

Fact sheet of the interlaboratory comparison:

Calibration of temperature measurement system – 2023-2024_v1

1. Context and objectives:

In 2023, CT2M organizes a european-wide interlaboratory comparison on temperature measurement system calibration. You are a calibration laboratory (accredited or not) or a test laboratory performing its own calibration, this interlaboratory comparison is organized for you.

The objectives of this proficiency testing are:

- Evaluate the performance of the participants to achieve calibration of temperature measurement system,
- Improve customer confidence of participants,
- Identify differences between participants.

2. Proficiency testing item:

The temperature measurement system to be calibrated consists of the following components:

- ✓ One Pt100 probe Ø6*100mm with silicone cable length 3m
- ✓ One Delta Ohm HD 2107.1 temperature indicator with 0.01°C resolution

The instrument is calibrated at the beginning and end of the round by a reference laboratory, whose best calibration uncertainty is 0.03°C (expanded uncertainty at k=2).

The metrological traceability of the reference value is guaranteed by the accreditation according to ISO 17025 of the reference laboratory.

3. Calibration Method:

The calibration method to be preferred is the method compared to a standard instrument. The number of comparisons is left to the discretion of the participant. They must use their routine operating procedure and their own means of calibration (standard instrument, comparison medium).

The temperature instrument can be calibrated on the following points:

-20°C, 5°C, 20°C, 37°C and 105°C

However, it is not mandatory to perform all calibration points if the means implemented by the participants do not allow it. In addition, any laboratory may participate, regardless of its uncertainty.

A detailed protocol will be provided to each participant at the beginning of the campaign.

4. Organization of the proficiency testing:

Each participant will have to calibrate the temperature measurement system within one week (France round) or two weeks (international round). The instrument will circulate successively from one participant to the other, according to a schedule that takes into account the unavailability of each participant.

The CT2M will provide the participants with an Excel form to use to register its results. For each calibration point, the participants must indicate at least the following results:

- ✓ Standard temperature (T_{std}),
- ✓ Temperature of the temperature measurement system to calibrate (T_{mes}),
- ✓ Correction ($T_{std} - T_{mes}$),
- ✓ Expanded ($k=2$) uncertainty, if determined.

Further information will be provided by the participants on the results file (on the method and the implemented means).

5. Assigned values and evaluation of performance:

The objectives of the performance evaluation of this inter-laboratory comparison are:

- The evaluation of the ability of each participant to obtain results in agreement with the results of all the participants (z-score or z'-score depending on the number of participants),
- The evaluation of the ability of each participant to obtain results close to an independent reference value taking into account the claimed expanded uncertainty (E_n score).

Two assigned values will therefore be established to meet each of these objectives:

- The robust average of the participants' results determined from the A algorithm defined in ISO 13528.
- The "reference value" determined from the reference laboratory results.

The standard deviation for proficiency assessment and the uncertainties of the assigned values will be determined in order to establish all the performance scores.

6. Report(s):

At the end of the round, a statistical analysis will be performed, and a final report will be sent to the participants. This report will contain the results of all the participants (rendered with a codification to respect anonymity), the detection of outliers, the assigned values and their uncertainties, the performance scores of the participants and all other elements useful for the interpretation.

Intermediate reports may be provided as the round is progressing, if the round period is longer than 6 months.

The final report will be distributed to all participants.

7. Provisional schedule:

| Key steps | Estimated deadline |
|---|---|
| End of registration | July, the 18 th 2023 |
| Round planning | August 2023 |
| Sending the detailed protocol and the results form | August 2023 |
| Launch of the round | September 2023 |
| Sending of interim report (if the round is longer than 6 months) | March 2024 |
| Publication of the final report | Depending on the number of participants |

8. Reciprocal commitments:

CT2M commitments:

The CT2M undertakes to:

- guarantee the confidentiality of participants results and respect their anonymity (*),
- carrying out the performance evaluation in complete impartiality,
- organize and process the results in accordance with the reference applicable documents (ISO 17043, ISO 13528).

(*) Data obtained and generated during the inter-laboratory comparison may be consulted during internal or external audits. Auditors are systematically subject to a confidentiality agreement. For communication purposes (conferences, articles, etc.), results may be used but in a totally anonymous manner. Transport of the test item from a participant to another necessarily entails the partial loss of anonymity concerning the identity of the previous participant and the following participant. Registration for this inter-laboratory comparison implies acceptance of this condition.

Participant commitments:

The participants of this inter-laboratory comparison undertake to:

- respect the protocol provided for carrying out calibrations,
- provide their results within the deadlines defined by the organizer,
- not to communicate with any other participant who may be known in order to avoid any risk of collusion,
- transmit all the necessary information of the successful completion of the inter-laboratory comparison to all persons concerned within their laboratory,
- inform CT2M of any malfunction.

9. Registration and contact:

If you are interested in participating in this inter-laboratory comparison, please complete the associated registration form "Registration form – Temperature ILC 2023-2024_v1" and return it by email to ciltemperature@ct2m.fr.

For further information please contact us by:

- ✓ Email: ciltemperature@ct2m.fr
- ✓ Phone: +33 (0)4 90 50 90 14