

Plan of the intercomparison of distributed calibration objects in pressure		
Approved by Håkan Källgren	Date 2024-04-17	Page 1 ( 7)

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## Intercomparison of 3 pressure gauges

The pressure gauges will be transported between participating laboratories.

### ILC pressure 2023:1

Proficiency testing provider (PT)

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

### Transfer standards:

#### Equipment 1 Pfeiffer CMR 374



Calibration points for comparison: 0,001, 0,005, 0,01, 0,05, 0,1 and 0,5 Torr for increasing pressures/values. Connections KF 16

You do not need to calibrate all pressure levels.

**Observe that it shall be connected to channel 1.**

#### Equipment 2 Pfeiffer CMR 371



Calibration points for comparison: 1, 5, 10, 50, 100 Torr for increasing pressures/values.

Connections KF 16

You do not need to calibrate all pressure levels.

**Observe that it shall be connected to channel 2**

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### Indicator and cables



### Equipment 3 Keller



Calibration points for comparison: 900; 950; 1000; 1050; 1100 hPa for increasing pressures/values.  
Connection ¼" NPT

You do not need to calibrate all pressure levels.

The three transfer standards above are sent in one parcel. Participants can choose to calibrate one or all gauges at the pressure steps that the laboratory is capable of.

The above concept for the intercomparison was decided by an advisory group related to the calibration area of pressure. No subcontractors are involved in the intercomparison.

Participants welcome to this intercomparison.

Participation is open for three categories of laboratories:

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- 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 all objects calibrated at the reference laboratory.

The recognized CMC levels in the reference laboratory is documented below as well as the possible uncertainty levels (U) of the transfer standards are given in the table below.

	Calibration Point/Pressure	CMC	Possible uncertainty (U)*
	Torr	Torr	Torr
<b>Object 1</b>	0,001	0,000028	0,0002
	0,005	0,00014	0,0003
	0,01	0,00028	0,001
	0,05	0,0013	0,002
	0,1	0,0016	0,002
<b>Object 2</b>	0,5	0,0040	0,005
	1	0,010	0,015
	5	0,014	0,02
	10	0,019	0,03
	50	0,0053	0,006
<b>Object 3</b>	100	0,0068	0,008
	hPa	hPa	hPa
	900	0,032	0,04
	950	0,034	0,04
	1000	0,035	0,04
	1050	0,037	0,05
	1100	0,038	0,05
	1050	0,037	0,05
	1000	0,035	0,04
	950	0,034	0,04
900	0,032	0,04	

\* Including possible drift during the circulation.

The resolution in the display of objects 1 and 2 is 4 decimals.

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The resolution in the display of object 3 is 5 digits.

The uncertainty values are expressed as expanded uncertainty (U) at 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.

Traceability will be through the reference laboratory RISE in 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 send to the organizer to decide how to proceed and to inform the next participant.

Each participant will have access to the object for maximum 10 working days and should use its own method for calibration.

If one wishes to use further calibration points these should be presented in the calibration certificate in order not to disturb a quick evaluation prepared for the the reporting form as excel document.

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. The organizer shall be informed when and by which means the transport to next participant will be organised.

Original data from the calibration shall be sent to the organizer immediately after finishing the measurements. 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)

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## Reporting

Excel-reporting document will be sent to the laboratories that have applied for participation and those shall be sent to the organiser when the objects are sent to next participant.

Participants shall send their final calibration certificate to the organiser within 1 week after the calibrations are finished in form of a pdf-file in a mail message.

For background information participants should inform on the following:

- Working standard – reference equipment
- Uncertainty of the working standard
- Traceability

At the end of the intercomparison a draft report will be returned to the participants within 4 weeks from the time when the last participant has reported the results in a calibration certificate.

The participants are encouraged to comment on the draft report within 2 weeks after receiving.

The final report will be published within 2 weeks after receiving comments on the draft report.

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 sent 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.

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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.
- In addition, 590 EUR on each calibration object as defined in list of objects above.

Each laboratory will cover the transport cost to next laboratory.

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