble Tube Tester and Dial Test Indicator based on JIS B 7510:1993
Cylinder Gauge	0 mm to 600 mm	1.2 μ m	Calibrated using ULM and Gauge Blocks based on JIS B 7515:1982
Internal Micrometer	0 mm to 25 mm 25 mm to 100 mm 100 mm to 600 mm	1.5 μ m 2 μ m 10 μ m	Calibrated using ULM and Gauge Blocks based on BS 959:2008
Setting Rod	0 mm to 25 mm 25 mm to 100 mm 100 mm to 600 mm	0.5 μ m 0.5 μ m 2.3 μ m	Calibrated using ULM and Gauge Blocks
Thickness Coating Film	0 mm to 2.5 mm	0.6 μ m	Calibrated using ULM and Gauge Blocks based on BS 5411
Pitch Gauge	0 mm to 12 mm	10 μ m	Calibrated using Profile Projector
Radius Gauge	0 mm to 100 mm	10 μ m	Calibrated using Profile Projector
Test Sieves	0 mm to 200 mm	10 μ m	Calibrated using Profile Projector
M μ Checker	0 mm to 3 mm	0.2 μ m	Calibrated using Gauge Blocks based on JIS B 7536 : 1982
Feeler Gauge (thickness)	0.01 mm to 10 mm	2 μ m	Calibrated using Precision Micrometer based on BS 957:2008

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Instrument Calibrated/Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty (\pm)*	Remarks
Dial Gauge Calibrator	0 mm to 25 mm	0.4 μ m	Calibrated using Precision Digital Linear Probe based on JIS B 7519:1994
Depth Gauge	0 mm to 25 mm 25 mm to 100 mm 100 mm to 300 mm	2.0 μ m 2.0 μ m 3.0 μ m	Calibrated using Gauge Blocks based on BS 6468:2008
Thickness Gauge	0 mm to 10 mm 10 mm to 65 mm	1.2 μ m 1.5 μ m	Calibrated using Gauge Blocks based on JIS B 7519:1994
Snap Gauge	0 mm to 100 mm 100 mm to 200 mm	0.3 μ m 0.8 μ m	Calibrated using ULM and Setting Ring
Screw Ring (simple Pitch Diameter)	0 mm to 20 mm 20 mm to 100 mm	0.5 μ m 1.0 μ m	Calibrated using ULM
Taper Plain Plug Diameter	0 mm to 20 mm 20 mm to 100 mm 100 mm to 200 mm 200 mm to 300 mm	0.5 μ m 0.6 μ m 0.9 μ m 1.0 μ m	Calibrated using ULM and Setting Ring
Taper Plain Plug Angle	1.78°	0.003°	Calibrated using ULM
Taper Plain Ring Diameter	0 mm to 20 mm 20 mm to 100 mm 100 mm to 300 mm	0.5 μ m 1.1 μ m 1.0 μ m	Calibrated using ULM and Setting Ring
Taper Plain Ring Angle	1.78°	0.003°	Calibrated using ULM
Taper Thread Plug Pitch Diameter	0 mm to 20 mm 20 mm to 100 mm	0.5 μ m 1.0 μ m	Calibrated using ULM
Taper Thread Plug Angle	1.78°	0.002°	Calibrated using ULM
Taper Thread Ring Pitch Diameter	0 mm to 20 mm 20 mm to 50 mm 50 mm to 100 mm	0.5 μ m 1.0 μ m 1.0 μ m	Calibrated using ULM and Setting Ring
Taper Thread Ring Angle	1.78°	0.003°	Calibrated using ULM
Taper Thread Ring Long Gauge Block	125 mm 150 mm 175 mm 200 mm 250 mm 300 mm 400 mm 500 mm	0.7 μ m 0.8 μ m 0.8 μ m 0.9 μ m 1.0 μ m 1.6 μ m 1.4 μ m 2.5 μ m	Calibrated using ULM and Gauge Blocks

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Instrument Calibrated/Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty (\pm)*	Remarks
Measuring Tape 1. Steel Type	Up to 1,000 mm 2,000 mm 5,000 mm 8,000 mm 10,000 mm 20,000 mm 30,000 mm 50,000 mm 100,000 mm	0.12 mm 0.18 mm 0.28 mm 0.35 mm 0.39 mm 0.56 mm 0.68 mm 0.88 mm 1.2 mm	Calibrated using scale and tape calibration unit based on JIS B 7512:2018
Measuring Tape 2. Fabric Type	Up to 1,000 mm 2,000 mm 5,000 mm 8,000 mm 10,000 mm 20,000 mm 50,000 mm 100,000 mm	0.13 mm 0.18 mm 0.28 mm 0.36 mm 0.40 mm 0.56 mm 0.89 mm 1.3 mm	Calibrated using scale and tape calibration unit based on JIS B 7522:2016
Holtest	0 mm to 175 mm 175 mm to 200 mm	1 μ m 2 μ m	Calibrated using Master Ring Gauge based on DIN 863-4:1999 for repeatability test only
Bevel Protractor	0° to 360°	0.6°	Calibrated using inclinometer and Feeler Gauge based on BS 1685:2008
Geometric Measurement (length) 1) 2d & 3 D Measurement	Contact Up to 1000 mm	0.0064 mm	Coordinate Measuring Machine
Geometric Measurement (length) 2) Single Direct Measurement	Contact Up to 600 mm	0.003 mm	Length Measuring Instrument
	Non-contact Up to 100 mm	0.0056 mm	Profile Projector
Geometric Measurement (diameter) 1) 2d & 3 D Measurement	Contact Up to 1000 mm	0.0064 mm	Coordinate Measuring Machine
Geometric Measurement (diameter) 2) Single Direct Measurement	Contact Up to 600 mm	0.003 mm	Length Measuring Instrument
	Non-contact Up to 100 mm	0.0056 mm	Profile Projector
Geometric Measurement (angle)	Up to 360- \bullet °	0.013- \bullet °	Calibrated using Coordinate Measuring Machine, Profile Projector
Geometric Measurement Plane Flatness.	Up to 1000 mm	0.0069 mm	Calibrated using: Coordinate Measuring Machiner

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Instrument Calibrated/Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty (\pm)*	Remarks
	Up to 1000 mm	0.0057 mm	Dial Test indicator
Geometric Measurement Straightness	Up to 1000 mm	0.0069 mm	Coordinate Measuring Machine
Geometric Measurement Parallelism	Up to 1000 mm	0.010 mm	Coordinate Measuring Machine
Geometric Measurement Squareness	Up to 1000 mm	0.010 mm	Coordinate Measuring Machine

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SCOPE OF CALIBRATION : MASS

Instrument Calibrated/Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty (\pm)*	Remarks
Standard Weight	1 mg	4 μ g	Calibrated using Standard Weight Sets and Mass Comparator based on OIML R111-2:2004
	2 mg	4 μ g	
	5 mg	4 μ g	
	10 mg	5 μ g	
	20 mg	5 μ g	
	50 mg	5 μ g	
	100 mg	5 μ g	
	200 mg	6 μ g	
	500 mg	7 μ g	
	1 g	8 μ g	
	2 g	10 μ g	
	5 g	14 μ g	
	10 g	20 μ g	
	20 g	30 μ g	
	50 g	78 μ g	
	100 g	0.15 mg	
	200 g	0.27 mg	
	500 g	0.72 mg	
	1 kg	1.3 mg	
	2 kg	2.8 mg	
5 kg	7.5 mg		
10 kg	26 mg		
20 kg	52 mg		
25 kg	0.28 g		

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SCOPE OF CALIBRATION : PRESSURE

Instrument Calibrated/Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty (\pm)*	Remarks
Pressure Measuring Device Vacuum	0 bar to -0.95 bar	0.42 mbar	Calibrated using Multifunction Calibrator based on AS 1349:2018
Pressure Measuring Device Pneumatic	0 bar to 20 bar	7 mbar	Calibrated using Multifunction Calibrator based on AS 1349:2018
Pressure Measuring Device Hydraulic	1 bar to 700 bar 700 bar to 1,100 bar	0.015% of reading 0.015% of reading	Calibrated using Deadweight Tester with reference to AS 1349:2018

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SCOPE OF CALIBRATION : FLOW

Instrument Calibrated/Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty (\pm)*	Remarks
Anemometer	0.15 m/s to 5 m/s 5 m/s to 20 m/s 20 m/s to 45 m/s	0.12 m/s 0.26 m/s 0.59 m/s	Calibrated using Anemometer Calibrator

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SCOPE OF CALIBRATION : HEAT & TEMPERATURE

Instrument Calibrated/Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty (\pm)*	Remarks
Temperature Measuring Device	-20 °C to 50 °C	0.2° C	Calibrated using Temperature Recorder, PRT, Humidity Chamber and Thermohygrometer
Relative Humidity Measuring Device	20 %RH to 95 %RH	2 %RH	Calibrated using Temperature Recorder, PRT, Humidity Chamber and Thermohygrometer
Liquid-in-glass Thermometer (total & Partial Immersion)	-30 °C to 0 °C 0 °C to 250 °C 250 °C to 400 °C	0.03 °C 0.04 °C 0.11 °C	Calibrated using Resistance Thermometer Display & PRT, Temperature Recorder, Constant Stirred Low Temperature Liquid Bath, Constant Stirred High Temperature Liquid Bath, Metal Block Bath and Ice Point
Temperature Sensor (thermocouple, Prt, Mechanical Thermometer & Thermistor)	-80 °C to -50 °C -50 °C to -30°C -30 °C to 0 °C 0 °C to 250 °C 250 °C to 400 °C 400 °C to 660 °C 660 °C to 800 °C 800 °C to 1,000 °C 1,000 °C to 1,200 °C	0.08 °C 0.06 °C 0.03 °C 0.04 °C 0.11 °C 0.13 °C 2.1 °C 3.1 °C 4.0 °C	Calibrated using Resistance Thermometer Display & PRT, Type R Thermocouple, Temperature Recorder, Constant Stirred Low Temperature Liquid Bath, Constant Stirred High Temperature Liquid Bath, Temperature Block Calibrator and Ice Point

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Instrument Calibrated/Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty (\pm)*	Remarks
Temperature Block Calibrator	-80 °C to -50 °C -50 °C to 660 °C 660 °C to 1,200 °C	0.06 °C 0.01 °C 2.7 °C	Calibrated using PRT, Thermocouple Type R and Temperature Display with reference to EA10/13:1999
Liquid Bath	-50 °C to 300 °C	0.01 °C	Calibrated using PRT, Thermocouple Type R and Temperature Display with reference to EA10/13:1999
Temperature Indicating Device Resistance Type Pt100	-200 °C to 850 °C	0.1 °C	Calibrated by electrical simulation using Calibrator and Ice point
Thermocouple Type K	-270 °C to -100 °C -100 °C to 1,370 °C	1.5 °C 0.1 °C	Calibrated by electrical simulation using Calibrator and Ice point
	270 °C to -100 °C -100 °C to 1,370 °C	1.5 °C 0.1 °C	Calibrated by electrical measurement using Multimeter and Ice Point with reference to ITS 90:1990
Thermocouple Type J	-210 °C to 1,200 °C	0.1 °C	Calibrated using PRT, Thermocouple Type R and Temperature Display with reference to EA10/13:1999 Calibrated by electrical simulation using Calibrator and Ice point
	-210 °C to 1,200 °C	-210 °C to 1,200 °C	Calibrated by electrical measurement using Multimeter and Ice Point with reference to ITS 90:1990

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Instrument Calibrated/Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty (\pm)*	Remarks
Thermocouple Type T	-270 °C to -100 °C	0.5 °C	Calibrated using PRT, Thermocouple Type R and Temperature Display with reference to EA10/13:1999 Calibrated by electrical simulation using Calibrator and Ice point
	100 °C to 400 °C	0.1 °C	Calibrated using PRT, Thermocouple Type R and Temperature Display with reference to EA10/13:1999 Calibrated by electrical simulation using Calibrator and Ice point
	-270 °C to -100 °C -100 °C to 400 °C	0.5 °C 0.1 °C	Calibrated by electrical measurement using Multimeter and Ice Point with reference to ITS 90:1990
Thermocouple Type E	-270 °C to -100 °C	0.3 °C	Calibrated using PRT, Thermocouple Type R and Temperature Display with reference to EA10/13:1999 Calibrated by electrical simulation using Calibrator and Ice point
	-100 °C to 1,000 °C	0.1 °C	Calibrated using PRT, Thermocouple Type R and Temperature Display with reference to EA10/13:1999 Calibrated by electrical simulation using Calibrator and Ice point

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	-270 °C to -100 °C -100 °C to 1,000 °C	0.3 °C 0.1 °C	Calibrated by electrical measurement using Multimeter and Ice Point with reference to ITS 90:1990
Thermocouple Type R	0 °C to 500 °C	0.4 °C	Calibrated using PRT, Thermocouple Type R and Temperature Display with reference to EA10/13:1999 Calibrated by electrical simulation using Calibrator and Ice point
	500 °C to 1,760 °C 0 °C to 500 °C	0.2 °C 0.4 °C	Calibrated by electrical measurement using Multimeter and Ice Point with reference to ITS 90:1990
Thermocouple Type S	0 °C to 500 °C 500 °C to 1,760 °C	0.4 °C 0.1 °C	Calibrated using PRT, Thermocouple Type R and Temperature Display with reference to EA10/13:1999 Calibrated by electrical simulation using Calibrator and Ice point
	500 °C to 1,760 °C	0.2 °C	Calibrated by electrical measurement using Multimeter and Ice Point with reference to ITS 90:1990
Thermocouple Type N	-100 °C to 1,300 °C	0.1 °C	Calibrated using PRT, Thermocouple Type R and Temperature Display with reference to EA10/13:1999 Calibrated by electrical simulation using Calibrator and Ice point

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Instrument Calibrated/Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty (\pm)*	Remarks
	-270 °C to -100 °C -100 °C to 1,300 °C	1.5 °C 0.1 °C	Calibrated by electrical measurement using Multimeter and Ice Point with reference to ITS 90:1990
Thermocouple Type B	600 °C to 1,820 °C 0 °C to 500 °C	0.3 °C 0.4 °C	Calibrated by electrical measurement using Multimeter and Ice Point with reference to ITS 90:1990
Temperature Calibrator Resistance Type Pt100	-200 °C to 850 °C	0.1 °C	Calibrated by electrical measurement using Multimeter and Ice Point with reference to ITS 90:1990
Temperature Calibrator Resistance Type Jpt100	-200 °C to 500 °C	0.1 °C	Calibrated by electrical measurement using Multimeter and Ice Point with reference to ITS 90:1990
Radiation Thermometer	-20 °C to 150 °C 150 °C to 200 °C 200 °C to 400 °C 400 °C to 600 °C 600 °C to 800 °C 800 °C to 1,000 °C 1,000 °C to 1,200 °C	0.45 °C 0.86 °C 1.4 °C 1.9 °C 2.7 °C 3.4 °C 4.7 °C	Calibrated using Temperature Recorder, Thermocouple, Single Blackbody Calibrator and Cyclops Spherical Blackbody Source with reference to ASTM E 1256:2017

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SCOPE OF CALIBRATION : VOLUME

Instrument Calibrated/Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty (\pm)*	Remarks
Burette	1 ml to 10 ml 10 ml to 25 ml 25 ml to 50 ml 50 ml to 100 ml	6 μ l 20 μ l 30 μ l 70 μ l	Calibrated using Analytical Balance and Distilled Water based on ISO 385:2005(E)
Measuring Cylinder	5 ml 5 ml to 10 ml 10 ml to 25 ml 25 ml to 100 ml 100 ml to 250 ml 250 ml 500 ml 500 ml to 1,000 ml 1,000 ml to 2,000 ml	40 μ l 70 μ l 0.2 ml 0.4 ml 0.7 ml 1.6 ml 3 ml 5 ml	Calibrated using Analytical Balance and Distilled Water based on ISO 4788:2005(E)
One Mark Volumetric Flask	5 ml to 10 ml 10 ml to 25 ml 25 ml to 100 ml 100 ml to 500 ml 500 ml 2,000 ml	20 μ l 30 μ l 60 μ l 0.2 ml 0.3 ml	Calibrated using analytical Balance and Distilled Water based on ISO 1042:1998
Pipette	Type 1, Type 2, Type 3 0.5 ml to 1 ml 1 ml to 2 ml 2 ml to 5 ml 5 ml to 10 ml 10 ml to 25 ml	4 μ l 7 μ l 15 μ l 29 μ l 57 μ l	Calibrated using Analytical Balance and Distilled Water based on ISO 835:2007(E) Calibrated usi
Piston Operated Volumetric Apparatus (pova)	10 μ l to 200 μ l 200 μ l to 500 μ l 500 μ l to 1,000 μ l 1 ml to 2 ml 2 ml to 5 ml 5 ml to 10 ml	0.10 μ l 0.12 μ l 0.15 μ l 0.25 μ l 0.57 μ l 1.20 μ l	Calibrated using Analytical Balance and Distilled Water based on ISO 8655-6:2002 and ISO 8655-2:2002
Viscosity Flow Cup I. Ford Cup	Cup no. 1 (10 cSt to 35 cSt) Cup no. 2 (25 cSt to 120 cSt) Cup no. 3 (49 cSt to 220 cSt) Cup no. 4 (70 cSt to 370 cSt) Cup no. 5 (200 cSt to 1,200 cSt)	0.07 cSt 0.2 cSt 0.5 cSt 0.6 cSt 2 cSt	Calibrated using Standard Solution and Stop Watch based on ASTM D 1200:2010 (reapproved 2018)

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Instrument Calibrated/Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty (\pm)*	Remarks
Viscosity Flow Cup li. Zahn Cup	Cup no.1 (5 cSt to 60 cSt) Cup no. 2 (20 cSt to 250 cSt) Cup no. 3 (100 cSt to 800 cSt) Cup no. 4 (200 cSt to 1,200 cSt) Cup no. 5 (400 cSt to 1,800 cSt)	0.1 cSt 0.5 cSt 1.5 cSt 2 cSt 3 cSt	Calibrated using Standard Solution and Stop Watch based on ASTM D 4212:2016
Hydrometer	0.600 g/ml to 1.500 g/ml	0.7 mg/ml	Compare using Hydrometer based on BS 718:1991

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SCOPE OF CALIBRATION : ELECTRICAL

Instrument Calibrated/Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty (\pm)*	Remarks
Time & Frequency Tachometer (noncontact)	0 rpm to 1,000 rpm 1,000 rpm to 10,000 rpm 10,000 rpm to 20,000 rpm	1.1 rpm 2.3 rpm 4.2 rpm	Calibrated using Tachometer Calibrator and Tachometer based on ASTM F2046:2011
Time & Frequency Tachometer (contact)	0 rpm to 1,000 rpm 1,000 rpm to 10,000 rpm	1.1 rpm 2.3 rpm	Calibrated using Tachometer Calibrator and Tachometer based on ASTM F2046:2011
Time & Frequency Stopwatch & Timer	10 s to 60 s 60 s to 300 s 300 s to 600 s 600 s to 900 s 900 s to 1800 s 0.5 h to 1 h 1 h to 3 h	50 ms 60 ms 60 ms 60 ms 60 ms 90 ms 0.10 s	Pendulum 6689, HP 8662 & HP 53132A
Basic Dc-If Measuring Equipment (multimeter, Clamp Meter, Data Acquisition, Etc) Dc Voltage	0 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 1000 V	8.5 mV/V + 0.46 mV 5.6 mV/V + 0.91 mV 3.7 mV/V + 5.9 mV 3.9 mV/V + 6.3 mV 5.6 mV/V + 59 mV 7.2 mV/V + 0.64 mV	Generating using a Multifunction / Multiproduct Calibrator
Basic Dc-If Measuring Equipment (multimeter, Clamp Meter, Data Acquisition, Etc) Dc Current	-300 mA to -220 mA 220 mA to 220 mA -2.2 mA to 2.2 mA -22 mA to 22 mA -220 mA to 220 mA -2.2 A to 2.2 A 20 A to -10 A -10 A to -3 A 3 A to 10 A 10 A to 20 A 20 A to 30 A	0.14 mA/A 70 mA/A 39 mA/A 37 mA/A 49 mA/A 86 mA/A 0.55 mA/A 0.55 mA/A 0.55 mA/A 0.55 mA/A 2.0 mA/A	Generating using a Multifunction / Multiproduct Calibrator
Basic Dc-If Measuring Equipment (multimeter, Clamp Meter, Data Acquisition, Etc) Ac Voltage	0 V to 1100 V	See Matrix A	Generating using a Multifunction / Multiproduct Calibrator

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Instrument Calibrated/Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty (\pm)*	Remarks
Basic Dc-If Measuring Equipment (multimeter, Clamp Meter, Data Acquisition, Etc) Ac Current	0 A to 50 A	See Matrix B	Generating using a Multifunction / Multiproduct Calibrator
Basic Dc-If Measuring Equipment (multimeter, Clamp Meter, Data Acquisition, Etc) Dc Current Clamp	10 A to 16.5 A 16.5 A to 150 A 150 A to 1000 A	2.8 mA/A + 3.6 mA 2.9 mA/A + 19 mA 3.2 mA/A + 17 mA	Generating using a combination of Multiproduct Calibrator & Current Coil
Basic Dc-If Measuring Equipment (multimeter, Clamp Meter, Data Acquisition, Etc) Ac Current Clamp	<u>45 Hz to 65 Hz</u> 10 A to 16.5 A 16.5 A to 150 A 150 A to 1000 A	3.3 mA/A + 5.0 mA 3.5 mA/A + 32 mA 3.5 mA/A + 0.12 A	Generating using a combination of Multiproduct Calibrator & Current Coil
	<u>65 Hz to 440 Hz</u> 10 A to 16.5 A 16.5 A to 150 A	9.3 mA/A + 5.2 mA 9.8 mA/A + 25 mA	
Basic Dc-If Measuring Equipment (multimeter, Clamp Meter, Data Acquisition, Etc) Frequency	0.5 Hz to 10 MHz	25 μ Hz/Hz	Generating using a Multiproduct Calibrator
Basic Dc-If Measuring Equipment (multimeter, Clamp Meter, Data Acquisition, Etc) Resistance fixed Resistance	0 ?	10 m?	Generating using a Multifunction / Multiproduct Calibrator
	1 m?	0.20 m?	
	10 m?	1.0 m?	
	1 ?	95 m?	
	10 ?	0.23 m?	
	100 ?	1.0 m?	
	1 k?	8.5 m?	
	10 k?	85 m?	
	100 k?	1.1 ?	
	1 M?	20 ?	
	10 M?	0.40 k?	
	100 M?	10 k?	
	1.9 ?	0.18 m?	
	19 ?	0.44 m?	
	190 ?	1.9 m?	
1.9 k?	16 m?		
19 k?	0.16 ?		
190 k?	2.1 ?		
1.9 M?	40 ?		
19 M?	0.95 k?		

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Instrument Calibrated/Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty (\pm)*	Remarks
Basic Dc-If Measuring Equipment (multimeter, Clamp Meter, Data Acquisition, Etc) Resistance variable Resistance	0 ? to 40 ? 40 ? to 400 ? 400 ? to 4 k? 4 k? to 40 k? 40 k? to 400 k? 400 k? to 4 M? 4 M? to 40 M? 40 M? to 400 M?	0.25 m?/? 0.25 m?/? 0.15 m?/? 0.20 m?/? 0.20 m?/? 0.50 m?/? 1.5 m?/? 2.6 m?/?	Generating using a Multifunction / Multiproduct Calibrator
Basic Dc-If Measuring Equipment (multimeter, Clamp Meter, Data Acquisition, Etc) Capacitance (Variable)	0.5 nF to 4 nF 4 nF to 40 nF 40 nF to 400 nF 400 nF to 4 mF 4 mF to 40 mF 40 mF to 400 mF 400 mF to 4 mF 4 mF to 40 mF	3.4 mF/F 3.0 mF/F 3.0 mF/F 4.0 mF/F 5.0 mF/F 5.0 mF/F 5.0 mF/F 10 mF/F	Generating using a Multifunction / Multiproduct Calibrator
Basic Dc-If Generating Equipment (Calibrator, Power Supply, Etc) Dc Voltage	0 to 200 mV 200 mV to 2 V 2 V to 20 V 20 V to 200 V 200 V to 1000 V	5.6 mV/V + 0.12 mV 3.9 mV/V + 0.58 mV 3.9 mV/V + 5.6 mV 6.3 mV/V + 50 mV 6.1 mV/V + 0.68 mV	Measuring using a Precision Multimeter
Basic Dc-If Generating Equipment (Calibrator, Power Supply, Etc) Dc Current	0 to 200 mA 200 mA to 2 mA 2 mA to 20 mA 20 mA to 200 mA 200 mA to 2A	13 mA/A + 0.64 nA 13 mA/A + 6.4 nA 15 mA/A + 63 nA 54 mA/A + 0.98 mA 0.21 mA/A + 18 mA	Measuring using a Precision Multimeter
Basic Dc-If Generating Equipment (Calibrator, Power Supply, Etc) Ac Voltage	0 to 1000 V	See Matrix C	Measuring using a Precision Multimeter
Basic Dc-If Generating Equipment (Calibrator, Power Supply, Etc) Ac Current	0 to 2 A	See Matrix D	Measuring using a Precision Multimeter
Basic Dc-If Generating Equipment (Calibrator, Power Supply, Etc) Resistance	0 ? to 2 ? 2 ? to 20 ? 20 ? to 200 ? 200 ? to 2 k? 2 k? to 20 k? 20 k? to 200 k? 200 k? to 2 M? 2 M? to 20 M? 20 M? to 100 M?	7.3 m?/? + 25 m? 9.4 m?/? + 45 m? 9.0 m?/? + 62 m? 9.1 m?/? + 0.58 m? 9.1 m?/? + 5.8 m? 9.1 m?/? + 58 m? 10 m?/? + 1.1 ? 23 m?/? + 0.11 k? 0.14 m?/? + 11 k?	Measuring using a Precision Multimeter

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Instrument Calibrated/Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty (\pm)*	Remarks
Basic Dc-If Generating Equipment (Calibrator, Power Supply, Etc) Capacitance (At 1khz)	1 nF to 10 nF 10 nF to 100 nF 100 nF to 1 mF	0.50 mF/F 0.50 mF/F 0.50 mF/F	Measuring using a Precision LCR Meter
Basic Dc-If Generating Equipment (Calibrator, Power Supply, Etc) Inductance (At 1khz)	100 mH to 1 mH 1 mH to 10 mH 10 mH to 100 mH	3.0 mH/H 3.0 mH/H 3.0 mH/H	Measuring using a Precision LCR Meter
Specific Dc-If Equipment Earth Resistance	0.1 Ω to 1 k Ω 1 k Ω to 100 k Ω	0.10 m Ω / Ω 1.0 m Ω / Ω	Generating using a Decade Resistance Box
Specific Dc-If Equipment Insulation Resistance (Up To 5kv)	100 k Ω to 10 M Ω 10 M Ω to 100 M Ω 100 M Ω to 1 G Ω 1 G Ω to 10 G Ω 10 G Ω to 100 G Ω 100 G Ω to 1 T Ω	2.0 m Ω / Ω 2.0 m Ω / Ω 1.0 m Ω / Ω 2.0 m Ω / Ω 5.0 m Ω / Ω 5.0 m Ω / Ω	Generating using a combination of High Voltage & Decade Resistance Box
Specific Dc-If Equipment Milli-micro Ohmmeter (at 10a)	50 m Ω 100 m Ω 150 m Ω 200 m Ω	79 m Ω 80 m Ω 81 m Ω 83 m Ω	Generating using a MicroOhmmeter Calibrator
Specific Dc-If Equipment Milli-micro Ohmmeter(at 30a)	5 m Ω 10 m Ω 15 m Ω 20 m Ω	11 m Ω 8.6 m Ω 11 m Ω 8.2 m Ω	Generating using a MicroOhmmeter Calibrator
Specific Dc-If Equipment Milli-micro Ohmmeter(at 100a)	0.5 m Ω 1.0 m Ω 1.5 m Ω 2.0 m Ω	1.4 m Ω 1.0 m Ω 1.7 m Ω 2.4 m Ω	Generating using a MicroOhmmeter Calibrator
Specific Dc-If Equipment Milli-micro Ohmmeter(at 200a)	50 m Ω 100 m Ω 150 m Ω 200 m Ω	0.79 m Ω 0.45 m Ω 0.20 m Ω 1.1 m Ω	Generating using a MicroOhmmeter Calibrator
Specific Dc-If Equipment Lcr Meter (At 1khz) inductance	100 mH to 1 mH 1 mH to 10 mH 10 mH to 100 mH 100 mH to 1 H 1 H to 10 H	20 mH/H 20 mH/H 20 mH/H 8.0 mH/H 8.0 mH/H	Generating using a combination of DecadeStandard Inductance

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Instrument Calibrated/Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty (\pm)*	Remarks
Specific Dc-If Equipment Lcr Meter (At 1khz) capacitance	1 pF to 10 pF 10 pF to 100 pF 100 pF to 1 nF 1 nF to 10 nF 10 nF to 100 nF 100 nF to 1 mF 1 mF to 10 mF 10 mF to 100 mF 100 mF to 1 mF	0.50 mF/F 0.50 mF/F 0.50 mF/F 0.50 mF/F 0.50 mF/F 0.50 mF/F 0.20 mF/F 0.40 mF/F 4.0 mF/F	Generating using a combination of DecadeStandard Capacitance
Specific Dc-If Equipment Lcr Meter (At 1khz) resistance	1 ? to 10 ? 10 ? to 100 ? 100 ? to 1 k? 1 k? to 10 k? 10 k? to 100 k? 100 k? to 1 M?	0.10 m?/? 0.10 m?/? 0.10 m?/? 0.50 m?/? 0.50 m?/? 0.50 m?/?	Generating using a combination of DecadeStandard Resistance
Specific Dc-If Equipment High Voltage Meter/probe dc Voltage	1 kV to 10 kV 10 kV to 30 kV	0.51 mV/V + 0.67 V 0.55 mV/V + 0.73 V	Generating using a combination of High Voltage Generator, High Voltage Divider & Precision Multimeter
Specific Dc-If Equipment High Voltage Meter/probe ac Voltage (At 50/60 Hz)	1 kV to 10 kV 10 kV to 20 kV	4.6 mV/V + 1.5 V 4.2 mV/V + 20 V	Generating using a combination of High Voltage Generator, High Voltage Divider & Precision Multimeter
Specific Dc-If Equipment High Voltage Source/tester dc Voltage	0.5 kV to 10 kV 10 kV to 25 kV 25 kV to 100 kV	5.0 mV/V 2.4 mV/V 1.5 mV/V	Measuring using a combination of High Voltage Meter, High Voltage Divider & Precision Multimeter
Specific Dc-If Equipment High Voltage Source/tester ac Voltage (At 50/60 Hz)	0.5 kV to 10 kV 10 kV to 25 kV 25 kV to 50 kV	10 mV/V 16 mV/V 16 mV/V	Measuring using a combination of High Voltage Meter, High Voltage Divider & Precision Multimeter
Specific Dc-If Equipment High Current Source/tester dc Current	-20 A to 20 A -100 A to 100 A	0.20 mA/A 0.50 mA/A	Measuring using a combination of Precision Multimeter & Current Shunt
Specific Dc-If Equipment High Current Source/tester ac Current	<u>50 Hz to 1 kHz</u> 2 A to 20 A 20 A to 100 A <u>1 kHz to 10 kHz</u> 2 A to 20 A 20 A to 100 A	1.0 mA/A 1.0 mA/A 5.0 mA/A 5.0 mA/A	Measuring using a combination of Precision Multimeter & Current Shunt

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Instrument Calibrated/Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty (\pm)*	Remarks
Specific Dc-If Equipment Power Source (welding - Std Grade) dc Current	0 A to 40 A 40 A to 500 A	18 mA/A + 69 mA 17 mA/A + 0.57 A	Measuring using a combination of Load Banks & Clamp Meter
Specific Dc-If Equipment Power Source (welding - Std Grade) ac Current (at 50/60 Hz)	0 A to 40 A 40 A to 500 A	19 mA/A + 69 mA 17 mA/A + 0.58 A	Measuring using a combination of Load Banks & Clamp Meter
Specific Dc-If Equipment(oscilloscope) I) Vertical Deflection A) Dc Voltage Impedance 1m Ω	\pm (888 mV to 222.4 V)	0.25 mV/V	Generating using an Oscilloscope Calibrator
Specific Dc-If Equipment(oscilloscope) I) Vertical Deflection B) Square Voltage Impedance 1m Ω	35.52 mVpp to 999.9 mVpp 1 mVpp to 21 mVpp 21.001mVpp to 556mVpp 556.01 mVpp to 210Vpp	10 mVpp/Vpp 1.0 mVpp/Vpp 1.0 mVpp/Vpp 0.50 mVpp/Vpp	Generating using an Oscilloscope Calibrator
Specific Dc-If Equipment(oscilloscope) I) Vertical Deflection B) Square Voltage Impedance 50 Ω	35.52 mVpp to 999.9 mVpp 1 mVpp to 21 mVpp 21.001mVpp to 556mVpp 556.01 mVpp to 5.56Vpp	10 mVpp/Vpp 1.0 mVpp/Vpp 1.0 mVpp/Vpp 0.50 mVpp/Vpp	Generating using an Oscilloscope Calibrator
Specific Dc-If Equipment(oscilloscope) Ii) Horizontal Deflection a) Low Edge impedance 50 Ω /1m Ω	4.44 mVpp to 3.31 Vpp (Rise&Fall Time : 500ps)	30 mVpp/Vpp	Generating using an Oscilloscope Calibrator
Specific Dc-If Equipment(oscilloscope) Ii) Horizontal Deflection b) High Edge impedance 50 Ω	888 mVpp to 5.56 Vpp (Rise&Fall Time : 100ns)	30 mVpp/Vpp	Generating using an Oscilloscope Calibrator
Specific Dc-If Equipment(oscilloscope) Ii) Horizontal Deflection b) High Edge impedance 1m Ω	888 mVpp to 100 Vpp (Rise&Fall Time : 150ns)	30 mVpp/Vpp	Generating using an Oscilloscope Calibrator
Specific Dc-If Equipment(oscilloscope) Ii) Horizontal Deflection	100 Vpp to 210 Vpp (Rise&Fall Time : 200ns)	30 mVpp/Vpp	Generating using an Oscilloscope Calibrator

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Instrument Calibrated/Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty (\pm)*	Remarks
c) Fast Edge fast Edge Impedance 50 $\dot{\text{I}}\%$	4.44 mVpp to 3.1 Vpp (Rise&Fall Time : 150ps)	30 mVpp/Vpp	Generating using an Oscilloscope Calibrator
Specific Dc-If Equipment(oscilloscope) li) Horizontal Deflection d) Time Markers fast Edge Sine (50 $\dot{\text{I}}\%$ /1m $\dot{\text{I}}\%$)	450.5 ps to 909.09 ps 909.1 ps to 9.009 ns	0.25 ms/s 0.25 ms/s	Generating using an Oscilloscope Calibrator
Specific Dc-If Equipment(oscilloscope) li) Horizontal Deflection d) Time Markers fast Edge Square (50 $\dot{\text{I}}\%$ /1m $\dot{\text{I}}\%$)	9.0091 ns to 55 s	0.25 ms/s	Generating using an Oscilloscope Calibrator
Specific Dc-If Equipment(oscilloscope) li) Horizontal Deflection a) Sine Voltage impedance 50 $\dot{\text{I}}\%$ /1m $\dot{\text{I}}\%$	<u>4.44 mVpp to 5.56 Vpp</u> 50 Hz to 10 MHz 10 MHz to 100 MHz 100 MHz to 550 MHz <u>4.44 mVpp to 3.336 Vpp</u> 550 MHz to 1.1 GHz	15 mVpp/Vpp 15 mVpp/Vpp 30 mVpp/Vpp 40 mVpp/Vpp	Generating using an Oscilloscope Calibrator
Specific Dc-If Equipment(oscilloscope) lii) Auxiliary a) Dc Current	\pm (88.8 mA to 111.2 mA)	2.5 mA/A	Generating using an Oscilloscope Calibrator
Specific Dc-If Equipment(oscilloscope) lii) Auxiliary b) Square Current	88.8 mApp to 111.2 mApp	2.5 mApp/App	Generating using an Oscilloscope Calibrator
Specific Dc-If Equipment(oscilloscope) lii) Auxiliary c) Resistance	50 k? to 12 M? 800 k? to 1.2 M?	5.0 m?/? 1.0 m?/?	Generating using an Oscilloscope Calibrator
Specific Dc-If Equipment(oscilloscope) lii) Auxiliary d) Capacitance	1 pF to 35 pF 35 pF to 95 pF	20 mF/F 30 mF/F	Generating using an Oscilloscope Calibrator

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Instrument Calibrated/Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty (\pm)*	Remarks
Specific Rf Equipment Wideband Ac Voltage meter	<u>1 kHz</u> 1.1 mV (-46 dBm) 3.0 mV (-37 dBm) 11 mV (-26 dBm) 33 mV (-17 dBm) 110 mV (-6.2 dBm) 330 mV (-3.4 dBm) 1.1 V (14 dBm) 3.5 V (24 dBm)	8.0 mV/V 7.0 mV/V 7.0 mV/V 6.0 mV/V 6.0 mV/V 5.0 mV/V 5.0 mV/V 4.0 mV/V	Generating using a Multifunction Calibrator
Specific Rf Equipment Rf Power Meter	3 mW to 100 mW (-25 dBm to 20 dBm)	3.0 mW/W	HP 11683A, HP 432A, HP 478A, HP 34401A
Specific Rf Equipment Frequency Meter	0.5 Hz to 10 MHz	25 mHz /Hz	Generating using a Multiproduct Calibrator
Specific Rf Equipment Frequency Tester/source	0.1 Hz to 3 GHz	0.2 mHz/Hz	Measuring using a Precision Frequency/ Universal Counter
Specific Rf Equipment Time Base	0.33 ns to 10 s	0.20 ms/s	Measuring using a Precision Frequency/ Universal Counter

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SCOPE OF CALIBRATION : OPTICAL & PHOTOMETRIC

Instrument Calibrated/Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty (\pm)*	Remarks
Spectrophotometer (uvvisible Range) A) Wavelength	240 nm to 645 nm	0.2 nm	Calibrated using Holmium perchlorate as standard based on ASTM E275:2013 and ASTM E925:2014
Spectrophotometer (uvvisible Range) B) Absorbance (230 Nm To 640 Nm)	0.2 to 1.0	0.006	Calibrated using Potassium Dichromate and Neutral Density Filter as standard based on ASTM E275:2013 and ASTM E925:2014
Transmittance (normal Incidence)	380 nm to 780 nm	0.94 %	Calibrated using Agilent Cary 7000 Spectrophotometer based on ASTM D1746:2015 and ISO 9050:2003

SITE LOCATION (HQ)	1. Category 1
FIELD(S) OF CALIBRATION :	DIMENSIONAL,ELECTRICAL,FORCE,HEAT & TEMPERATURE,MASS,OPTICAL & PHOTOMETRIC,PRESSURE

SCOPE OF CALIBRATION : FORCE

Material / Product Tested	Type Of Test / Properties Measured / Range Of Measurement	Standard Test Methods / Equipment / Techniques	Remarks
Hardness Tester	20 HRA to 88 HRA 30 HRB to 100 HRB 10 HRC to 70 HRC	\pm 0.6 HRA \pm 0.6 HRB \pm 0.6 HRC	Calibrated using Load Cell and Hardness Block set based on ISO 6508-2:2015 under method clause 5 indirect verification

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SCOPE OF CALIBRATION : DIMENSIONAL

Material / Product Tested	Type Of Test / Properties Measured / Range Of Measurement	Standard Test Methods / Equipment / Techniques	Remarks
Measuring Projector (individual Linear Axis Only)	0 mm to 50 mm	1.7 μ m Magnification 0.1%	Calibrated using Glass Scale, Precision Ball and Reading Scale based on JIS B7184:1999
	50 mm to 100 mm	1.9 μ m Magnification 0.1%	Calibrated using Glass Scale, Precision Ball and Reading Scale based on JIS B7184:1999
	100 mm to 200 mm	2.5 μ m Magnification 0.1%	Calibrated using Glass Scale, Precision Ball and Reading Scale based on JIS B7184:1999
	200 mm to 300 mm	3.5 μ m Magnification 0.1%	Calibrated using Glass Scale, Precision Ball and Reading Scale based on JIS B7184:1999
Co-ordinate Measuring Machine	0 mm to 1,000 mm	10 μ m	Calibrated using Ball Bar Set, Long Gauge Block, Gauge Block Set and Thermometer with Sensor based on ANSI/ASME B89:1997
Caliper	0 mm to 1,000 mm 1,000 mm to 1,500 mm 1,500 mm to 2,000 mm	7.5 μ m 17 μ m 23 μ m	Calibrated using Gauge Blocks based on BS EN ISO 13385- 1:2011
External Micrometer Up To 25 Mm 50 Mm Frame 100 Mm Frame 150 Mm Frame 200 Mm Frame 300 Mm Frame 400 Mm Frame 500 Mm Frame 600 Mm Frame	25 mm traverse 25 mm traverse	0.5 μ m 1.1 μ m 1.3 μ m 1.3 μ m 1.5 μ m 2.0 μ m 2.0 μ m 2.3 μ m 2.5 μ m	Calibrated using Gauge Blocks based on BS EN ISO 3611-2010
Linear Height Gauge	0 mm to 1,000 mm	7.5 μ m	Calibrated using Gauge Blocks based on BS EN ISO 13225:2012

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Material / Product Tested	Type Of Test / Properties Measured / Range Of Measurement	Standard Test Methods / Equipment / Techniques	Remarks
Surface Plate Flatness	600 mm x 600 mm 800 mm x 800 mm 1m x1m	1.3 µm 1.8 µm 2.2 µm	Calibrated using Planekator, Repeat-O-Meter and MicroComparator based on BS 817:2008
Measuring Microscope (individual Linear Axis Only)	0 mm to 200 mm	2.2 µm	Calibrated using Glass Scale based on JIS B 7153:1995

SCOPE OF CALIBRATION : MASS

Material / Product Tested	Type Of Test / Properties Measured / Range Of Measurement	Standard Test Methods / Equipment / Techniques	Remarks
Analytical Balance And Weighing Scale	0 g to 5 g	0.03 mg	Calibrated using Standard Weight Sets based on ASTM E898:2020 The uncertainty quoted is based on adjustment made to the sensitivity of the weighing instrument immediately before calibration.
	0 g to 20 g	0.04 mg	
	0 g to 50 g	0.2 mg	
	0 g to 100 g	0.2 mg	
	0 g to 200 g	0.2 mg	
	0 g to 500 g	0.6 mg	
	0 kg to 1 kg	1.1 mg	
	0 kg to 2 kg	3 mg	
	0 kg to 3 kg	5 mg	
	0 kg to 5 kg	6 mg	
	0 kg to 10 kg	0.05 g	
	0 kg to 20 kg	0.1 g	
	0 kg to 30 kg	2 g	
	0 kg to 50 kg	3 g	
	0 kg to 100 kg	6 g	
	0 kg to 200 kg	11 g	
	0 kg to 500 kg	22 g	
0 kg to 750 kg	47 g		
0 kg to 1,000 kg	52 g		
0 kg to 1,500 kg	60 g		
0 kg to 2,000 kg	103 g		
Standard Weight	1 kg	14 mg	Mass comparison with reference to OIML R111- 2:2004
	2 kg	14 mg	
	5 kg	16 mg	
	10 kg	0.14 g	
	20 kg	0.15 g	
	25 kg	0.15 g	

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SCOPE OF CALIBRATION : PRESSURE

Material / Product Tested	Type Of Test / Properties Measured / Range Of Measurement	Standard Test Methods / Equipment / Techniques	Remarks
Pressure Measuring Device	-700 mbar to 700 mbar 0 bar to 20 bar 0 psi to 11,000 psi	1.7 mbar 50 mbar 0.025% of reading	Calibrated using Pressure Calibrator with reference to AS 1349:2018

SCOPE OF CALIBRATION : HEAT & TEMPERATURE

Material / Product Tested	Type Of Test / Properties Measured / Range Of Measurement	Standard Test Methods / Equipment / Techniques	Remarks
Temperature Sensor (thermocouple, Prt, Mechanical Thermometer & Thermistor)	-30 °C to 30 °C 30 °C to 650 °C	0.051 °C 0.17 °C	Calibrated using Resistance Thermometer Display & PRT, Temperature Recorder, Constant Stirred Temperature Liquid Bath, Constant Stirred High Temperature Liquid Bath, Temperature Block Calibrator and Ice Point
Temperature Controlled Enclosure	-80 °C to -20 °C -20 °C to 250 °C 250 °C to 800 °C 800 °C to 1,000 °C 1,000 °C to 1,200 °C	0.6 °C 1 °C 2 °C 3 °C 5 °C	Calibrated using Temperature Recorder, PRT and Thermocouple with reference to AS 2853:1986
Liquid Bath	-30 °C to 300 °C	0.1 °C	Calibrated using Temperature Recorder, PRT, Thermocouple and Barometer with reference to AS 2853:1986
Humidity Controlled Enclosure	30 %RH to 98 %RH	5 %RH	Calibrated using Temperature Recorder, PRT, Thermocouple and Barometer with reference to AS 2853:1986

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Material / Product Tested	Type Of Test / Properties Measured / Range Of Measurement	Standard Test Methods / Equipment / Techniques	Remarks
Temperature Indicating Device resistance Type Pt100	-200 °C to 650 °C	0.1 °C	Calibrated by electrical simulation using Calibrator and Ice Point
Temperature Indicating Device resistance Type Jpt100	-200 °C to 500 °C	0.1 °C	Calibrated by electrical simulation using Calibrator and Ice Point
Thermocouple Type K	-270 °C to -100 °C -100 °C to 1,370 °C	1.5 °C 1 °C	Calibrated by electrical simulation using Calibrator and Ice Point
Thermocouple Type J	-210 °C to 1,200 °C	1 °C	Calibrated by electrical simulation using Calibrator and Ice Point
Thermocouple Type T	-270 °C to 400 °C	1 °C	Calibrated by electrical simulation using Calibrator and Ice Point
Thermocouple Type E	-270 °C to 1,000 °C	1 °C	Calibrated by electrical simulation using Calibrator and Ice Point
Thermocouple Type R	0 °C to 1,760 °C	1 °C	Calibrated by electrical simulation using Calibrator and Ice Point
Thermocouple Type S	0 °C to 1,760 °C	1 °C	Calibrated by electrical simulation using Calibrator and Ice Point
Thermocouple Type N	-100 °C to 1,300 °C	1 °C	Calibrated by electrical simulation using Calibrator and Ice Point

SCOPE OF CALIBRATION : ELECTRICAL

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Material / Product Tested	Type Of Test / Properties Measured / Range Of Measurement	Standard Test Methods / Equipment / Techniques	Remarks
Basic Dc-I/f Measuring Equipment (Multimeter, Clamp Meter, Data Acquisition, Etc) Dc Voltage	± (0 to 300 mV) ± (300 mV to 3 V) ± (3 V to 30 V) ± (30 V to 300 V) ± (300 V to 1000 V)	0.10 mV/V 0.10 mV/V 0.10 mV/V 0.10 mV/V 0.10 mV/V	Generating using a Multifunction / Multiproduct Calibrator
Basic Dc-I/f Measuring Equipment (Multimeter, Clamp Meter, Data Acquisition, Etc) Dc Current	± (0 to 300 mA) ± (300 mA to 3 mA) ± (3 mA to 30 mA) ± (30 mA to 300 mA) ± (300 mA to 3 A) ± (3 A to 10 A) ± (10 A to 20 A)	0.20 mA/A 0.20 mA/A 0.20 mA/A 0.20 mA/A 0.60 mA/A 0.60 mA/A 0.60 mA/A	Generating using a Multifunction / Multiproduct Calibrator
Basic Dc-I/f Measuring Equipment (Multimeter, Clamp Meter, Data Acquisition, Etc) Ac Voltage	0 V to 1000 V	See Matrix E	Generating using a Multifunction / Multiproduct Calibrator
Basic Dc-I/f Measuring Equipment (Multimeter, Clamp Meter, Data Acquisition, Etc) Ac Current	0 A to 20 A	See Matrix F	Generating using a Multifunction / Multiproduct Calibrator
Basic Dc-I/f Measuring Equipment (Multimeter, Clamp Meter, Data Acquisition, Etc) Dc Current Clamp 10-coil	<u>3 A to 30 A</u> 10 Hz to 100 Hz 100 Hz to 440 Hz	5.0 mA/A 10 mA/A	Generating using a combination of Multiproduct Calibrator & Current Coil
Basic Dc-I/f Measuring Equipment (Multimeter, Clamp Meter, Data Acquisition, Etc) Dc Current Clamp 50-coil	16 A to 160 A 160 A to 525 A 525 A to 1000 A	3.0 mA/A 3.0 mA/A 3.0 mA/A	Generating using a combination of Multiproduct Calibrator & Current Coil
Basic Dc-I/f Measuring Equipment (Multimeter, Clamp Meter, Data Acquisition, Etc) Ac Current Clamp 10-coil	<u>3 A to 30 A</u> 10 Hz to 100 Hz 100 Hz to 440 Hz	5.0 mA/A 10 mA/A	Generating using a combination of Multiproduct Calibrator & Current Coil
	<u>30 A to 200 A</u> 10 Hz to 100 Hz 100 Hz to 440 Hz	5.0 mA/A 10 mA/A	Generating using a combination of Multiproduct Calibrator & Current Coil
Basic Dc-I/f Measuring Equipment (Multimeter, Clamp Meter, Data Acquisition, Etc) Ac Current Clamp 50-coil	<u>16 A to 160 A</u> 10 Hz to 100 Hz	5.0 mA/A	Generating using a combination of Multiproduct Calibrator & Current Coil

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Material / Product Tested	Type Of Test / Properties Measured / Range Of Measurement	Standard Test Methods / Equipment / Techniques	Remarks
	160 A to 1000 A 10 Hz to 100 Hz	5.0 mA/A	Generating using a combination of Multiproduct Calibrator & Current Coil
Basic Dc-I/f Measuring Equipment (Multimeter, Clamp Meter, Data Acquisition, Etc) Resistance (Variable)	0.1 ? to 40 ? 40 ? to 400 ? 400 ? to 4 k? 4 k? to 40 k? 40 k? to 400 k? 400 k? to 4 M? 4 M? to 40 M? 40 M? to 400 M?	1.0 m?/? 0.40 m?/? 0.40 m?/? 0.30 m?/? 0.30 m?/? 0.50 m?/? 2.0 m?/? 3.0 m?/?	Generating using a combination of Multiproduct Calibrator & Current Coil
Basic Dc-I/f Measuring Equipment (Multimeter, Clamp Meter, Data Acquisition, Etc) Capacitance (Variable)	0.5 nf to 4 nF 4 nF to 40 nF 40 nF to 400 nF 400 nF to 4 mF 4 mF to 40 mF 40 mF to 400 mF 400 mF to 4 mF 4 mF to 40 mF	3.0 mF/F 3.0 mF/F 3.0 mF/F 4.0 mF/F 10 mF/F 10 mF/F 10 mF/F 10 mF/F	Generating using a Multifunction / Multiproduct Capacitance Calibrator
Basic Dc-I/f Measuring Equipment (Multimeter, Clamp Meter, Data Acquisition, Etc) Frequency	0.5 Hz to 10 MHz	25 mHz /Hz	Generating using a Multifunction / Multiproduct Capacitance Calibrator
Basic Dc-I/f Generating Equipment (Calibrator, Power Supply, Etc) Dc Voltage	± (0 to 100 mV) ± (100 mV to 1 V) ± (1 V to 10 V) ± (10 V to 100 V) ± (100 V to 1000 V)	0.10 mV/V 0.10 mV/V 0.10 mV/V 0.10 mV/V 0.10 mV/V	Measuring using a Precision Multimeter
Basic Dc-I/f Generating Equipment (Calibrator, Power Supply, Etc) Dc Current	± (0 mA to 10 mA) ± (10 mA to 100 mA) ± (100 mA to 1 A) ± (1 A to 3 A)	1.0 mA/A 1.0 mA/A 2.0 mA/A 2.0 mA/A	Measuring using a Precision Multimeter
Specific Dc-I/f Equipment Insulation Resistance (Up To 5kv)	10 M? to 100 M? 100 M? to 1 G? 1 G? to 10 G? 10 G? to 100 G? 100 G? to 1 T?	5.0 m?/? 5.0 m?/? 5.0 m?/? 10 m?/? 10 m?/?	Generating using a combination of High Voltage & Decade Resistance Box
Specific Dc-I/f Equipment Lcr Meter (At 1khz) inductance	100 mH to 1 mH 1 mH to 10 mH 10 mH to 100 mH 100 mH to 1 H 1 H to 10 H	30 mH/H 30 mH/H 30 mH/H 10 mH/H 10 mH/H	Generating using a combination of Decade-Standard Inductance

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Material / Product Tested	Type Of Test / Properties Measured / Range Of Measurement	Standard Test Methods / Equipment / Techniques	Remarks
Specific Dc-If Equipment Lcr Meter (At 1khz) capacitance	1 pF to 10 pF 10 pF to 100 pF 100 pF to 1 nF 1 nF to 10 nF 10 nF to 100 nF 100 nF to 1 mF 1 mF to 10 mF 10 mF to 100 mF 100 mF to 1 mF	1.0 mF/F 1.0 mF/F 1.0 mF/F 1.0 mF/F 1.0 mF/F 1.0 mF/F 1.0 mF/F 1.0 mF/F 10 mF/F	Generating using a combination of Decade-Standard Capacitance
Specific Dc-If Equipment Lcr Meter (At 1khz) resistance	1 ? to 10 ? 10 ? to 100 ? 100 ? to 1 k? 1 k? to 10 k? 10 k? to 100 k? 100 k? to 1 M?	1.0 m?/? 1.0 m?/? 1.0 m?/? 1.0 m?/? 1.0 m?/? 1.0 m?/?	Generating using a combination of Decade-Standard Resistance
Specific Dc-If Equipment High Voltage Source/tester dc Voltage	0.2 kV to 5 kV 5 kV to 10 kV	10 mV/V 10 mV/V	Measuring using a combination of High Voltage Meter, High Voltage Divider & Precision Multimeter
Specific Dc-If Equipment High Voltage Source/tester ac Voltage (At 50/60 Hz)	0.5 kV to 10 kV	15 mV/V	Measuring using a combination of High Voltage Meter, High Voltage Divider & Precision Multimeter
Specific Dc-If Equipment Power Source (welding - Std Grade) dc Current	0 A to 40 A 40 A to 500 A	18 mA/A + 69 mA 17 mA/A + 0.57 A	Measuring using a combination of Load Banks & Clamp Meter
Specific Dc-If Equipment Power Source (welding - Std Grade) ac Current (At 50/60 Hz)	0 A to 40 A 40 A to 500 A	19 mA/A + 69 mA 17 mA/A + 0.58 A	Measuring using a combination of Load Banks & Clamp Meter
Specific Dc-If Equipment(oscilloscope) I) Vertical Deflection a) Square Wave 50 i‰	4.44 mV _{pp} to 3.34 V _{pp}	3.0 mV/V _{pp}	Generating using an Oscilloscope Calibrator
Specific Dc-If Equipment(oscilloscope) I) Vertical Deflection a) Square Wave 1 Mi‰	4.44 mV _{pp} to 133.44 V _{pp}	3.0 mV/V _{pp}	Generating using an Oscilloscope Calibrator

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Material / Product Tested	Type Of Test / Properties Measured / Range Of Measurement	Standard Test Methods / Equipment / Techniques	Remarks
Specific Dc-If Equipment(oscilloscope) l) Vertical Deflection b) Dc Level 50 ĩ%	$\pm(4.44 \text{ mV to } 2.78 \text{ V})$	3.0 mV/V	Generating using an Oscilloscope Calibrator
Specific Dc-If Equipment(oscilloscope) l) Vertical Deflection b) Dc Level 1 Mĩ%	$\pm(4.44 \text{ mV to } 133.44 \text{ V})$	3.0 mV/V	Generating using an Oscilloscope Calibrator
Specific Dc-If Equipment(oscilloscope) li) Horizontal Deflection a. Time Markers 50 ĩ%	4 ns/div to 5.5 s/div	25 $\mu\text{s/s}$	Generating using an Oscilloscope Calibrator
Specific Dc-If Equipment(oscilloscope) li) Horizontal Deflection b. Edge Response(rise/fall Time) 50 ĩ% Load	< 1 ns	25 $\mu\text{s/s}$	Generating using an Oscilloscope Calibrator
Specific Dc-If Equipment(oscilloscope) li) Horizontal Deflection b. Edge Response(rise/fall Time) 1 Mĩ%	< 100 ns	25 $\mu\text{s/s}$	Generating using an Oscilloscope Calibrator
Specific Dc-If Equipment(oscilloscope) li) Horizontal Deflection c. Bandwidth 50 ĩ%	50 kHz to 100 MHz 100 MHz to 250 MHz	2.0 mHz/Hz 4.0 mHz/Hz	Generating using an Oscilloscope Calibrator
Specific Dc-If Equipment(oscilloscope) li) Horizontal Deflection c. Bandwidth 1 Mĩ%	10 Hz to 49.999 kHz	3.0 mHz/Hz	Generating using an Oscilloscope Calibrator

SCOPE OF CALIBRATION : OPTICAL & PHOTOMETRIC

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Material / Product Tested	Type Of Test / Properties Measured / Range Of Measurement	Standard Test Methods / Equipment / Techniques	Remarks
Spectrophotometer (uv-visible Range) A) Wavelength	240 nm to 645 nm	0.2 nm	Calibrated using Holmium perchlorate as standard based on ASTM E275:2013 and ASTM E925:2014
Spectrophotometer (uv-visible Range) B) Absorbance (230 Nm To 640 Nm)	0.2 to 1.0	0.006	Calibrated using Potassium Dichromate and Neutral Density Filter as standard based on ASTM E275:2013 and ASTM E925:2014
Smoke Meter)	20 ~ 80% Opacity	1.0% Opacity	Opacity filter as reference
Tint Tester	20 ~ 90% Transmittance	1.0% Transmittance	Transmittance filter and glass standards as reference

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