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TECHNICAL PROTOCOL
EURAMET PROJECT 1321

ANGLE BLOCK BILATERAL COMPARISON

DRAFT A.2

08 July 2014

Laboratoire national de métrologie et d'essais
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1 DOCUMENT CONTROL

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2 INTRODUCTION

The comparison is organised within the EU-Indonesia Trade Support Programme II, Sub-project Number APE12-06b, “Improvement of traceability of Metrology and Calibration measurements of Puslit KIM”.
Two National Metrology Institutes take part in this comparison: LNE (France) and KIM-LIPI (Indonesia).
LNE is acting as the pilot laboratory and in this function is responsible for providing the travelling standard, the evaluation of the measurement results and the final report.
The comparison will be accomplished in accordance with the EURAMET Guidelines on Conducting Comparisons and BIPM Guidelines for Planning, Organising, Conducting and Reporting Key, Supplementary and Pilot Comparisons.

3 MEASUREMENT ARTEFACT

Five angle blocks of 10'', 5', 30', 5° and 30° will be used to test the calibration capabilities of the laboratory.

Figure 1 : *Image of the angle block box. There 25 angle blocks, only the 10’’, 5’, 30’, 5°, 30° angle blocks will be measured. The others should be kept untouched under grease protection.*

The angle blocks will be KOBA blocks with a measuring face of 50 x 8 mm.

4 HANDLING THE ARTEFACT

4.1 General handling

Open the wooden box carefully and only in clean environment. Use clean room gloves which are in the box in order to handle the angle block and **never** touch the measuring surfaces. When not in use, place the angle blocks back into its container to avoid dust or dirt deposits.

If it's for a long period then put grease of the different faces in order to avoid any oxidation problem.

4.2 Cleaning

To cleaning the angle block, the protection grease must removed using ethanol, and acetone if the grease is to dry and cannot be removed only with ethanol.

4.3 Storage

Use wooden box to avoid dust deposits. Always try to keep the artefact under good measuring room conditions, i.e. within the room, where it gets calibrated. For travel and long period of storage, don't forget to put grease in order to protect the angle blocks from oxidation.

5 MEASURAND

The angle blocks used are basically a polygon but with only two faces. These blocks, like polygons, also have pyramidal errors. The angle is defined by the angle between the measuring faces with the plain perpendicular to the line being common to both functional planes.

6 MEASUREMENT INSTRUCTIONS

The angle blocks must be measured using an aperture, which is 1mm less (on the edge) than the overall face.

The autocollimator must be adjusted as precisely as possible, with it's optical axis perpendicular and in true alignment to the table's axis of rotation and central to the centre of the angle block faces.

The angle blocks are to be measured in both the normal and inverted positions, but only the mean will be reported. The angle blocks must be adjusted for eccentricity and must be laterally adjusted so that the measuring faces have a minimum run-out.

The deviation of the nominal angle must be reported in arc seconds.

7 MEASUREMENT UNCERTAINTY

The uncertainty of measurement shall be estimated according to the ISO Guide to the Expression of Uncertainty in Measurement. (GUM) and the complete uncertainty budget must be reported.

8 REPORTING OF RESULTS

A report should be sent to the pilot laboratory within one month after the measurements are completed. The report should include:

- Description of the measurement method
- The reference standard

- The traceability to the SI
- The results of the quantities to be measured
- The associated standard uncertainties, the effective degrees of freedom and the expanded uncertainties.
- The uncertainty budget.

9 TRANSPORTATION

The travelling standard must be transported in the original case and protected from mechanical loads, vibration etc. for transport by plane.

10 CIRCULATION SCHEME

The agenda of the calibration is given in the following Table 1:

Laboratory	**Scheduled time**
LNE 1st	August 2014
KIM LIPI	September 2014
LNE 2nd	October 2014

Table 1 : *Timetable of the comparison*

11 CONTACT

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