

Plan of the intercomparison of distributed calibration objects in temperature	Issue 1	
Approved by Håkan Källgren	Date 2023-11-10	Page 1 ( 5)

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## Intercomparison of digital thermometers

The gauges will be transported between participating laboratories.

### ILC temp 2023:1

#### Proficiency testing provider (PT)

Swedish Metrology and Quality AB (SMQ) is organizing this intercomparison on calibration of the following objects.



#### Temperature ranges

Sensor 1

-80, -40, 30, 0, 50, 80, 120 and 200°C

Sensor 2

-80, -40, -30, 0, 50, 120, 200, 300, 400 and 500°C

You may participate even if you cannot calibrate all points.

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The above concept of intercomparison was decided by an advisory group related to the calibration of temperature.

No subcontractors are involved in the intercomparison.

### Participants welcome to this intercomparison.

Participation is open for three categories of laboratories:

- Accredited laboratories
- Laboratories that will apply for accreditation.
- Laboratories that want to evaluate their Calibration and Measurement Capability (CMC).

Due to practical reasons the number of participants is limited to minimum 8 and maximum 20.

### Description of the values included in the intercomparison.

The intercomparison will start and end with both sensors calibrated at the reference laboratory which also will define the reference values. Its CMC levels for uncertainty are given in the tables below as well as the possibly reference uncertainty when calibrating the object.

Calibration Point temperature °C	CMC values Reference laboratory °C	Possible reference uncertainty (U) Sensor 1* °C	Possible reference uncertainty (U) Sensor 2* °C
-80	0,005	0,015	0,015
-40	0,005	0,015	0,015
-30	0,005	0,015	0,015
0	0,005	0,015	0,015
50	0,005	0,015	0,015
80	0,005	0,015	0,015
120	0,005	0,015	0,015
200	0,005	0,015	0,015
300	0,010		0,020
400	0,010		0,020
500	0,015		0,025

\* Including possible drift during circulation.

The uncertainty values presented in the table above are expressed as U with 95 % confidence level.

The reference values and respective uncertainties concerning these intercomparison objects will be based on the calibration in the reference laboratory before and after the distribution.

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Reference laboratory will be RISE Sweden.

### Detailed documented instructions

Detailed technical instructions will be sent to the participants who have registered to the ILC together with the reporting form as an excel document.

### Time schedule and quality check

After registration of interested laboratories a plan for circulating of the calibration objects and a time schedule will be worked out and sent to all of them.

The calibration objects will eventually be transported by different means in participating countries.

Immediately at receiving and sending the objects each participant shall inform the organizer (SMQ) by e-mail about the status of the objects. If there are any signs of impact (for example marks or scratches) a photograph shall be sent to the organizer to decide how to proceed and to inform the next participant.

Each participant will have access to the object for maximum 5 working days and should use its own method for calibration.

Laboratories freely decide which uncertainty they want to state in the protocol, accredited laboratories can declare their CMC-values, or a value estimated for the actual measurement condition.

After finishing calibration, the objects shall be sent to the following participant on the transportation list using the same parcel they arrived in.

Original data from the calibration shall be sent to the organizer immediately after finishing the calibrations. This is preferably done by e-mailing the filled excel-reporting file. By a fast delivery, the organizer gets control that everything is as expected. It also helps to detect eventual arising problems in time.

### Statistical analyses that will be used

The organiser will calculate reference values that will be used in the calculations as described in ISO/IEC 17043:2010 annex B3 presenting En-values (formula B5)

### Reporting

Participants shall send their final calibration certificate to the organiser within one week after the calibrations are finished in form of a pdf-file in a mail message.

The excel-reporting document that will be sent to all laboratories shall indicate important environment conditions.

For background information participants should inform on the following:

- Working standard – reference equipment

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- Uncertainty of the working standard
- Traceability

At the end of the intercomparison a draft report will be returned to the participants within 2 weeks from the time when the last participant has reported its results in a calibration certificate.

The participants are encouraged to comment on the draft report within two weeks after receiving it.

If a participant does not follow the described reporting rules without giving reasonable explanations the organizer tries to extract the relevant content for the comparison. If this is not possible the results will be excluded from the report.

A participant may decide to withdraw from the exercise. This might be caused by problems detected during or after having performed the measurements. However, the withdrawal in this case must be announced to the organizer before the draft report is distributed to all participants.

The participant may appeal to the full report if there should be major faults in the report.

The intercomparison report will list up all participating laboratories. However, each will be treated anonymously, and its result will only be identified by a code that is send to each participant in a separate e-mail.

### Damaged PT/ILC item

The participant shall immediately inform the organizer in case of any anomalies or other detected problem to allow him to take appropriate actions.

### Price for participation

- Laboratories having maximum 3 calibration technicians –basic price 750 EUR.
- Laboratories having more than 3 calibration technicians –basic price 980 EUR.
- In addition, 280 EUR calibration sensor 1
- In addition, 420 EUR calibration sensor 2

The laboratories shall pay the transport costs to next laboratory.

If the laboratory decides not to fulfil its part of the agreement after they have registered, they shall still pay the registration price.