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MSL proficiency test MSL-PT-L01-2020

External Micrometer

Technical Protocol

1. Introduction

The purpose of this proficiency test is to verify the calibration capability of the participating laboratories in the field of engineers' measuring tools and instruments by calibrating an external micrometer with a range of 0-25 mm x 0.001 mm. The instrument will be initially calibrated by MSL then sent to each participating laboratory. Between measurements at each laboratory, the instrument will be returned to MSL for a damage check and recalibration before being dispatched to the next participant. Finally, the instrument will be recalibrated by MSL to determine any possible drift.

2. Equipment and handling

- Mitutoyo External Micrometer 0-25 mm x 0.001 mm S/N: XXXXX

On receipt, unpack and inspect the instrument for any damage. Report any damage immediately to MSL.

Once measurements are completed, repack the instrument in the original packaging and return by courier to:

Nina Wronski
Measurement Standards Laboratory
Callaghan Innovation
69 Gracefield Road
Lower Hutt 5010

3. Measurements to be carried out

Please do NOT dismantle or attempt any maintenance on the instrument.

Calibrate the micrometer following your normal method. This may include as many of the following metrological characteristics that are within your capability:

- error of indication of the digital readout
- flatness of each measuring face
- parallelism of measuring faces

The metrological characteristics are as described in JIS B 7502:2016.

The choice of measurement points for determining the error of indication is up to the participant but should be those usually used for a commercial or in-house calibration. Laboratories should submit their proposed measuring points to MSL at the time of registration.

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4. Documents to be submitted

Within one week of completion of the measurements, participating laboratories are required to submit their results to MSL in the form of a calibration certificate as routinely reported to customers. Also submit your raw results – including measurement repeats - in the form of electronic or physical worksheets as recorded during the calibration. If you wish to submit results for more than one testing officer, we would be willing to analyse the additional data. However, please indicate which results you wish to formally submit for the programme.

Uncertainties of measurement should be calculated and reported for each characteristic using your usual method, which should be consistent with the method in the ISO *Guide to the Expression of Uncertainty in Measurement*. Uncertainties should be reported as expanded uncertainties at the 95 % level of confidence.

It is acceptable for the purposes of this proficiency test to report an uncertainty below that on your Scope of Accreditation or to report results at points outside the range of the measurand on your Scope of Accreditation.

5. Further information

Schedule

The comparison is scheduled to start in *****. Each laboratory has been assigned one week to complete the calibration.

Analysis

Results for each reported characteristic from all participating laboratories will be compared to the reference values measured at MSL. The results will be reported as a table of normalised error (E_n) values, which are given by:

$$E_n = \frac{\text{LAB} - \text{REF}}{\sqrt{U_{\text{LAB}}^2 + U_{\text{REF}}^2}}$$

where:

LAB = participating laboratory's reported characteristic

REF = reference laboratory's reported characteristic

U_{LAB} = participating laboratory's expanded uncertainty

U_{REF} = reference laboratory's expanded uncertainty

Reporting

Your laboratory will receive a customised interim report comparing your results with the most recent reference calibration results, including a normalised error analysis and feedback on your submitted calibration certificate. The interim report will be available within two weeks of your results being submitted to MSL.

A draft final report will be compiled once all participating laboratories have completed their calibrations. This report will identify results only by the laboratory number and the same report will be issued to all participants. Laboratories will be given two weeks to comment on the draft final report, after which a final report will be issued.

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Contact information

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