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CALIBRATION SERVICE For temperature sensors

DESCRIPTION

PYROCONTROLE is equipped with its own temperature metrology laboratory, enabling it to offer the following services:

- Calibration of new sensors from Pyrocontrole and other manufacturers.
- Periodic recalibration of sensors from Pyrocontrole and other brands.

Equipped with measuring instruments linked to the national and international reference standards, our laboratory performs high-quality calibration from -40 °C to +450 °C for resistance sensors and -40 °C to +1,500 °C for thermocouples, in accordance with the applicable standards.

Depending on the severity of the requirements, two levels of service are proposed:

- Pyrocontrole calibration with provision of a Calibration Certificate guaranteeing reliable measurements which meet the customers' requirements.
- Cofrac-accredited calibration; the Cofrac accreditation guarantees mastery of the resources, methods and expertise by the staff involved. All these points contribute to the provision of a top-level service acknowledged nationally and internationally.

Calibration Report or Cofrac? Our specialists can advise you according to your needs and how strict your requirements are.



- Cofrac-accredited metrology laboratory no. 2-1385
- Two possible services: Pyrocontrole calibration with calibration certificate

Cofrac-accredited calibration

PYROCONTROLE CALIBRATION

PYROCONTROLE's laboratory performs calibration by comparison and issues a calibration certificate linked to reference standards of the SI system of international units.

Calibration by comparison of Pt100 resistance sensors (sensor alone or measurement line linked to a display) Calibration by comparison of thermocouples (TC alone or TC measurement line linked to a display) Calibration by comparison of sensor with current-output transmitter Calibration by comparison of thermocouple with current-output transmitter

UNCERTAINTY OF THE LABORATORY

Item calibrated	Measurement range	Calibration uncertainty	Method and means
Platinum resistance probe	-40 to 90°C	0.07	
Measurement line (resistance probe)	90 to 450°C	0.12	Comparison with a standard reference
Platinum resistance probe linked to a	-40 to 90°C	0.10	platinum resistance thermometer.
current-output transmitter	90 to 450°C	0.13	
Thermocouple Measurement line (thermocouple)	-40 to 290°C	0.30	
	290 to 450°C	0.56	
	450°C to 980°C	1.50	Comparison with a standard reference
	980 to 1200°C	1.60	o memocoupie.
	1200 to 1500°C	2.70	
	-40 to 290°C	0.30	
Thermocouple linked to a current-output transmitter	290 to 450°C	0.56	Comparison with a standard reference
	450°C to 980°C	1.50	platinum resistance thermometer.
	980 to 1200°C	1.60	S thermocouple.
	1200 to 1500°C	2.70	

SENSOR DIMENSIONS

Means	Measurement range	Diameter of sensors to be calibrated	Length of sensors to be calibrated
Thermostatted bath	-40 to 90°C	$\emptyset \le 10$ mm	$L \ge 130 mm$
Thermostatted bath	90 to 300°C	Ø ≤ 14mm	L ≥ 150mm
Fluidized bath	300 to 450°C	$\emptyset \le 11$ mm	L ≥ 350mm
Oven	450 to 1200°C	Ø ≤ 8mm	L ≥ 350mm
Oven	500°C to 800°C	Ø ≤ 8mm	$L \ge 400 mm$
Oven	800 to 1500°C	Ø ≤ 8mm	$L \ge 650 mm$

NOTE:

We cannot calibrate sensors longer than 1 m. Possibility of calibrating platinum resistance thermometers with 2 and 3 wire mounting. The uncertainty indicated on the calibration certificate issued may be downgraded according to the performance of the sensor or measurement line. Count 50 mm extra for the straight Possibility of supplying a correspondence table showing RESISTANCE or EMF / TEMPERATURE (Pt100 or Thermocouple)

COFRAC-ACCREDITED CALIBRATION

PYROCONTROLE's laboratory performs calibration by comparison and provides a calibration certificate issued by our COFRAC-accredited laboratory (Accreditation no. 2-1385)

Calibration by comparison of Pt100 resistance sensors (sensor alone or measurement line linked to a display)

Calibration by comparison of thermocouples (TC alone or TC measurement line linked to a display)



UNCERTAINTY OF THE LABORATORY

Item calibrated	Measurement range	Calibration uncertainty	Method and means
Platinum resistance probe	-40 to 90°C	0.07	
Measurement line (resistance probe)	90 to 450°C	0.12	Comparison with a standard reference
	-40 to 290°C	0.30	platinum resistance thermometer.
Thermocouple	290 to 450°C	0.56	
Measurement line (thermocouple)	450°C to 980°C	1.50	
	980 to 1200°C	1.60	Comparison with a standard reference
	1200 to 1500°C	2.70	5 themiocoupie.

SENSOR DIMENSIONS

Means	Measurement range	Diameter of sensors to be calibrated	Length of sensors to be calibrated
Thermostatted bath	-40 to 90°C	Ø ≤ 10mm	$L \ge 130 mm$
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Oven	500°C to 800°C	Ø ≤ 8mm	$L \ge 400 mm$
Oven	800 to 1500°C	Ø ≤ 8mm	$L \ge 650 mm$

NOTE:

We cannot calibrate sensors longer than 1 m.

Possibility of calibrating platinum resistance thermometers with 3-wire mounting. The uncertainty indicated on the calibration certificate issued may be downgraded according to the performance of the sensor or measurement line. Count 50 mm extra for the straight part of elbowed sensors \geq 90°.



SENSOR DRIFT...

During use, depending on the process constraints, the accuracy of a temperature sensor declines at varying rates and therefore no longer guarantees the correct measurement defined initially (according to the standard: Pt100 Ω sensor or thermocouple).

• This means it requires regular calibration.

A TC always drifts downwards, by several degrees a year. To compensate this phenomenon, industrial companies set the temperature of their process higher than nominally necessary with a sufficient margin to offset this drift until the next calibration operation, usually performed once a year. In this way, they define a setpoint higher than the optimum temperature for the heat treatment.

 This additional heating naturally has consequences: possible creation of faults and heterogeneity on the parts, premature wear of the refractories and, lastly, excessive energy consumption. This is why it is important to control sensor drift.

.. IN-SITU CALIBRATION!

Pyrocontrole's temperature measurement assemblies with in-situ calibration enable you to monitor the evolution of your temperature sensors' drift over time, using a method which is easy to implement. This technology offers numerous advantages in terms of energy saving, productivity, quality and traceability:

- The reduced uncertainty of your measurements allows you to lower the heating setpoint, thus saving energy. By avoiding overheating, the life span of your equipment is improved.
- The process remains available because there is no longer any need to halt production; calibration is performed on the equipment while it is operating, without having to dismantle the sensors so there is no risk of breakage. Maintenance time is thus reduced. This technology provides significant flexibility for scheduling your metrological monitoring operations.
- The improved accuracy of your measurements helps to reduce your standard deviations; the quality of the finished product is also improved and quality monitoring is facilitated. Lastly, you benefit from better traceability of your thermal process.



IN-SITU CALIBRATION METHOD WITHOUT DISMANTLING THE SENSOR

This method* of verification by comparison is quick and simple to implement.



- Opening of the connecting head of the sensor to be checked.
- Insertion of the standard reference sensor into the guide tube.
- Connection of the standard reference sensor to the precision thermometer.
- Temperature stabilization.
- Calibration by comparison of the temperature on the reference standard and the temperature on the process sensor.

DECIDE ON THE FREQUENCY OF THE TESTS

At the point of operation, regular comparison of the temperature reading against the temperature given by the standard reference sensor enables you to detect any measurement drift.



Non-contractual document - Please confirm specifications before ordering.

RELATED SERVICES

Pyrocontrole has a temperature metrology calibration laboratory. COFRAC accreditation no. 2-1385 - Calibration by comparison.

- CUFRAC accreditation no. 2-1385 Galibration by compar
- From -40 °C to +450 °C for Pt100 Ω sensors
- From -40 °C to +1,500 °C for thermocouples

We can add the "in-situ calibration" function on all sensors equipped with DIN/DAN heads, starting at a diameter of 6 mm.

Please contact us if you want to benefit from this feature on your next sensors.





ETR PT100 & THERMOCOUPLE



DESCRIPTION

These **reference standards**, used only in laboratories, enable you to perform calibration with a good level of uncertainty (schedule periodic calibration by a COFRAC-accredited laboratory). Delivered in a case with a certificate of calibration by comparison or at the ITS fixed points: please contact us for details.

SPECIFICATIONS

	ETR-PT Pt100 sensor	S thermocouples Model LNE S80
Ranges	-100°C to +450°C	0°C à +1554°C
Resistance at 0°C	100 Ω	-
Stability	Up to 0.05°C	-
Measuring current	1 mA	-
Alpha coefficient	0.003850°C ±4ppm	-
Nominal current	1 mA	-
Diameter and length of sensing element	6 x 450 mm	-
Interchangeability class	Class A as per IEC 60751	-
Calibration certificate	by comparison	
Produced under licence	-	LNE
Material	-	10% rhodium-platinum / pure platinum
Dimensions	-	7 mm x 650 mm
Accessories	Delivered in a case	

DIAGRAM (MM)



TO ORDER

Pt100 sensor

Delivered in a case with a certificate of calibration by comparison.

Possibility of an emf/temperature correspondence table for each degree: please contact us.

Domain	Reproducibility	Reference
-100 °C to +450 °C	$\leq 10m\Omega$ (or $\leq 26m$ K)	L918746-001

S thermocouples

Reference standard

Model BNM-LNE S80: 0 $^{\circ}\mathrm{C}$ to 1,554 $^{\circ}\mathrm{C}$

Delivered in a case with a certificate of calibration by comparison (7 points: 400, 600, 800, 1,000, 1,200, 1.400 and 1,500 °C) or at the IT fixed points.

Possibility of an emf/temperature correspondence table for each degree: please contact us.

Related service	Model	Reference
Without calibration	BNM-LNE S80	L918189-000
Calibration by comparison	BNM-LNE S80	L968028-001
Fixed-point calibration	BNM-LNE S80	L968028-002



ETT PT100 & THERMOCOUPLE



DESCRIPTION

These secondary reference sensors are used in workshops or laboratories, used for calibration. They must also be calibrated periodically against a reference standard.

Possibility of a certificate of calibration at the ITS 90 fixed points or by comparison.

SPECIFICATIONS

ETT-PT Pt100 sensor	ETT-TCS S thermocouples Model S90-03
-100°C to +400°C and -100°C to +550°C	0°C to +1554°C
100 Ω	-
Up to 0.05°C	-
1 mA	-
0.003850°C ±4ppm	-
1 mA	-
6 x 450 mm	-
Class A as per IEC 60751	-
Case	-
-	10% rhodium-platinum / pure platinum
-	7 mm x 650 mm
-	By comparison
-	Delivered in a case
	ETT-PT Pt100 sensor -100°C to +400°C and -100°C to +550°C 100 Ω 100 Ω 100 Ω 0.003850°C ±4ppm 1 mA 6 x 450 mm Class A as per IEC 60751 Case - <tr <="" th=""></tr>

DIAGRAM



TO ORDER

Pt100 sensor

Delivered in a case with a certificate of calibration by comparison.

Possibility of an emf/temperature correspondence table for each degree: please contact us.

Domain	Reproducibility	Reference
-100 °C to +400 °C	< 2E mO (ar < C0 ml())	L918749-002
-100 °C to +550 °C	\leq 23 III22 (01 \leq 00 IIIN)	L918749-001

ETT-TCS Type S thermocouples

Secondary reference

Model S90-03: 0 °C to 1,554 °C

Delivered in a case with a certificate of calibration by comparison.

Possibility of an emf/temperature correspondence table for each degree: please contact us.

Domain	Model	Reference
Calibration by comparison	Model S90-03	L918189-000



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