

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
¹ Electronic Balance, Spring Balance, Load Cell Resolution: 0.000 01 mg	Up to 10 g	0.04 mg	OIML Class E2, F1, M1 weight sets and internal calibration procedure utilized in the calibration of the weighing system.
0.000 01 mg	(10 to 20) g	0.05 mg	
0.000 01 mg	(20 to 50) g	0.08 mg	
0.000 01 mg	(50 to 60) g	0.11 mg	
0.000 01 mg	(60 to 70) g	0.12 mg	
0.000 01 mg	(70 to 100) g	0.16 mg	
0.000 1 mg	(100 to 150) g	0.2 mg	
0.000 1 mg	(150 to 220) g	0.3 mg	
0.000 1 mg	(220 to 300) g	0.4 mg	

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¹ Electronic Balance, Spring Balance, Load Cell Resolution: 0.001 g 0.001 g 0.001 g 0.001 g 0.001 g 0.001 g 0.01 g 0.01 g 0.01 g 0.01 kg 0.1 kg 0.5 kg 1 kg 5 kg 10 kg	(300 to 1 000) g (1 000 to 2 000) g (2 to 3) kg (3 to 5) kg (5 to 6) kg (6 to 8) kg (8 to 10) kg (10 to 12) kg (12 to 20) kg (20 to 100) kg (100 to 1 000) kg (1 000 to 5 000) kg (5 000 to 10 000) kg (10 000 to 40 000) kg (40 000 to 80 000) kg	1 mg 2 mg 3 mg 5 mg 10 mg 12 mg 17 mg 20 mg 26 mg 5.8 g 58 g 0.33 kg 0.66 kg 3.2 kg 6.3 kg	OIML Class E2, F1, M1 weight sets and internal calibration procedure utilized in the calibration of the weighing system.
¹ Push-Pull Gauge, Force Gauge, Tension, Tensile	Up to 1 000 N (1 000 to 3 000) N (3 000 to 5 000) N (5 000 to 10 000) N	0.006 N 0.01 N 0.02 N 0.03 N	Weight Sets
¹ Hand Torque Tool, Torque Wrench, Torque Driver, Electronic Torque	(0.2 to 20) N·m (20 to 40) N·m (40 to 60) N·m (60 to 80) N·m (80 to 100) N·m (100 to 200) N·m (200 to 400) N·m (400 to 600) N·m (600 to 800) N·m (800 to 1 000) N·m	0.06 N·m 0.07 N·m 0.08 N·m 0.09 N·m 0.1 N·m 3.1 N·m 3.5 N·m 3.9 N·m 4.4 N·m 5 N·m	Static Torque Transducer
¹ Hardness Tester, Duro Tester (Types A, B, C, D, DO, O) Indenter Dimensions Length Angle Radius Spring Force	Up to 3.57 mm Up to 36° Up to 0.51 mm Up to 44.5 N	2.1 μm 0.003 4° 3 μm 0.026 N	Based on ASTM D 2240-15 using Vision Measuring Machine Durometer Calibrator

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Manometer	Up to 1 psig	0.001 9 psi	Fluke 700PD2 Pressure Module
¹ Pneumatic Pressure Devices	Up to 200 kPa (> 200 to 2 000) kPa	0.06 kPa 0.58 kPa	Pneumatic Pressure Calibrator
¹ Hydraulic Pressure Devices	Up to 7 MPa (> 7 to 70) MPa	4 kPa 21 kPa	Hydraulic Pressure Calibrator
¹ Vacuum Gauges	(-90 to 0) kPa	55 Pa	Vacuum Calibrator
¹ Barometric Pressure, Absolute Pressure	(100 to 1 034) hPa	0.6 hPa	Absolute Pressure Calibrator
Mass (Standard Weights)	1 mg 2 mg 5 mg 10 mg 20 mg 50 mg 100 mg 200 mg 500 mg 1 g 2 g 5 g 10 g 20 g 50 g 100 g 200 g 500 g 1 kg 2 kg 5 kg 10 kg 20 kg	6 µg 6 µg 6 µg 13 µg 14 µg 24 µg 26 µg 27 µg 30 µg 12 µg 14 µg 18 µg 24 µg 35 µg 87 µg 0.14 mg 0.26 mg 0.85 mg 2 mg 6.9 mg 11 mg 20 mg 69 mg	Electronic Balance, OIML Class E2, F1, and M1 Weights
Mass (Standard Weights)	50 kg 100 kg 200 kg 500 kg	1 g 1 g 5 g 5 g	Electronic Balance, OIML Class F2 Weights

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Torque Calibrators	(0.1 to 2) N·m (2 to 4) N·m (4 to 6) N·m (6 to 8) N·m (8 to 10) N·m (10 to 20) N·m (20 to 40) N·m (40 to 200) N·m (200 to 400) N·m (400 to 1 000) N·m (1 000 to 1 500) N·m	0.92 % of reading 0.46 % of reading 0.31 % of reading 0.23 % of reading 0.18 % of reading 0.1 % of reading 0.05 % of reading 0.03 % of reading 0.02 % of reading 0.01 % of reading 0.006 % of reading	Weights, Calibration Arms
¹ Universal Testing Machine, Crane Scales, Compression / Tensile Testing Machine	Compression Testing Machine (0.1 to 200) kN (> 200 to 1 000) kN Tensile Testing Machine 100 N to 30 kN	0.32 % of reading 0.42 % of reading 0.16 % of reading	Master Load Cell
Volumetric Glassware, Burette	5 ml 10 ml 25 ml 50 ml 100 ml	0.003 5 ml 0.003 7 ml 0.006 5 ml 0.01 ml 0.018 ml	Electronic Balance
Volumetric Glassware, Volumetric Flask	2 ml 5 ml 10 ml 20 ml 25 ml 50 ml 100 ml 200 ml 250 ml 500 ml 1 000 ml	0.005 8 ml 0.005 8 ml 0.005 9 ml 0.006 2 ml 0.006 5 ml 0.01 ml 0.017 ml 0.028 ml 0.035 ml 0.063 ml 0.13 ml	Electronic Balance
Volumetric Glassware, Measuring Cylinder	5 ml 10 ml 25 ml 50 ml 100 ml 250 ml 500 ml 1 000 ml	0.005 8 ml 0.005 9 ml 0.006 5 ml 0.01 ml 0.017 ml 0.035 ml 0.063 ml 0.13 ml	Electronic Balance

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Volumetric Glassware, Measuring Pipette	0.5 ml 1 ml 2 ml 5 ml 10 ml 15 ml 25 ml 50 ml	0.002 3 ml 0.002 3 ml 0.002 3 ml 0.002 4 ml 0.003 7 ml 0.006 ml 0.006 5 ml 0.01 ml	Electronic Balance
Volumetric Glassware, Volumetric Pipette	0.5 ml 1 ml 2 ml 5 ml 10 ml 15 ml 25 ml 50 ml 100 ml	0.002 3 ml 0.002 3 ml 0.00 23 ml 0.002 4 ml 0.003 7 ml 0.006 ml 0.006 5 ml 0.01 ml 0.016 ml	Electronic Balance
Piston Pipette	(10 to 1 000) μ l	0.14 μ l	Electronic Balance
¹ Anemometers (Air Velocity)	2.5 m/s 5 m/s 7.5 m/s 10 m/s 12.5 m/s 15 m/s	0.25 m/s 0.25 m/s 0.25 m/s 0.25 m/s 0.42 m/s 0.42 m/s	Lutron MHB-382SD Barometer, Trotec TA400 Dynamic Pressure Anemometer, Omega WTM-1000 Wind Tunnel
Liquid Flow Devices	(1 to 3) m ³ /h (3 to 6) m ³ /h (6 to 10) m ³ /h (10 to 20) m ³ /h (20 to 30) m ³ /h	0.051 m ³ /h 0.018 m ³ /h 0.065 m ³ /h 0.069 m ³ /h 0.099 m ³ /h	Ultrasonic Flow Meter, Calibration Rig
Liquid Flow Devices	(1 to 6) m ³ /h (6 to 12) m ³ /h (12 to 24) m ³ /h (24 to 42) m ³ /h	0.029 m ³ /h 0.037 m ³ /h 0.056 m ³ /h 0.069 m ³ /h	Electromagnetic Flow Meter, Calibration Rig

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Air Flow Meters	(0 to 0.3) lpm (0.3 to 1) lpm (1 to 2) lpm (2 to 3) lpm (3 to 4) lpm (4 to 5) lpm (5 to 10) lpm (10 to 20) lpm (20 to 30) lpm (30 to 50) lpm (50 to 100) lpm (100 to 150) lpm (150 to 200) lpm	0.006 5 lpm 0.012 lpm 0.021 lpm 0.031 lpm 0.04 lpm 0.05 lpm 0.1 lpm 0.2 lpm 0.3 lpm 3.4 lpm 3.8 lpm 4.1 lpm 7.5 lpm	Air Flow Calibrator, Calibration Rig
Hydrometers	(600 to 850) kg/m ³ (> 850 to 1 350) kg/m ³ (> 1 350 to 2 000) kg/m ³	0.08 kg/m ³ 0.1 kg/m ³ 0.14 kg/m ³	Electronic Balance, Standard Rong Weight, Barometer