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## Description: Proficiency testing: Thermocouples

PT-2026-002-T

### Provider of proficiency testing

Testo Industrial Services GmbH  
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79199 Kirchzarten  
GERMANY

### Coordination

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### Pilot laboratory

Testo Industrial Services GmbH  
Temperature laboratory  
79199 Kirchzarten  
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## 1 Programme

A proficiency testing is carried out for calibrations of **thermocouples**. The proficiency testing is realised within the scope of accreditation as a provider of proficiency testing in accordance with DIN EN ISO/IEC 17043:2023. The aim of the proficiency testing is to confirm the competence of the participating laboratories for the reported measurement uncertainties.

**Three thermocouples (Type t, Type K, and Type S)** are sent as calibration objects. The calibration objects are to be calibrated according to DKD-R 5-3:2018 using the immersion method<sup>1</sup>. The respective measurement points are:

Type T: -80 °C, -40 °C, 0 °C, 100 °C and 200 °C  
Type K: 300 °C, 400 °C, 500 °C and 550 °C  
Type S: 500 °C, 600 °C, 800 °C and 1000 °C

### 1.1 Confidentiality

All parties involved undertake to maintain confidentiality with regard to the information and results obtained in the course of the proficiency testing.

The results are presented in anonymised form in the final report.

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<sup>1</sup> No calibration in temperature chamber.

## 1.2 Schedule / Procedure

**Planned Start: August 2026**

The proficiency test is conducted in a ring format, with intermediate measurements scheduled at the pilot laboratory, as well as calibration before and after all participants.

**Each participant has one calendar week to carry out the calibration and one calendar week to forward the calibration objects.** If this is not possible, the coordinator must be informed, if possible even before the start of the proficiency testing. If necessary, the time periods will be adjusted due to delivery distances and public holidays.

The participants are responsible for an **insured and immediate forwarding** of the calibration items to the next participant or to Testo Industrial Services.

## 2 Realisation

### 2.1 Calibration objects

Designation	KG 1: Thermocouple Type T	KG 2: Thermocouple Type K	KG 3: Thermocouple Type S
Manufacturer	TC Direc	TC Direct	Testo
Length	500 mm	500 mm	550 mm
Diameter	3 mm	3 mm	5 mm (ceramic sheath)
Reference junction connection	Banana plug (4 mm)	Banana plug (4 mm)	Open ends
Immersion depth	Min: 100 mm Max: 400 mm	Min: 100 mm Max: 400 mm	Min: 150 mm Max: 500 mm



Figure 1: Example image of a non-precious thermocouple. Shown here: a type K thermocouple with a reference junction.

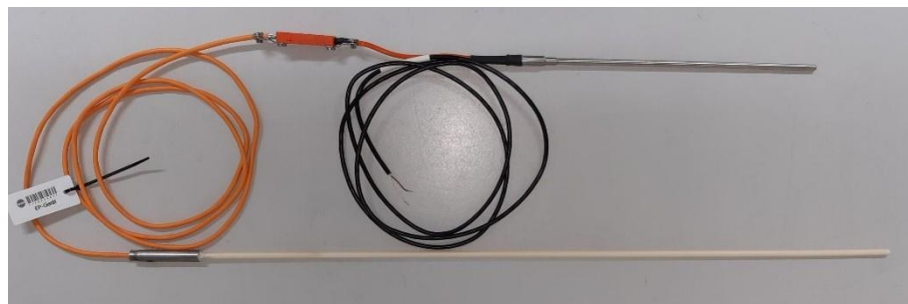


Figure 2: Thermocouple Type S with reference junction.

## 2.2 Notes

The calibrations are to be carried out by the participating laboratory.

The measurement uncertainty must be stated as an expanded measurement uncertainty in accordance with EA-4/02 M:2022 and ILAC-P14:09/2020.

## 2.3 Assigned values

The assigned values for the non-precious metal thermocouples are determined using the weighted average of all results submitted by the accredited calibration laboratories. The mathematical basis for determining the reference value and its measurement uncertainty is based on Cox's publication<sup>2</sup>. An examination for outliers is carried out in advance.

If this is not possible, the assigned values are determined as a reference value measurement in the pilot laboratory.

For the Type S thermocouple, the pilot laboratory establishes the reference value by means of a calibration at fixed points.

In addition, the stability of the calibration objects is assessed over the duration of the comparison measurement and, where appropriate, taken into account in the evaluation as a transfer uncertainty contribution.

## 2.4 Evaluation

The results are evaluated using the  $E_n$ -value for the assigned value. A correlation may be taken into account. An acceptable result is achieved if  $|E_n| < 1.0$ .

## 3 Participation

### 3.1 Participants

This proficiency testing is primarily aimed at calibration laboratories that have or are seeking accreditation for the specified measurand.

Other laboratories can also participate as long as they calibrate according to the specified procedures, issue a report according to ISO 17025 and declare an expanded measurement uncertainty according to EA-4/02 M:2022.

### 3.2 Registration procedure

If interested, the laboratory will be sent an offer with the participation fees. Participation is considered binding as soon as the offer has been accepted and the order confirmation has been sent to the laboratory.

The registration deadline is enclosed with the offer.

*Note: A minimum number of 8 participants is required for the organisation of this proficiency testing.*

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<sup>2</sup> Cox, M.G., The evaluation of key comparison data, Metrologia, 39 (2002), 589-595

#### **4 Further information**

At the end of the proficiency testing, a draft of the final report is sent to the participants to review the results and their performance evaluation.

It is planned to present the results in anonymised form to the DKD Technical Committee.

An in-between report will be issued if necessary.