Rel. 20251209

Calibration certificates for a wide range of measured variables in our laboratory - or, on request, on site at your location

- **Acceptance test certificates 3.1 in accordance with DIN EN 10204**
- **DAkkS certificates, traceable and accredited according to ISO 17025**

As a reliable partner for measurement and calibration technology and quality assurance, we offer standard-compliant calibration certificates for a comprehensive range of measurement variables, including:

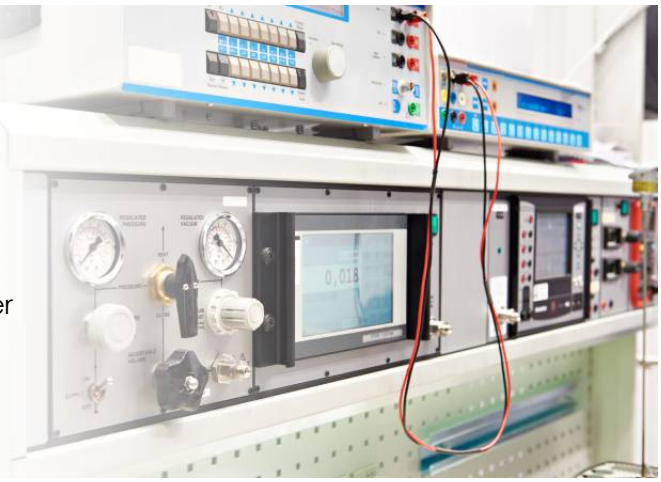
Physical measurement variables:
- Temperature
- Pressure
- Force
- relative air humidity
- Material humidity
- Density, Brix, Salinity
- Flow velocity
- Volume flow of gases and liquids
- Volume of fluids
- Sound level

Chemical measurement variables:
- pH value
- Conductivity
- Photometers

Mechanical measurement variables:
- Tensile-compression testing machines
- Length
- Electric displacement sensors
- Torque
- Scales / balances
- Force measuring devices, material testing machines, piezoelectric force measuring dev.
- Adhesion strength test instruments

Electrical measurement variables:
- Voltage AC / DC
- Current AC / DC
- Direct current resistance
- Frequency

Manufacturer-independent - flexible - traceable
We calibrate not only our own products,but also most third-party products,traceable to national standards.This allows our services to integrate-seamlessly into existing QA and audit structures.



Calibration in our laboratory (or on site)
In order to offer the best possible accuracy under defined environmental parameters in a reproducible manner, we calibrate your measuring equipment in our laboratory.
- Short turnaround times
- On request calibration on site, at your location

Developed for laboratory managers and QA managers
- Maximum measurement reliability thanks to qualified measurement technology
- Documentation in accordance with applicable standards and audit requirements
- Clear, comprehensible test reports
- Transparent measurement uncertainties
- Reliable planning of your calibration intervals

Please refer to the table on page 2 for detailed information.

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Calibration certificates

Calibration of measurement devices LR-Cal

Measured variable	Application	Measuring range	Accuracy
Temperature	Calibration of: Analog and digial thermometers	- 80°C...1100°C	- 80°C...+500°C: ±0.1 K 500 °C ...1100 °C: ±3.0 K
	Process validations: Temperature profiles and T distrubutions in furnaces, tunnel furnaces, heating lines, etc.	-40°C...500°C	-40°C...+500°C: ± 0.5 K
	Calibration of: Controllers, measured value displays and measuring devices without transducers (probes), xT recorders, etc. Simulators for temperature sensors, as well as all common types of temperature sensors	PT 100: -200°C... +850 °C Thermocouples TC: Typ K, J, R, S ... all curves according to IEC 751, IEC 584	PT 100: ±0.2 K TE: ≤ ±0.3 K
	Calibration of: all surface sensors and surface measuring systems	0 °C ... 600 °C	±1.5 K or 1.5 % of rdg. (whichever value is greater)
	Calibration of: Pyrometers or infrared thermometers, thermal imaging cameras	0°C...350°C	0°C...100°C: ±0.5 K 100°C...350°C: ±1.0 K
Gauge pressure (pos./neg.)	Calibration of: Digital and analog pressure gauges, vacuum gauges	-800 mbar...-0.23 mbar	$\pm 8.0 * 10^{-5} * p_e$, +0,007 mbar
		-10 mbar...+30 mbar	$\pm 3.0 * 10^{-4} * p_e$, ≥0.003 mbar
		0.03 bar...0.35 bar	$\pm 1.5 * 10^{-4} * p_e$, ≥0.030 mbar
		0.35 bar...7 bar	$\pm 7.0 * 10^{-5} * p_e$, ≥0.045 mbar
		7 bar...140 bar	$\pm 7.0 * 10^{-5} * p_e$, ≥0.90 mbar
		140 bar...200 bar	$\pm 1.5 * 10^{-4} * p_e$
		1,0 bar...70 bar	$\pm 1.0 * 10^{-4} * p_e$, ≥0.65 mbar
		70 bar...700 bar	$\pm 1.5 * 10^{-4} * p_e$
		700 bar...2500 bar	$\pm 3.0 * 10^{-4} * p_e$
Absolute pressure	Calibration of: Barometers, absolute pressure gauges	0.8 bar...1.2 bar absolute	±0.10 mbar
		1.2 bar...8.0 bar absolute	$\pm 7.0 * 10^{-5} * p_{abs}$, ≥0.10 mbar
		8 bar...141 bar absolute	$\pm 7.0 * 10^{-5} * p_{abs}$, ≥0.9 mbar
		141 bar...201 bar absolute	$\pm 1.5 * 10^{-4} * p_{abs}$
		1 bar, 3 bar...71 bar absolute	$\pm 1.0 * 10^{-4} * p_{abs}$, ≥0.65 mbar
		71 bar...701 bar absolute	$\pm 1.5 * 10^{-4} * p_{abs}$
		701 bar...2500 bar absolute	$\pm 1.5 * 10^{-4} * p_{abs}$
Relative humidity **U / %rF Dew point T_D**	Calibration of: Climate chambers, climate rooms, weatherin chambers, etc. as well as humidity-dependent systems	2...98% rh in temperature range 0°C...80°C	≤ 60% rh: ± 1.0% rh >60 % rh: ±1.5 % rh
	Calibration of: Moisture transducers and moisture meters	11% rh	0,5 % rh
		33% rh	0,5 % rh
		75% rh	1,5 % rh
	Calibration of: Psychrometers, etc., humidity transducers, dew point meters	Temperature range: 5°C ≤ T ≤ 80°C	± 0,1 K
		Moisture range: 2% rh ≤ U ≤ 95% rh	≤30 % rh: ± 0.5 % rh ≤60 % rh: ± 1.0 % rh ≤95 % rh: ± 1.5 % rh
		Dew point range: -40°C ≤ T_D ≤ 90°C	0.2 K
pH value	in our laboratory with calibration liquids	1.68...12.01 pH	0.01 pH
Conductivity	in our laboratory with calibration liquids	0.5...147 µS/cm 0,147...350 mS/cm	1.6...0.3% of rdg. 0.2...0.3% of rdg.
Flow velocity	Calibration of: Anemometers and flow channels	0...20 m/s	±1.0% of rdg. but not less than 0.05 m/s
Volume flow	Calibration of: Volume flow meters	0...110 l/min – gases	±1,0% v. Mw.
		0...20 l/min - liquids	±1.0% of rdg.
Volume flow	Calibration of: Dosing devices, pipettes, dispensing systems, containers	0 ... 5000 ml additional measuring ranges possible	±1.2 ml
Density, Brix, Salinity	Refractometers		±0.1% brix
Sound pressure	Sound level meters	94 dB and 114 dB at 1 kHz	±0.2 dB
Rotation speed	Calibration of: Rotors, shafts, motors	optical: 1000000 Upm	±1 Upm
	Calibration of: Optical and mechanical speed measuring devices	optical: 1000000 Upm	±1 Upm
		mechanical: 10000 Upm	±1 Upm
Angle of rotation	Torque wrenches (torque screwdrivers with angle gauge)	0°…360°	0.1°…0.9°
Electrical measured variables	Calibration of: Multimeters, current clamps, ohmmeters, frequency meters, R-L-C meters and bridges, generators, oscilloscopes, dividers and converters, VDE test equipment, sources, recorders, power supplies, shunts, etc.	further details on request	further details on request
Geometric measurements	Calibration of: Bow micrometers, calipers, dial gauges, rulers, etc.	further details on request	further details on request
Profile projectors			Manufacturer's specifications
Coating thickness gauges		0 ... 30 mm	±0.001 mm
Torque **Friction**	Calibration of: Torque measuring devices and transducers Friction coefficients	left + right: 200 ... 1000 Nm	±0.65% of rdg.
		20 ... 200 Nm	±0.50% of rdg.
		4 ... 20 Nm	±0.35% of rdg.
		0.01 ... 4 Nm	±1.00% of rdg.
Force	Calibration of: Force tensile and compression measuring devices, Hand-held force measuring devices	up to 50 kN further ranges on request	±0.05% of rdg.
Precision balances **Analytical balances**	in our laboratory	on request	E1, F1, M1
Electrical distance sensors		1 m	±0.1 mm
Adhesive bonding	Calibration of: Adhesive tape testing devices		Manufacturer's specifications
Lux meters		10 Lx…20,000 Lx	±1.50…2.50% of rdg.

of rdg. = of reading = of measured/indicated value