

EUROMET PROJECT FINAL REPORT OF COMPARISON

Ref No.: 229

Field: Length

Partners: CH(OFMET), DE(PTB), DK(DFM), ES(CEM), FI(CMA), FR(LNE,ETCA), GB(NPL), IT(IMGC), NL(NMI), SE(SP)

Subject: INTERCOMPARISON OF INTERFEROMETRIC MEASUREMENTS OF SHORT GAUGE BLOCKS

Result:

A set of seven gauge blocks with lengths up to 100 mm was circulated and calibrated by ten European national metrology institutes and one national laboratory. The exercise started in January 1991 and ended in December 1992. Measurement items were the central length, the variation in length, the flatness and, where possible, the coefficient of thermal expansion.

The agreement of the measurement results for the central length is roughly within ± 20 nm and can be regarded as very good. It seems to depend mainly on the quality of the measurement surfaces and the wringing capability of the gauge blocks. The agreement of the measurement of flatness and variation in length is considerably worse than could be expected from the results of central length measurements. This is explained mainly by the fact that in practical measurements the border zone defined by the standard is not quantitatively respected. The measurements of the thermal coefficient of expansion are in good agreement.

Within an additional measurement loop, a few laboratories took the opportunity to correct for some problems encountered during the first measurements.

The final report collecting all the reported data is available to the participants. The main results are being submitted for publication:

Intercomparison of interferometric measurements of short gauge blocks

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