



APLAC INTERLABORATORY COMPARISON APM 021 - VOLUME INSTRUCTIONS TO LABORATORIES

EQUIPMENT

A metal case containing:

graduated measuring cylinder of 100 mL capacity with 1 mL graduation

PLEASE HANDLE THE MEASURING CYLINDER CAREFULLY!!!

On receipt, unpack the artifact and inspect them for any defects. Leave the artifact in their box when not in use. When ready to start, place them on a suitable work surface.

MEASUREMENTS TO BE CARRIED OUT

Participants are asked to carry out calibration of measuring cylinder, which is in this comparison program defined as:

*"determination of correction to the nominal scale of artifact to obtain the estimate of true volume of water contained in the measuring cylinder for **20 mL, 40 mL, 60 mL, 80 mL and 100 mL** nominal scale at 20⁰C temperature"*

Calibration should be performed based on gravimetric method as outlined in *ISO 4787, or ASTM 542 or AS 2162, or other equivalent standards, or in-house laboratory developed method following gravimetric method for the calibration of graduated measuring cylinder*. Possible comparison among participants is only possible when all participants report the calibration results in a harmonized way. For this purpose, calibration results shall be reported in the form of accordance with the above description, i.e. *correction to the nominal scale of artifact to obtain the estimate of*



true volume of water contained in the measuring cylinder for **20 mL, 40 mL, 60 mL, 80 mL and 100 mL** nominal scale at 20°C temperature". Such correction may be calculated using the following formula:

$$C_{i(20^{\circ}C)} = V_{i(20^{\circ}C)} - V_{i(nominal)}$$

where:

$C_{i(20^{\circ}C)}$ = correction shall be applied to nominal scale of measuring cylinder at i-th point of measurement to obtain the estimate of true volume of water contained at 20°C

$V_{i(20^{\circ}C)}$ = estimates of true volume of water contained in the measuring cylinder at i-th point of measurement at 20°C

$V_{i(nominal)}$ = nominal scale value of measuring cylinder at i-th point of measurement

Calibration results shall be reported in the attached result sheet.

UNCERTAINTY OF MEASUREMENT

Uncertainty should be calculated using the method described in the ISO Guide to the Expression of Uncertainty in Measurement. The expanded uncertainty, U_{lab} , for each mass standard is to be reported at a 95% level of confidence.

Uncertainty sources should be estimated by each participant in evaluating uncertainty based on the mathematical model of gravimetric method volume measurement.

DOCUMENTS TO BE SUBMITTED

Within one week of the completion of the measurements, the participating laboratory is required to send the attached Results Form **and** the calibration report/certificate for the artifacts to its accreditation body. Description of the calibration procedure used shall also be provided if it is not included in the calibration report/certificate.



No other documents are required. Laboratories should make a copy of the Results Form for their own records.

Participants should report their accredited Best Measurement Capability, and shall give explanatory remarks if their reported uncertainty in this programme differs from their BMC.

A final report will be issued at the end of the programme with each laboratory only identified by a **confidential** code number.

GENERAL INFORMATION

For general queries, please contact your accreditation body. Additional information may be obtained from:

Program coordinator:

Donny Purnomo (Mr)

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Asia Pacific Laboratory Accreditation Cooperation

APLAC INTERLABORATORY COMPARISON APM021 - VOLUME RESULTS SHEET

Lab.code (filled by coordinator) : _____
 Laboratory : _____
 Accreditation Number (accredited by) : _____
 Calibration officer : _____
 Date of calibration : _____
 Standard test specification/method : _____
 Environmental temperature : _____ °C
 Environmental relative humidity : _____ %
 Atmospheric pressure : _____ mmHg
 Ambient air density : _____ kg/m³

Nominal Scale Value (mL)	Correction to the Nominal Scale Value (mL)	Expanded Uncertainty at 95% c.l (± mL)	Accredited Best Measurement Capability (± mL)
20			
40			
60			
80			
100			

Explanatory remarks, if reported uncertainty differs from BMC :

Standard used : _____
 Capacity / Manufacturer : _____
 Sequence of reading : _____
 Number of times this : _____
 sequence was done to determine measured value for the volume : _____