

Intercomparisons on calibration of load cells	Issue 1	
Approved by Håkan Källgren	Date 2023-03-12	Page 1 (5)

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Intercomparison on calibration of load cells in, ILC force 2022:3

Proficiency testing provider (PT)

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

1. Force calibration tensile and compression load cell 100N
2. Force calibration tensile and compression load cell 1000N

Participants may choose the objects they want to calibrate.

This concept of the intercomparison on calibration has been decided by the advisory group related to this calibration areas. 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 8 and maximum 20.

Description of the values included in the intercomparison.

A reference value will be established as a base for calculations in the report.

Preliminary uncertainty values are:

	Possible reference uncertainty value load cell	Possible reference uncertainty value including the amplifier
Loading	N	N
100 N compression	0,005	0,006
100 N tension	0,005	0,006
1000 N compression	0,05	0,06
1000 N tension	0,05	0,06

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.

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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:

2 Knuckle eyes for tensile loading to each load cell.

Load button and thrust piece for compression to each load cell.

Connection cable and voltage

6 m 6 wire

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

There will be more information given to the laboratories when 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.

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Calibration points

The participants shall calibrate according to their own method and use their reference equipment. The calibration points on force (compression and extension) will be:

1000N load cell calibration points (compression and extension)	100N load cell calibration points (compression and extension)
0	0
100	10
200	20
300	30
400	40
500	50
600	60
800	80
1000	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 17043:2010 annex B Equation B55 which gives E_n -values

Reporting

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 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.

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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 N load cell

- 100 N load cell excluding amplifier compression 380 EUR.
- 100 N load cell excluding amplifier tension 380 EUR.
- 100 N load cell including amplifier compression 490 EUR.
- 100 N load cell including amplifier tension 490 EUR.
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Additional 1000 N load cell

- 1000 N load cell excluding amplifier compression 380 EUR.
- 1000 N load cell excluding amplifier tension 380 EUR.
- 1000 N load cell including amplifier compression 490 EUR.
- 1000 N load cell including amplifier tension 490 EUR.

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

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

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