Intercomparisons on calibration of load cells	Issue 1	
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Intercomparison on calibration of load cells ILC force 2023:3

Proficiency testing provider (PT)

Swedish Metrology and Quality AB (SMQ) is organising this intercomparison on calibrations of:

1. Force calibration compression load cell 100 kN including circulated amplifier
2. Force calibration compression load cell 100 kN including own amplifier

Only increasing load shall be calibrated
Participants may choose up to which load they want to calibrate.

This concept of the intercomparison on calibration has been decided by the advisory group related to this calibration area. No subcontractors are involved in the intercomparison.

Participants in the intercomparison

There are three categories of laboratories that may participate in this comparison:

- Accredited laboratories
- Laboratories that will apply for accreditation.
- Laboratories that want to evaluate their calibration quality.

The result of the intercomparison will establish a base for the CMC values in calibrations for the laboratories.
The number of participants is minimum 4 and maximum 20.

Description of the values included in the intercomparison.

A reference value and its uncertainty will be determined according to calibrations at the reference laboratory and will serve as a base for calculations in the report. The table below show the reference laboratory CMC uncertainty together with predictable uncertainty of the reference value. Note that the predicted uncertainty of the reference value is a rough estimate considering the influence of the calibration object (load cell + amplifier), i.e. its repeatability and stability (drift during the course of the comparison).

Loading	Relative CMC uncertainty of the reference laboratory (deadweight) *	Predictable relative uncertainty of the reference value *
100 kN compression	0,005 %	0,03 %

* Values are related to the measured value

Time schedule and detailed documented instructions

A detailed time schedule and technical instructions together with the reporting protocol in form of an excel document will be sent to the participants who have registered to the ILC. The time schedule will allow one week for calibration including transport to next participant.

Preliminary data from the calibration shall be sent to the organiser by e-mail directly after finishing the measurements. Preferably you can use the prepared excel protocol form directly or send it in pdf-format. The final calibrating certificate shall have the form you are used to and shall be sent as pdf-file one week after finalizing the work.

Equipment to calibrate.

Load cell

Amplifier

Connecting equipment

The following connecting details will be provided by SMQ and shipped together with the load cell.

Connection cable and voltage 5 m 4 wire

Preferred excitation voltage 5V AC 225 Hz. Nominal output 2 mV/V

There will be more information given to the laboratories after they have registered for this ILC.

Different approach of calibrations

The laboratories can choose to calibrate the load cell in connection to the amplifier or without the amplifier using its own amplifier. Both calibration principles can be used as well.

Calibration points

The participants shall calibrate according to their own method and use their reference equipment. The participants can calibrate up to the force level they decide. The calibration points on force on compression will be:

100 kN load cell calibration points, kN
0
10
20
30
40
50
60
80
90
100

Load cell shall be calibrated with increasing loads only. Not decreasing loads.

Statistical analyses that will be used

The organiser calculates the reference value based on the reference values from calibrations before and after the calibration.

The formula described in ISO/IEC 17043:2023 annex B Equation B6 which gives En-values

Reporting

The participants shall send the excel sheets provided when the equipment is sent to next participant.

Participants shall send the calibration certificate to the organiser within one week after the calibrations are finished. If the participant is an accredited laboratory the certificate shall comply with ISO 17025.

A draft report will be given to the participants within 4 weeks from the time when the last participant has reported the results in a calibration certificate.

The participant shall comment on the draft report within two weeks after receiving the draft report.

A participant not following the described reporting rules without giving reasons will be excluded from the report.

A participant may decide to leave the work before the draft report is distributed to the participants.

The participant may appeal to the organiser the full report if there are major faults in the report.

The report will be anonymously, and the participants will get an identification code related to the results in a separate e-mail.

Damaged PT item

The participant shall immediately inform the organiser about any damages on the PT item and the organiser will take appropriate actions.

Price for participation

Price for laboratories:

- Laboratories having maximum 3 calibration technicians –basic price 750 EUR.
- Laboratories having more than 3 calibration technicians –basic price 980 EUR.

Additional 100 kN load cell:

- load cell excluding amplifier 1100EUR.
- load cell including amplifier 1300 EUR.

The basic price will be invoiced when the laboratory has registered for the ILC.

Each laboratory will cover the costs for transport including insurance costs to the next laboratory.

If the laboratory decides not to fulfil their part of the agreement after they have applied, they shall pay the basic price.