



Reliable partner of metrological services

We are one of the oldest metrology companies in Lithuania that is accredited and recognized internationally.

We provide a wide range of metrology services throughout Lithuania and Europe and have accumulated a base of more than 1,800 standards.

We actively participate in international interlaboratory comparisons and the development of verification methodologies. We also pay great attention to ecological solutions and sustainable business practices — we care not only for the environmental protection but also for the well-being of employees and customers.

Our Goals

- To listen to our customer needs and create added value by ensuring the accuracy of measurements
- To constantly improve our technologies and strive for the growth of the company's business value through quality services
- To develop innovative metrology services for the Lithuanian market, and to apply these solutions to foreign customers in the future
- To operate to the highest standards of transparency, governance, ethics and social responsibility

METROLOGICAL VERIFICATION / INSPECTION) ACTIVITY FIELDS

Metrological verification is the assessment of the suitability of a measuring instrument by examining its metrological characteristics and verifying compliance with the specified requirements.

The inspection is performed for instruments subject to legal metrology control. This is defined by the Law on Metrology of the Republic of Lithuania. The instruments are subject to different metrological re-verification intervals.

Dimensional metrology

Measures of length	(0,5 to 5,0) m, accuracy class I, II, III
Measuring tapes	(0 to 200) m, accuracy class I, II, III
Measuring sticks	(0 to 5) m \pm 1 mm
Length measuring instruments for wood and land	(0 to 100) m initial verification accuracy $\leq \pm (c + 1,5 + L)$ mm re-verification accuracy $\pm 2(c + 1,5 + L)$ mm L- length, m c =1 mm for rods of several parts, other c=0
Material length measuring instruments	accuracy class I, II, III
Devices for measuring the diameter (thickness) of tree trunks and log	(0 to 1,0) m \pm (0,5 to 10) %
Sieves	Cells size 20 μ m to 125 mm $\pm \geq 2,3 \mu$ m
Railway gauge	Measuring range \sim 1520 mm $\pm \sim$ 1 mm
Railway caliper - gauge PŠV	(0 to 290) mm \pm (0,1 to 0,2) mm
Levels	$\pm m_{km}$ the standard deviation of the height difference measurement given in the specification
Portable laser rangefinders	(0 to 10) m \pm 1,5 mm
Digital treadmills for measuring the tread depth of car tires	measuring range \sim 25 mm $\pm >$ 0,02 mm
Calipers (digital calipers, non-slip calipers and circular calipers)	(0 to 2000) mm
Vehicle headlamp levelling and testing equipment	accuracy \pm 3 mm
Logs measurement sistem	L - (0,50 to 30) m \pm 10 mm, D - (20 to 1500) mm \pm 1 mm, \pm 2 mm, \pm 3 mm, \pm 5 mm V - 80 mm \leq D \leq 140 mm \pm 200/D % and D > 140 mm \pm 1,5 %

Liquid and gas volume and debit

Oil stations	(1 to 100) dm ³ ± 1,0 %
Fuel stations	Q < 160 dm ³ /min ± 0,5 %
Liquefied petroleum (propane-butane) gas metering system	Q ≤ 70 dm ³ /min ± 1,0 %
Volumetric flasks	< 50000 dm ³ , accuracy class 1 and 2
Milk volume meters	10 dm ³ ± 0,05 dm ³ 20 dm ³ ± 0,075 dm ³
Burettes	(1 to 100) cm ³ A, AS, 1, B, 2 class
Pipettes	(0,1 to 200) cm ³ A, AS, 1, B, 2 class
Glasswares	(1 to 5000) cm ³ A, 1, B, 2 class
Cylinders	(5 to 2000) cm ³ A, 1, B, 2 class
Menzuras	(50 to 1000) cm ³ ± > 2,5 cm ³
Tubes	(5 to 25) cm ³ ± > 0,1 cm
Pycnometers	(1 to 100) cm ³ ± > 0,1 cm ³
Plastic measuring containers	(0,005 to 5) dm ³ , Class A, B
Volume measures	(0,02 to 5) dm ³ ± > 3 %
Piston operated apparatus	(0,001 to 200) ml ± 0,2 %
Grain hectolitre mass meter	1 l ± 4,0 g/dm ³
Tank truck	(1 to 32) m ³ ± (0,005 to 0,16) m ³ graduation accuracy ± (0,002 to 0,064) m ³
Milk accounting systems	(1 to 32) m ³ ± 0,5 %
Automatic liquid level gauges in tanks	up to 3500 mm ± (2 to 4) mm (-10 to 50) °C ± 1 °C
Fixed storage tanks	(3 to 200) m ³ ± 0,3 %
Vertical storage tanks	(3 to 200) m ³ ± 0,2 %
Small storage tanks	up to 35 m ³ ± 0,5 %
Tank complex accounting system HIMS	accuracy of: density ± 0,3% level ± 1 mm temperature ± 0,5 °C mass ± 0,5 %
Cold water meters with relative diameters (15 to 50) mm	Q _n ≤ 15 m ³ /h Q _{min} ≤ Q < Q _t – ± 5% Q _t ≤ Q ≤ Q _n – ± 2% Q _n ≤ Q ≤ Q _{max} – ± 2%
Hot water meters with relative diameters (15 to 20) mm	Q _{min} ≤ Q < Q _t – ± 5% Q _t ≤ Q ≤ Q _n – ± 3% Q _n ≤ Q ≤ Q _{max} – ± 3%
Water meters for open channels with Parchal, Venturi, Khafagi-Venturi gutters or with rectangular or triangular dams	accuracy ± > 2,5%
Ultrasonic liquid flow meter for open channels LMA-01	(50 to 1000) mm ± 2 mm accuracy ± > 1,5 %
Diaphragm meters for liquids and gases	(50 ≥ D ₂₀ ≤ 1000) mm d ₂₀ ≥ 12,5 mm





Liquid and gas volume and debit

Liquefied gas meters and metering systems in gas carriers	$q \leq 1500 \text{ dm}^3/\text{min} \pm 1,0 \%$
Sewage meter SNU100	accuracy $\pm 2 \text{ mm}$
Heat energy meters	class 2 4 5 (OIML R75) 1 2 3 (OIML R75-1, EN 1434-1)
Ultrasonic water and heat meters SKU-01, SKU-01M	$D_s \geq 150 \text{ mm}$ $\pm (2 + 0,02qp/q) \%$ $\pm 0,5 \text{ K}$ $\pm (2,5+3/\Delta T+0,02qp/q + Et) \%$

Mass

Weighing instruments up to 10 t	I, II, III, IIII class
Car weighing instruments up to 60 t	III, IIII class
Wagon weighing instruments up to 200 t	III, IIII class
Weighing instruments up to 10 kg	I, II class
Electronic hanging weighing instruments up to 10 t	III, IIII class
Mechanical commercial weighing instruments up to 10 t	III, IIII class
Bunker weighing instruments up to 20 t	II, III, IIII class
Automatic intermittent totalizing weighing instruments (0 to 5000) kg	$\geq 0,2$ class
Automatic single product weighing instruments up to 3000 kg	manual weighing mode XI and Y(I), XII and Y(II), XIII and Y(a), XIII and Y(b) class automatic weighing mode (XI to XIII), Y(I), Y(II), Y(a), Y(b) class
Continuous automatic totalizing weighing instruments $Q_{\text{max}} = 1000 \text{ t/h}$	$\geq 0,5$ class
Automatic packing weighing instruments up to 3000 kg	$\geq 0,5$ class
Weighing system for moving vehicles CROSS WIM	accuracy: determining the axle load $\pm 8\%$ determining the total mass of the car $\pm 5\%$ car height and width measurement $\pm 0,3 \text{ m}$ car length measurement $\pm (1,0 \text{ to } 16,2) \text{ m}$
Dynamic car weighing instruments 3590E-AF09 „Dini Argeo“ up to 20000 kg	class 2 for total car mass class D for individual axle load
Weights 1 mg to 20 kg	F_1, F_2, M_1, M_2 or M_3 class $\pm (0,006 \text{ to } 1000000) \text{ mg}$

Force, torque

Pedal ergometers	up to 500 W \pm (3 ... 60 W), \pm 5 % (above 60 W), RPM up to 130 rpm \pm 2 rpm
Assembly tools for screws and nuts – Hand torque tools	(0,2 to 3000) Nm \pm 4 %
General purpose static force dynamometers	(0 to 500) kN class 1, 2
Test of braking systems on vehicles	(0 to 6) kN \pm 3 % (0 to 40) kN \pm 2 %

Ionizing radiation

Ambient dose equivalent/rate meters	2,0 μ Sv/h to 11 mSv/h \pm (15 ... 30) %
Exposure doses and dose rate meters	1,0 μ R 180 μ R/h to 1,0 R/h \pm (15 to 25) %
Individual dosimeters	10 μ Sv to 10 mSv 2,0 μ Sv/h to 11 mSv/h \pm (10 to 25) %
Dose rate and surface contamination meter RadEye B20, RadEye B20-ER, RadEye PRD	2,0 μ Sv/h to 11 mSv/h \pm 30 % 10 Bq to 10 kBq \pm 25 %
Surface contamination meters	10 Bq to 10 kBq \pm (20 to 45) %
Radiation contamination meter AN/VDR-2	(0,001 to 10) mGy/h \pm 20 %
Dosimetric environmental monitoring system SARA AGS711X	0,001 μ Sv/h to 100 mSv/h \pm 15 %

Physical and chemical measurements

Hydrometers	(650 to 1840) kg/m ³ \pm > 0,5 div. (0 to 105) volume % \pm > 0,1 volume %
Oil densimeters	(0,71 to 1,63) g/cm ³ \pm > 0,0001 g/cm ³
Wood moisture meters	(7 to 60) % \pm > 0,2 % (0 to 100) % \pm > 0,5 %
Automatic flash point analyzer FP 935 G	(40 to 450) °C \pm > 0,035 t _p
Automatic capillary viscometer system VISCO HOUILLON ATREM	(3 to 2000) mm ² /s \pm > 0,5 %
Particulate analyzers	(7 to 100) % \pm > 2 %
Glass butyrometers	(0 to 40) % fat \pm > 0,5 div.
Milk analyzers (lactoscopes)	(0 to 7) % fat \pm > 1 % (0 to 5) % protein \pm > 1 %
Breathalyzer	(0,05 to 3,0) mg/l up to 0,4 mg/l \pm (0,02 to 0,032) mg/l (0,4 to 2,0) mg/l \pm (5 to 8) % above 2,0 mg/l \pm (20 to 30) %





Physical and chemical measurements

Smoke gauges for diesel engines (opacimeters)	(0 to 100) % $\pm > 1$ %
Gas concentration sensor DKJ-01	(0 to 50) %AUR $\pm 0,05 \cdot C_{max}$ %AUR $\pm 0,1 \cdot C$ %AUR
Oximeters	temperature (0 to 55) $^{\circ}$ C $\pm > 0,3$ % concentration of dissolved oxygen in water (0 to 199,9) mg/l (0 to 600) % O ₂ $\pm > 0,5$ %
Car exhaust analyzers	(0,01 to 7) volume % CO ± 5 % (0,01 to 16) volume % CO ₂ ± 5 % (0,01 to 2000) volume ppm HC ± 5 % (0,01 to 21) volume % O ₂ ± 5 %
Explosive / flammable gas measuring systems and alarms	(5 to 50) % ASR/AUR $\pm > 3$ %
Toxic gas measurement systems and alarms	5 volume ppm to 2 volume % $\pm > 5$ %
pH-meters	(-2 to 12,45) pH $\pm > 0,01$ pH (-1900 to +1900) mV $\pm > 1$ mV 0,01 μ S/cm to 19,00 mS/cm $\pm > 1,5$ % (0 to 19) mg/l O ₂ $\pm > 1,5$ %
Electric aspirators	(0,2 to 50) l/min $\pm > 5$ %
Rotameters (floating flow meters)	(0,0 3 ... 1,2) m ³ /h $\pm (2 \text{ to } 10)$ %
Window-transmittance meter CL 176 RS	(0 to 100) % $\pm > 2$ %
Grain drop number analyzers	(62 to 1000) s $\pm > 1$ s

Physical and optical measurements

Luxmeters	(5 to 1500) lx $\pm > 2$ %
Flame photometers PFM	0 to 160) mmol/l Na ⁺ $\pm > 0,5$ % (0 to 10) mmol/l K ⁺ $\pm > 0,5$ %
Photoelectric colorimeters	(0 to 100) % T $\pm > 1$ % T
Fuel calorimeter type B-08	40 000 ± 100 J/K $\pm > 0,1$ %
Polarimeters	(-100 to +100) $^{\circ}$ Z $\square > 0,02$ $^{\circ}$ Z (-41 to +41) $^{\circ}$ $\pm > 0,03$ $^{\circ}$
Refractometers	(1,32 to 1,7) n _d $\pm > 1 \times 10^{-4}$ n _d
Spectrophotometers, photometers	(220 to 900) nm $\pm > 0,5$ nm (0 to 2) A $\pm > 0,002$ A

Temperature

Glass liquid laboratory thermometers	(-80 to +600) $^{\circ}$ C class 1, 2 $\pm (0,2 \text{ to } 15)$ $^{\circ}$ C
Glass liquid technical thermometers	(-80 to +600) $^{\circ}$ C class 1,2 $\pm (1 \text{ to } 10)$ $^{\circ}$ C
Glass mercury electrocontact thermometers	(-65 to +650) $^{\circ}$ C $\pm (1 \text{ to } 5)$ $^{\circ}$ C
Digital thermometers	(-80 to +600) $^{\circ}$ C
Manometric thermometers	(-65 to +600) $^{\circ}$ C $\pm (0,5 \text{ to } 10)$ $^{\circ}$ C (-80 to +600) $^{\circ}$ C $\pm (0,1 \text{ to } 4,0)$ $^{\circ}$ C





Temperature

Glass thermometers for petroleum	$(-80 \text{ to } +600)^\circ\text{C} \pm (0,1 \text{ to } 4,0)^\circ\text{C}$
Dial thermometers	$(-80 \text{ to } +600)^\circ\text{C}$, class 1,2 $\pm (2 \text{ to } 10)^\circ\text{C}$
Spirit and mercury meteorological thermometers	$(-60 \text{ to } +60)^\circ\text{C} \pm (0,1 \text{ to } 0,5)^\circ\text{C}$
Maximum electric thermometers	$(32 \text{ to } 42)^\circ\text{C}$ class 1,2 $\pm (0,15 \text{ to } 0,4)^\circ\text{C}$
Thermometers CRR	$(-20 \text{ to } +250)^\circ\text{C} \pm 2\%$ of range
Glass liquid density meters (hydrometer thermometers)	$(-25 \dots +40)^\circ\text{C} \pm (0,1 \text{ to } 0,5)^\circ\text{C}$
Resistance temperature sensors, class A, B, C	$(-80 \text{ to } +850)^\circ\text{C} \pm (0,15 + 2,0 \cdot 10^{-3} t \text{ to } 0,6 + 0,8 \cdot 10^{-3} t)^\circ\text{C}$
Converter Pt 100/4-20 mA	$\pm 0,08 \text{ mA}$
Infrared thermometers	$(-50 \text{ to } 1200)^\circ\text{C}$
Thermoelectric temperature sensors (thermocouples)	$(-40 \text{ to } 1700)^\circ\text{C} \pm (1,0 \text{ to } 2,5)^\circ\text{C}$ $(-40 \text{ to } +333)^\circ\text{C}$ and $\pm (0,0025 \cdot t \text{ to } 0,0075 \cdot t)$ from $(333 \text{ to } 1700)^\circ\text{C}$
Air temperature and humidity measuring instruments	$(-50 \text{ to } 70)^\circ\text{C} \pm (2 \text{ to } 100)\%$
Air temperature and humidity meter TDM-011	$(0 \text{ to } 40)^\circ\text{C}$, $(20 \text{ to } 85)\% \pm 0,5^\circ\text{C}$, $\pm 3,5\%$
Temperature recorders	$(-80 \text{ to } 1600)^\circ\text{C}$

Pressure

Technical manometers	$< 100 \text{ MPa}$, class 0,4 to 5,0
Pressure gauges, traction meters	$(-40 \text{ to } +40) \text{ kPa}$ class 1,0 1,5 2,5 4,0
Pressure and differential pressure transducers	$(-0,1 \text{ to } 60) \text{ MPa}$, differential pressure $< 400 \text{ kPa}$ class 0,1 0,2 0,25 0,5
Tyre pressure measuring instruments	$(0 \text{ to } 1,2) \text{ MPa}$ $\pm 8 (\pm 10) \text{ kPa} \leq 0,4 \text{ MPa}$ $\pm 16 (\pm 20) \text{ kPa} (0,4 \text{ to } 1,0) \text{ MPa}$ $\pm 25 (\pm 31) \text{ kPa} > 1,0 \text{ MPa}$
Non-invasive blood pressure monitors (non-automated)	$(0 \text{ to } 260) \text{ mmHg}$, $(0 \text{ to } 35) \text{ kPa}$ accuracy @ $(15 \text{ to } 25)^\circ\text{C} \pm 3 \text{ mmHg} \pm 0,4 \text{ kPa}$ accuracy @ $(10 \text{ to } 40)^\circ\text{C} \pm (3 \text{ or } \leq 2\% \cdot p) \text{ mmHg} \pm (0,4 \text{ or } \leq 2\% \cdot p) \text{ kPa}$ hysteresis accuracy $\pm 4 \text{ mmHg} \pm 0,5 \text{ kPa}$
Non-invasive blood pressure monitors	$(0 \text{ to } 260) \text{ mmHg}$ $(0 \text{ to } 35) \text{ kPa}$ accuracy @ $(15 \text{ to } 25)^\circ\text{C} \pm 3 \text{ mmHg} \pm 0,4 \text{ kPa}$ accuracy @ $(10 \text{ to } 40)^\circ\text{C} \pm (3 \text{ or } \leq 2\% \cdot p) \text{ mmHg} \pm (0,4 \text{ or } \leq 2\% \cdot p) \text{ kPa}$ hysteresis accuracy $\pm 5 \text{ mmHg} \pm 0,7 \text{ kPa}$
Tonometers (contact mechanical intraocular pressure gauges)	$(0 \text{ to } 127,5) \text{ mmHg}$ weight $2,0 \text{ g} \pm 20 \text{ mg}$ $4,5 \text{ g} \pm 20 \text{ mg}$ $9,5 \text{ g} \pm 20 \text{ mg}$ of the mobile system effective mass @ $5 \pm 20 \text{ mg}$ effective mass @ $10 \pm 200 \text{ mg}$
Barometers	Atmospheric pressure $(800 - 1060) \text{ hPa} \pm 2 \text{ hPa}$ Temperature coefficient $\pm 0,16 \text{ hPa} / ^\circ\text{C}$
Video recorders	$(-270 \text{ to } +2495)^\circ\text{C}$, linearization accuracy $\pm (0,02 \text{ to } 0,22)^\circ\text{C}$ $(-5 \text{ mV to } 50 \text{ V})$ $(0 \text{ to } 20) \text{ mA}$ $(0 \text{ to } 600) \Omega$

Electricity

Digitals current clamp meters	(0 to 1000) V \pm > 0,5 % (0 to 1000) A \pm > 0,6 % (0 Ω to 400 M Ω) \pm > 0,1 % (0,5 Hz to 10 MHz) \pm > 0,1 % (0,5 nF to 40 mF) \pm > 1 %
Analog current clamp meters	(0 to 100) V @ (10 to 40) Hz \pm > 0,5 % (0 to 1000) V @ (40 to 1000) Hz \pm > 0,5 % (0 to 1000) A @ (10 to 65) Hz \pm > 1 % (0 Ω to 40 M Ω) \pm > 0,6 %
Current transformers	I ₁ = (0,5 to 50000) A I ₂ = (1 to 5) A Class 0,1 0,2 0,2S 0,5 0,5S 1 3 10 5P 5PR 10P 10PR
Digital instruments for insulation and earthing resistance measurements	insulation resistance (0 to 1T Ω) \pm (0,2R) Ω earth resistance (0 to 400) k Ω \pm (0,2R) Ω specific earth resistance (0 to 2000) k Ω \pm (0,02 \square) Ω earthing circuit resistance (0 to 10) k Ω \pm (0,1R) Ω DCV (0 to 1000) V \pm (0,05U) V ACV (0 to 1000) V \pm (0,05U) V ACI (0 to 1000) A \pm (0,05 I) A (15 to 1000) Hz \pm (0,001f) Hz (0,01 to 10) μ F \pm (0,15C) μ F
Analog ommeters	0,006 Ω to 10 ¹⁰ Ω \pm > 0,015 %
Insulation resistance meter METREL TeraOhm 5 kV	DCV (3 to 600) V \pm 3,0 % ACV (3 to 600) V \pm 3,0 % testing voltage (250 to 5000) V \pm 3,0 % 0,2 nF to 50 μ F \pm 5,0 % 3 k Ω to 5 T Ω \pm > 5,0 %
Electrical network measurement systems UNITEST EURO EXPERT	(0 to 2000) M Ω \pm 2 % (100 \div 440) V \pm 2 % 50 Hz \pm 0,1 %
Multifunctional installation testers METREL EUROTEST MI 3102, MI3102H, MI3101, MI3105, MI3102H CL, MI3102H BT, MI3152H	(0 to 199,9) M Ω \pm 0,5 % (0 to 999) M Ω \pm (2 to 10) % (0 to 19,99) Ω \pm 3 % (20 to 1999) Ω \pm 5 % DCV (0 to 1200) V \pm 3 % ACV (0 to 500) V (@ 50 Hz \pm 2 % DCI (0 to 99,9) mA \pm 5 %, (100 mA to 19,99 A) \pm 5%
Phase - zero loop impedance meter METREL MI 3122	ACV (0 to 550) V \pm 2 % (0,0 to 99,9) Ω \pm 5 % 100 Ω to 9,99 k Ω \pm 10 %;
Installation testers FLUKE 1650	ACV (0 to 550) V \pm 0,8 % (0 to 1000) M Ω \pm 1,5 %
Clamp meter for earthing resistance 4200 KYORITSU	DCI (0 mA to 31,5 A) \pm 2 % (0 to 599) Ω \pm 1,5 %
Multifunctional installation tester Metrel Eurotest 61557 METREL	ACV (2 to 440) V \pm 2 % (15,3 to 99,9) Hz \pm 0,1 % (0,02 to 1999) Ω \pm 2 % (0,02 to 1999) M Ω \pm 2 %
Digital installation tester Macrotest HT5035	ACV (100 to 460) V \pm 3 % (47,0 to 63,6) Hz \pm 0,1 % (0 to 1999) Ω \pm 5 % (0,01 to 1999) M Ω \pm 2 %
Electricity meters	ACV (30 to 300) V ACI 1 mA to 120 A Class 0,2S 0,5S 0,5 1 2 3 and A, B, C

Time and frequency

Clocks in vehicle parking machines	± 20 s per 24 h
Mobile calls time counting systems	up to 60 min $\pm 0,8$ s 5400 s = 90 min. up to 90 min ± 1 s
Landline calls time counting systems	(0 to 7212) s ± 3 s
Mechanical stopwatches	up to 60 min $\pm 0,8$ s
Digital stopwatches	9999,9 s ± 5 s/24 h

Motion parameters

Radar vehicle speed measurement and video recording systems	24,15 GHz $\pm 0,1$ GHz (20 to 250) km/h ± 1 km/h (or ± 2 km/h)
Vehicle speed measurement TraffiSection VECTOR P2P	< 100 km/h ± 2 km/h > 100 km/h ± 2 %
Laser vehicle speed measuring devices	(8 to 350) km/h ± 2 km/h (or ± 2 %) (10 to 1500) m $\pm 0,015$ m
Vehicle average speed measurement system „PASScam“	(1 to 250) km/h ± 3 km/h up to 100 km/h ± 3 % above 100 km/h
Vehicle speed measurement system ITC EYE	(1 – 300) km/h ± 2 km/h
Analog tachographs	(20 to 180) km/h ± 6 km/h 999999,9 km ± 4 % (0 to 24) h ± 2 min/ 24 h
Digital tachographs	(20 to 220) km/h ± 1 km/h 999999,9 km ± 2 % (0 to 24) h ± 2 s/ 24 h
Taximeters	999999,9 km ± 2 % (0 to 24) h $\pm 0,2$ % /24 h

Sound level and vibration measurements

Vibrometers	(0,01 to 5000) m/s ² $\pm > 3$ %
Sound level Meters, class 1 and 2	SPL (20 to 140) dB $\pm > 0,6$ dB 20 Hz to 20 kHz
Equipment for pure-tone and speech audiometry	sound pressure level (0 to 130) dB ± 3 dB @ (125 ... 4000) Hz, ± 5 dB @ above 4000 Hz vibratory force level (0 to 130) dB ± 4 dB @ (125 ... 4000) Hz, ± 5 dB @ above 4000 Hz

Inspection activity (which is not metrological verification)

Conformity assessment of control systems for the quantity of pre-packaged products and volumetric containers

CALIBRATION ACTIVITIES FIELD

Calibration of a measuring instrument is a way of the conformity assessment of the instrument.

Calibration is the act of comparing a device under test (DUT) of an unknown value with a reference standard of a known value.

Dimensional metrology

Quantity	Instrument or artifact	Range
Length	Gauge blocks	(0,1 to 100) mm
Length	Gauge blocks	(100 to 1000) mm
Length	Measures of length accuracy class I	< 200 m
Length	Measures of length, measuring tapes, rulers, height and distance measuring instruments	< 200 mm (1 to 200) m < 10 m (10 to 200) m
Length	Micrometer gauges	Reading error 10 µm to 0,1 µm
Length	Caliper gauges	Resolution 0,01 mm to 0,1 mm
Length	Sieves	cell size (0,02 to 125) mm
Length	Length measuring machine	(0 to 1) m
Length	Indicator and indicator gauges	reading error (100 to 0,01) µm
Length	Thickness measuring instruments	(0 to 635) mm Thickness gauges
Length	Details, mechanisms	< 200 mm (0 to 20) m
Length	Calibres	< 1000 mm
Length	Log simulators	diameter (100 to 400) mm, length ≥ 1000 mm
Length	Metric feeler gauge	(0,01 to 2,0) mm
Length	Weld seam gauges	(0 to 100) mm
Length	Optical gauges	(0 to 1000) mm
Length	Optimeters	(0 to 500) mm
Length	Levels	reading error (0,005 to 0,5) mm/m





Dimensional metrology

Angle	Angle measurement instruments Steel squares (10 to 100)°	(10 to 100)°
Angle	Angle measurement instruments	(1/60 to 360)°
Angle	Protractors	reading error 0,167' to 60'
Angle	Optical gauges	(0 to 360)°
Angle	Weld seam gauges	(0 to 360)°
Surface flatness and straightforwardness	Straightedges	< 500 mm
	Optical flat	diameter <100 mm
	Surface plane	> 10 mm



Mass, force, torque

Quantity	Instrument or artifact	Range
Mass	Weighting instruments	1 mg to 20 t
Mass	Weights E_2	1 mg to 10 kg
Mass	Weights F_1	1 mg to 20 kg
Mass	Weights F_2	1 mg to 20 kg
Mass	Weights M_1	1 mg to 20 kg
Mass	Weights M_{1-2}	500 kg 1000 kg 2000 kg
Force	General purpose static force dynamometers	(0 to 50) kN
Force	Tension/compression testing machines	0,1 N to 3000 kN
Force	Test of braking systems on vehicles	(1000 to 15000) N
Torque	Assembly tools for screws and nuts – Hand torque tools	(0,2 to 1) Nm
Torque	Assembly tools for screws and nuts – Hand torque tools	(1 to 3000) Nm



Pressure

Quantity	Instrument or artifact	Range
Pressure	Pressure meters Pressure calibrators	0 Pa to 70000 kPa
Pressure	Tyre pressure measuring instruments	(0 to 1400) kPa
Pressure	Barometers	(80 to 109,9) kPa

Volume of liquid

Quantity	Instrument or artifact	Range
Volume	Glassware, volumetric flasks, burettes, cylinders, pycnometers, volumetric test measures	1 ml to 200 l
Volume	Piston operated apparatus (micropipettes, piston burettes, dispensers)	1 μ l to 200 ml
Volume	Fixed storage tanks	(0,01 to 20) m ³
Volume	Fixed storage tanks	(1 to 200) m ³
Volume	Horizontal storage tanks	(3 to 200) m ³
Volume	Vertical storage tanks	(200 to 50000) m ³

Physical and chemical measurements

Quantity	Instrument or artifact	Range
Concentration of hydrogen ions H ⁺ in solution. Oxidation reduction potential e_{vj}	pH-meters	(-2000 to +2000) mV (-1 to 19) pH
Electrical conductivity of liquids	Conductometers	0,1 μ S/cm to 24,8 mS/cm
Electrical conductivity of liquids	Conductometers	(1,3 to 12880) μ S/cm
Concentration of dissolved oxygen in water	Oximeters	(0 to 20) mg/l



Physical and chemical measurements

Gas concentration

Explosive gas analyzers, alarms and measuring systems	(0,25 to 60) CH ₄ % of volume
	(0,03 to 0,7) C ₃ H ₈ % of volume
	(0,16 to 1,60) H ₂ % of volume
Toxic gas measurement systems and alarms	(20 to 2000) ppm CO
	(20 to 2000) ppm NO
	(20 to 2000) ppm SO ₂
	(10 to 250) ppm NO ₂
	(35 to 2000) ppm CO ₂
	(1 to 50) CO ₂ % of volume
	(1 to 2000) ppm H ₂ S
	(5 to 5000) ppm NH ₃
Oxygen analyzers	(0,5 to 10) ppm Cl ₂
	(10 to 100) ppm isobutylene
Car exhaust analyzers	(0 to 25) O ₂ % of volume
	(0,5 ÷ 9) CO % of volume
	(0,6 ÷ 14) CO ₂ % of volume
	(200 ÷ 2000) ppm HC
	(0 ÷ 25) O ₂ % of volume



Physical and optical measurements

Quantity	Instrument or artifact	Range
Light transmittance	Window-transmittance meters Opacimeters	1 ml to 200 l (0 to 100) % (0,26 to 1,37) %
Illumination	Luxmeters	(5 to 1200) lx
Index of refraction	Refractometers	nD = (1,33 to 1,65) 0 Brix % to 74 Brix %
Angle of rotation (caused by passing polarized light)	Polarimeters	6 ° to -40 ° 99 °Z to -99 °Z
Wavelength Absorbance	Spectrophotometers, photometers	(279 to 681) nm (0,3 to 1) A



Temperature, humidity

Quantity	Instrument or artifact	Range
Temperature	Glass thermometer	(-65 to 400) °C
Temperature	Digital thermometers	(-65 to 600) °C
Temperature	Resistance temperature sensors	(-65 to 600) °C
Temperature	Climate chambers	(-65 to 300) °C
Temperature	Drying box, electric ovens, steam sterilizers	(20 to 1200) °C
Temperature	Thermocouples	(-40 to 1200) °C
Temperature	Thermostats	(-80 to +660) °C
Temperature	Thermocouples	(-40 to 1200) °C
Temperature	Thermostats	(-80 to +660) °C
Temperature	Thermostatic baths	(10 to 95) °C
Humidity Temperature	Temperature and humidity meters	(10 to 98) % (-10 to + 70) °C

Sound level and vibration measurements

Quantity	Instrument or artifact	Range
Sound pressure level Frequency	Sound calibrators	(94 to 124) dB (250 to 1000) Hz
Sound pressure level	Sound level meters	(94; 114; 124) dB @ 1000 Hz; 250 Hz (30 to 140) dB
Acceleration, velocity, amplitude	Vibration meters	(0,1 to 100) m/s ² (0,3 to 300) mm/s (1 to 3000) µm
		5,012 Hz (10 to 15,85) Hz (19,95 to 2000) Hz
Sensitivity of vibration transducer	Vibration transducers	(0,5 to 10000) mV/m/s ²
		5,012 Hz (10 to 15,85) Hz (19,95 to 2000) Hz
Acceleration, velocity, amplitude	Shakers, hand-held shakers, vibrating tables, platforms	(0,1 ÷ 200) m/s ² (0,3 ÷ 300) mm/s (1 ÷ 3000) µm
		5,012 Hz (10 ÷ 2000) Hz 12 Hz
		(5,012 ÷ 2000) Hz 5,012 Hz (10 ÷ 2000) Hz 12 Hz

Electricity

Quantity	Instrument or artifact	Range
DC voltage	DC Voltage standards	1,018 V 10 V
DC Resistance	Reference resistors	1 mΩ to 1 GΩ
DC voltage	Multifunction calibrators, sources	0 mV to 1000 V
AC voltage		0 mV to 1000 V; 10 Hz to 1 MHz
DC Current		100 μA to 10 A
AC Current		0 μA to 10 A; 10 Hz to 10 kHz
DC Resistance	Multifunction calibrators Reference resistors kits	0 Ω to 100 MΩ
DC Voltage	Digital multimeters, other electrical quantities measuring devices	0 mV to 1000 V
AC voltage		0 mV to 1000 V; 10 Hz to 1 MHz
DC Current		0 μA to 10 A
AC Current		0 μA to 10 A; 10 Hz to 10 kHz
4 -wire Resistance		0 Ω to 1 MΩ
2 -wire Resistance		0 Ω to 100 MΩ
Capacity	Digital multimeters	0,75 nF to 40 mF

Time and frequency

Quantity	Instrument or artifact	Range
Frequency	Frequency counters	0,1 Hz to 300 MHz
Period		3,3 ns to 10 s
Time interval		100 μs to 10000 s
Pulse width		100 ns to 10 s
Frequency	Steady signal generators, frequency synthesisers, multifunction calibrators	0,1 Hz to 300 MHz
Time		3,3 ns to 10 s
Frequency		5 MHz, 10 MHz
Period	Pulse generators	100 ns to 9 s
Pulse width		100 ns to 10000 s
Time interval		100 ns to 10 s
Voltage (vertical scale)	Digital oscilloscopes	1 mV/div to 50 V/div
	Analog oscilloscopes	1 mV/div to 50 V/div
Time (horizontal scale)	Digital oscilloscopes	10 ns/div to 10 s/div
	Analog oscilloscopes	10 ns/ div to 10 s/ div
Voltage (amplitude of signal)	Digital oscilloscopes	8 mV to 80 V
	Analog oscilloscopes	8 mV to 80 V
Time interval	Digital oscilloscopes	100 ns to 10 s
	Analog oscilloscopes	100 ns to 10 s
Pulse width	Digital oscilloscopes	100 ns to 1 s
	Analog oscilloscopes	100 ns to 10 s
Time	Mechanical and digital stopwatches	(0,00020 to 400000) s

Ionizing radiation

Quantity	Instrument or artifact	Range
Ambient dose equivalent/rate	Ambient dose equivalent/rate meters	(1,9 to 10000 $\mu\text{Sv/h}$)



Other fields

Quantity	Instrument or artifact	Range
Acceleration	Vehicle deceleration measuring devices	(0,00 to 9,81) m/s^2
Distance	Vehicle headlamp levelling and testing equipment	-
RPM	Laboratory centrifuges	(100 to 20000) rpm
Temperature		(-20 to +100) $^{\circ}\text{C}$
Time		60 s to 30 min
RPM	Tachometers	(12 to 100000) rpm



TESTING ACTIVITIES

Objects under test	Parameters	Documents	Method
Prepackaged products and measuring containers	Sampling	Council Directive 76/211/EEC of 20 January 1976 on the approximation of the laws of the Member States relating to the making-up by weight or by volume of certain prepackaged products	Random sampling
Solid prepackaged products	Mass	Technical Regulation for Prepackaged Goods and Measuring Containers (approved by Order No. 4-594 of the Minister of Economy of the Republic of Lithuania of 25 September 2015)	Weighing
Liquid prepackaged products	Volume	Council Directive of 19 December 1974 on the approximation of the laws of the Member States relating to bottles used as measuring containers	Weighing
Frozen prepackaged products	Mass	ISO 8106:2004 Glass containers -- Determination of capacity by gravimetric method -Test method	Weighing
Prepacked powder and bulk products	Mass	OIML R 87:2016 Quantity of product in prepackages	Weighing
Prepacked preserved products	Mass	OIML R 138:2007 Vessels for Commercial Transactions, which includes requirements for Measuring Container Bottles	Weighing
Prepackaged products with paste consistency and/or rheological properties	Mass		Weighing
Measuring containers	Volume		Gravimetric