



**10<sup>th</sup> EUROMET Technical Committee Chairpersons Meeting**  
**21-22 March 2007**

**Item 10.12.07 – Report from TC-Mass and Related Quantities**

**1. Projects**

In the period under review (from 1 April 2006` to date) in TC area of Mass and Related Quantities the numbers of proposed, agreed and completed projects in the various categories are shown in the table below. The previous years numbers are shown in brackets.

	<b>Comparison</b>	<b>Co-operation</b>	<b>Traceability</b>	<b>Consultation</b>	<b>Total</b>
<b>Proposed</b>	7 (6)	4 (2)	-	-	11(8)
<b>Agreed</b>	17 (16)	13 (11)	3 (3)	1 (1)	34 (31)
<b>Completed</b>	22 (20)	25 (23)	6 (6)	11 (11)	64 (60)
<b>Total</b>	<b>46 (42)</b>	<b>42 (36)</b>	<b>9 (9)</b>	<b>12 (12)</b>	<b>109 (99)</b>

The projects can be broken down by technical area as follows:

	<b>Proposed</b>	<b>Agreed</b>	<b>Completed</b>	<b>Total</b>
<b>Density</b>		2	5	<b>7</b>
<b>Force</b>	4	6	2	<b>12</b>
<b>Hardness</b>			1	<b>1</b>
<b>Mass</b>	3	13	26	<b>42</b>
<b>Pressure</b>	3	12	25	<b>40</b>
<b>Torque</b>	1		1	<b>2</b>
<b>Viscosity</b>		1	4	<b>5</b>

**2. Status of Comparisons in Mass and Related Quantities**

There are currently 19 registered European Regional Key Comparison in the area of Mass and Related Quantities, of which 11 are active, 4 have provisional equivalence, 3 have been approved for equivalence and one is planned to start this year. Details are given in the table below.

<b>Comparison ID</b>	<b>Project no.</b>	<b>Subfield</b>	<b>No. of part.</b>	<b>Pilot</b>	<b>Status</b>	<b>Years</b>
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EUROMET.M.M-K1	215 C	Mass	10	NPL	Report in progress, Draft B	1992-1999
EUROMET.M.M-K2	445 A	Mass	25	SP	Report in progress, Draft B	2001-2003
EUROMET.M.M-K2.1	786 A	Mass	5	SP	Protocol complete	2004-
EUROMET.M.M-K4	510 A	Mass	26	NPL	Report in progress, Draft B	1999-2003
EUROMET.M.D-K1	339 C	Density	12	METAS	<a href="#">Provisional equivalence</a>	1998-1999
EUROMET.M.D-K4.Prev	236 C	Density	5	IMGC	<a href="#">Provisional equivalence</a>	1993-1994
EUROMET.M.D-K2	627 A	Density	8	PTB	Report in progress, Draft B	2001-2002
EUROMET.M.D-K4	702 A	Density	11	IMGC	In progress	2003-
EUROMET.M.P-K1.a	442 A	Pressure	10	BNM-LNE	<a href="#">Approved for equivalence</a>	1999-2002
EUROMET.M.P-K1.b	442 A	Pressure	7	BNM-LNE	<a href="#">Approved for equivalence</a>	2000-2002
EUROMET.M.P-K2	305 C	Pressure	6	PTB	<a href="#">Approved for equivalence</a>	1994-1995
EUROMET.M.P-K3.a	439 A	Pressure	8	LNE/NPL	Report in progress, Draft B	1999-2001
EUROMET.M.P-K3.b	439 A	Pressure	13	NPL	Report in progress, Draft B	1999-2001
EUROMET.M.P-K4	389 C	Pressure	14	NPL	Report in progress, Draft B	1998-1999
EUROMET.M.P-K5	045 C	Pressure	7	BNM-LNE	<a href="#">Provisional equivalence</a>	1993-1995
EUROMET.M.P-K6	110 C	Pressure	6	BNM-LNE	<a href="#">Provisional equivalence</a>	1992-1994
EUROMET.M.F-K1	535 A	Force	9	MIKES	Report in progress, Draft A	2002-2004
EUROMET.M.F-K2	518 A	Force	10	NPL	Planned	2007-2008
EUROMET.M.F-K3	505 A	Force	11	PTB	In progress	2005-2007

There are also 6 supplementary comparisons of which four have been published and two are active. Details are given below.

Comparison ID	Project no.	Subfield	No. of partic.	Pilot	Status	Years
EUROMET.M.V-S1	273 C	Viscosity	4	PTB	<a href="#">Published</a>	1992-1993
EUROMET.M.V-S2	303 C	Viscosity	5	PTB	<a href="#">Published</a>	1993-1996
EUROMET.M.V-S3	415 C	Viscosity	12	PTB	<a href="#">Published</a>	2000
EUROMET.M.V-S4	415 C	Viscosity	8	PTB	<a href="#">Published</a>	1997
EUROMET.M.M-S1	461 A	Mass	15	CMI	Report in progress, Draft B	2001-2005
EUROMET.M.P-S1	788 A	Pressure	2	METAS	Report in progress, Draft B	2004-2005

### 3. CMCs

#### Last Submission

- The last submission EUROMET.M.5.2006 was submitted in May 06.
- SIM and APMP reviewed the submission and posted comments July 06.
- The submission was revised and resubmitted based on comments from these RMOs (Dec 06).
- Submissions were published in the BIPM KCDB (Jan 07).

#### Next Submissions

The next CMC submission from the EUROMET TC-M will be made at the end of March 07. It is expected to contain revisions from ten NMIs covering five technical areas (Mass, pressure, hydrometry, solid and liquid density).

An annual review timetable for EUROMET TC-M submissions was outlined and agreed at the last TC-M Contact persons meeting. This timetable is:

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|--|------------------|
| • Proposed changes submitted to TC chairman                      | <b>Sept</b>      |
| • Submissions reviewed by EUROMET review team                    | <b>Oct – Feb</b> |
| • Any outstanding issues concluded (at CP meeting)               | <b>Mar</b>       |
| • Agreed CMCs submitted to JCRB website for review by other RMOs | <b>Mar</b>       |
| • Comments from other RMOs received                              | <b>June</b>      |
| • Modifications to submissions                                   | <b>Sept</b>      |
| • Agreed CMCs published in the BIPM KCDB                         | <b>Sept</b>      |

The Submission of CMC from NIS (Egypt) via EUROMET has been agreed by TC-M and EUROMET Chairmen.

#### **CMC issues**

- An annual review timetable works well but one submission with multiple changes is cumbersome and multiple submissions (e.g. by measurement area) is difficult to administer
- KC support for CMC values;
  - What happens when KC uncertainties are limited by transfer standard stability and participants uncertainties are higher than their CMC claims
  - The status of bilateral comparisons is perceived as lower than for KCs by some reviewers. KC protocol MUST be followed in all cases and the use of independent NMI to analyse data has been suggested
- Since submissions in the EUROMET area mainly concern amendments to existing CMCs, Intra-regional review of submissions is currently performed by a “review team” – 1 expert in each technical area (plus the chairman). It is now proposed to circulate the reviewed changes (with a 2 week deadline) for comment by all CPs
- Changes to CMC values should be significant
- All submissions should be supported by accompanying documentation

#### **4. Meetings**

The Mass and related quantities TC meeting for 2007 was held at in Teddington UK from the 28<sup>th</sup> February to the 2<sup>nd</sup> March. The meeting included nine technical sessions to review progress in projects in the fields of mass, force, pressure, density. Additional workshops were held in the areas of mass pressure and dynamic measurement.

The TC meeting was attended by 66 delegates from 34 countries and also included representatives from the European Commission (IRMM) and the BIPM. For the first time two participants from NIS Egypt also attended the meeting. At the Contact Persons meeting Andy Henson, from the NPL International Office, made a presentation on “Developments in EURAMET and the EMRP”.



Upcoming meetings:

- 10th meeting of the CCM (BIPM, Paris) 23 March 2007
- EUROMET TC-M CP meeting (Bucharest, Romania) 27th to 29th February 2008

## **5. EUROMET adoption of the EA Special Calibration Documents**

The status of the following documents was discussed at the TC-M meeting in 2007. The status of the guides as of April 2007 is give below:

### **EA-10/03 Calibration of pressure balances (1997):**

The section on the evaluation of uncertainty is being updated. This will be completed by the end of the year.

### **EA-10/04 Uncertainty of Calibration Results in Force Measurements (1996):**

A EUROMET project (887) has been set up to review this document. The review will be complete by March 2008.

### **EA-10/14 EA Guidelines on the Calibration of Static Torque Measuring Devices (2000):** Conversion to EUROMET document completed.

### **EA-10/16 EA Guideline on the Estimation of Uncertainty in Hardness Measurements (2001):** Conversion to EUROMET document completed.

### **EA-10/17 EA Guidelines on the Calibration of Electromechanical Manometers (2002):** Conversion to EUROMET document completed.

### **EA-10/18 Guidelines on the calibration of non-automatic weighing instruments (2005):** Conversion to EUROMET document completed.

At the EUROMET TC-M Contact Persons meeting it was felt that an abridged/simplified version would be useful.

A Spanish version has been produced by CEM for use (mainly) in S. America.

## **6. The iMERA Project and the EMRP**

IMERA roadmaps in four areas (Mass, Force, Pressure and Dynamic measurement) have been developed and are part of the European Metrology Research Programme Draft Document. The roadmaps were reviewed at the last TC-M meeting (March 07).

## **7. Redefinition of the Kilogram**

The target date for the redefinition is still the CIPM meeting in 2011. The CCM have made a receoondation to the CIPM on the redefinition which includes a statement that the following conditions be met before the kilogram is redefined with respect to a fundamental constant:

1. there are no significant unresolved discrepancies between results from independent experiments,
2. the relative standard uncertainty of the best realization of the definition of the kilogram does not exceed two parts in  $10^8$ , at the level of one kilogram.
3. the results of a sufficient number of independent experiments are available with the required uncertainty.

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