

EURAMET comparison - Project number: XXXX

Comparison of sub-multiples of the kilogram

TECHNICAL PROTOCOL

1. Objectives

This technical protocol specifies the conditions of interlaboratory comparison of stainless steel mass standards between MIRS, Slovenia, MBM, Montenegro and HMI, Croatia.

The objectives of the comparison are to facilitate the demonstration of metrological equivalence between the participating national laboratories, and to check the capabilities of MBM and HMI to publish or improve, respectively, their calibration measurement capabilities (CMC).

2. Participants

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3. Transfer standards

The transfer standards for this comparison comprise three stainless steel cylindrical weights with a knob (OIML R111 design) of the following nominal masses: 200 g, 20 g, 2 g, and one german silver rectangular sheet weight (OIML R111 design) of the nominal mass 200 mg. The weights are housed in two containers as presented on Picture 1. They were produced by Mettler Toledo and purchased by MIRS in 1997.

Each weight is marked with a **dot**, additionally the 200 mg weigh is marked "1".



Picutre 1: Plastic (left) and wooden (right) container with standards

The density/volume, centres of gravity and the magnetic susceptibility of each mass standard (except for the 200 mg standard) are given as a part of the measurement report (Measurement Report.doc).

Stability of the standards has been monitored at the pilot laboratory.

4. Time schedule

Preliminary time schedule

Measurements at MIRS, Ljubljana: January 2015

Transport to HMI, Zagreb

Measurements at HMI, Zagreb: February 2015

Transport to MIRS, Ljubljana

Transport to MBM, Podgorica

Measurements at MBM, Podgorica: March 2015

Transport to MIRS, Ljubljana

Measurements at MIRS, Ljubljana: April 2015

Draft report expected: June 2015

5. Unpacking, handling and care of the standards

When the standards arrive at the participating laboratory, the transportation box and its contents should be checked for damage and missing items. A visual inspection of the surfaces of the standards should be made and the results noted on the measurement report. The pilot laboratory should be informed about the arrival and departure time and about the result of the visual inspection as soon as possible by email.

Every incident during handling of the transfer standards, where the standards may have been polluted or damaged, should be documented and communicated to the pilot laboratory as soon as possible. Also, the pilot laboratory should be informed about any delay or required change of the time schedule.

The standards should be stored at a place where they are protected from dust, aerosols and vapours all the time they are not in the balance, for example in their travelling containers or in a suitable clean environment protected from dust, drafts and vapour. If the weight is placed on a table, the table surface should be clean and covered by acid free tissue paper.

The transfer standards should be handled carefully and only ever with the appropriate tools. When being manipulated the weights should be handled with tongs or tweezers. The standards should never be touched with bare hands.

The standards should be wrapped in the acid free tissue paper provided before being put in their containers

6. Measurements to be performed

The participating laboratories shall determine the mass and conventional mass value of the transfer standards according their normal calibration procedure. An appropriate time should be allowed for the stabilisation of the weights following transportation (as specified in OIML R111 for class E1).

Before the mass determination, dust particles should be removed from the surface of the standard by a clean, soft brush. No further washing should be performed. After visual inspection for dust particles on the surface, the weights should be placed in the weighing chamber of the comparator.

All weighings should be performed in air. For the buoyancy correction, the air density should be determined using the laboratory's standard procedure, specified on the annexed form.

7. Reporting

A completed measurement report (the form "Measurement report.doc") for the measurement results, data of the ambient conditions, instruments used and traceability of the participant's reference standards must be submitted to the coordinator for the results within two weeks after the completion of the measurements. All collected measurement reports will be then sent to MIRS, which will carry out the data analysis.

The pilot laboratory will provide a first draft of the comparison report within four weeks after the receipt of the results of the data analysis.

8. Transportation

The containers, as presented on the Picture 1, are packed in a cardboard box.

It is the responsibility of each laboratory to organize the transport to the next participant – by well-known courier or, preferably, by hand-carrying – and ensuring that all necessary customs and importation documents (ATA Carnet for Montenegro) are in order.

Every incident, where the artefact may have been polluted or damaged, should be documented and communicated to the pilot laboratory as soon as possible. Also, the pilot laboratory should be informed about any delay or required change of the time schedule.

9. Financial aspects and insurance

Each participating laboratories is responsible for its own costs for the measurements, transportation and travel insurance as well as any damage that may occur within its country.

10. Annexed forms

Measurement Report