

# ACCREDITED

## CALIBRATION LABORATORY



### Calibration of the measuring instruments

The Calibration Laboratory located in the PLUM Sp. z o.o. is a stationary calibration laboratory which provides services in the field of calibration instruments for measuring temperature, pressure, electrical quantities and relative humidity. The laboratory meets requirements of the PN-EN ISO/IEC 17025:2018-02 standard and has been accredited by the Polish Centre for Accreditation since 2005, Certificate No.: AP 074. Accreditation confirms the competence of the laboratory and makes the issued calibration certificates acceptable in Poland and abroad. Knowledge and experience of laboratory personnel and high measurement capability CMC, achieved by laboratory standards with the highest accuracies, guarantee the high quality of services.

### Accredited calibration laboratory provides calibration services:

- digital multimeters, multifunction calibrators: voltage (DC, AC), current (DC, AC), resistance.
- standard resistors, decade resistance boxes and electrical safety testers,
- simulators and temperature indicators,
- pressure gauges (digital and mechanical), pressure transmitters, barometers
- instruments for measuring temperature and relative humidity: thermohygrometers, hygrometers,
- temperature and humidity transmitters,
- resistance temperature sensors, temperature transmitters with temperature sensors and electronic thermometers (comparative method and method of the fixed points cells: the triple point of mercury, the triple point of water, the melting point of gallium, the freezing point of indium and the freezing point of tin),
- pyrometers.

#### We provide:

- high quality of services
- competitive prices for services
- short duration of the service
- professional customer service

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## Temperature

Type of the calibrated measuring instruments	Measuring range *	CMC *
Calibration in the calibration bath		
<ul style="list-style-type: none"> <li>resistance temperature sensors</li> <li>temperature transmitters with temperature sensors</li> <li>electronic thermometers</li> </ul>	(- 40 ÷ 230) °C	0,008 °C 0,010 °C 0,010 °C
Calibration in the fixed points cells		
<ul style="list-style-type: none"> <li>resistance temperature sensors</li> </ul>	-38,8344 °C in cell tpHg 0,01 °C in cell tpH2O 29,7646 °C in cell mpGa 156,5985 °C in cell fpIn 231,928 °C in cell fpSn	0,0030 °C 0,0025 °C 0,0030 °C 0,0040 °C 0,0050 °C
Calibration in the temperature chamber		
<ul style="list-style-type: none"> <li>electronic thermometers</li> <li>temperature transmitters with temperature sensors</li> </ul>	(-30 ÷ 80) °C	0,1 °C
Calibration of pyrometers		
<ul style="list-style-type: none"> <li>radiation thermometers</li> <li>photoelectric pyrometers</li> </ul>	(-15 ÷ 500) °C	(0,8 ÷ 2,4) °C

## Pressure

Possibility of calibration in the chamber, in the temperature range (-40 ÷ 180) °C

Type of the calibrated measuring instruments	Measuring range *	CMC *
<ul style="list-style-type: none"> <li>digital pressure gauges, pressure calibrators</li> <li>pressure transmitters</li> <li>barometers</li> <li>mechanical pressure gauges</li> </ul>	gauge pressure (nitrogen, pure air, water)	
	(-100 ÷ 7000) kPa	≥ 0,0036 %
	(7000 ÷ 10000) kPa	≥ 0,020 %
	(10000 ÷ 70000) kPa	≥ 0,026 %
	absolute pressure (nitrogen, pure air, water)	
	(1,4 ÷ 7000) kPa abs	≥ 0,0036 %
(7000 ÷ 10000) kPa abs	≥ 0,020 %	
(10000 ÷ 70000) kPa abs	≥ 0,026 %	

## DC/AC electrical quantities

Type of the calibrated measuring instruments	Measuring range *	CMC *
Digital multimeters		
<ul style="list-style-type: none"> <li>DC voltage</li> <li>DC current</li> <li>resistance</li> <li>AC voltage (10 Hz ÷ 1 MHz)</li> <li>AC current (10 Hz ÷ 10 kHz)</li> </ul>	10 μV ÷ 1100 V 0,01 μA ÷ 20 A 0,001 Ω ÷ 20 GΩ 1 mV ÷ 1100 V 10 μA ÷ 20 A	≥ 0,0002 % ≥ 0,0015 % ≥ 0,00025 % ≥ 0,007 % ≥ 0,020 %
Multifunction calibrators, isolation meters, voltage sources, power supplies, standard resistors, decade resistance boxes		
<ul style="list-style-type: none"> <li>DC voltage</li> <li>DC current</li> <li>resistance</li> <li>AC voltage (10 Hz ÷ 500 kHz)</li> <li>AC current (40 Hz ÷ 10 kHz)</li> </ul>	10 μV ÷ 4000 V 0,01 μA ÷ 20 A 0,001 Ω ÷ 1,999 GΩ 1 mV ÷ 5200 V 10 μA ÷ 19,99 A	≥ 0,00015 % ≥ 0,0015 % ≥ 0,0003 % ≥ 0,012 % ≥ 0,038 %
Temperature indicators (meters), temperature simulators		
<ul style="list-style-type: none"> <li>indirect calibration with using standardized thermometric characteristics specified in PN-EN 60751:2009</li> </ul>	(-200 ÷ 200) °C (200 ÷ 500) °C (500 ÷ 850) °C	0,005 °C 0,010 °C 0,015 °C
Temperature indicators (meters)		
<ul style="list-style-type: none"> <li>indirect calibration with using characteristics of temperature transmitters with analog electrical signal</li> </ul>	(-200 ÷ 1820) °C	(0,04 · Z + 0,5) 10 <sup>-3</sup> °C where Z = (tmax - tmin) °C

## Temperature and Relative Humidity

Type of the calibrated measuring instruments	Measuring range *	CMC *
Devices for measuring the environmental conditions:		
<ul style="list-style-type: none"> <li>hygrometers - performs measurement of relative humidity</li> <li>thermohygrometers - performs measurements of temperature and relative humidity</li> <li>temperature and relative humidity transmitters</li> </ul>	humidity measurement: (10 ÷ 95) % in the temperature range: (10 ÷ 60) °C	(0,9 ÷ 1,2) %rh

\* Details of the measuring ranges and CMCs on the website <http://plum.pl/en/laboratory> (Scope of Accreditation No. AP 074)