

1. General Aspects

EURAMET TC-L has currently contact persons from 34 EURAMET members and 5 observers: 1 from a DI, 3 from liaison NMIs (EG, RSA and IL) and 1 from liaison organisation (BIPM). EURAMET TC-L will not any more take care of the CMC-processes of EG and IL. In the last meeting TC-L had 29 participants including an observer from Tunis.

2. Projects

In the period under review there were a total of 26 active projects with 11 being comparisons. In last TC-L meeting 12 new project proposals were discussed.

3. Comparisons

Key comparisons

The current status of EURAMET length key comparisons, in line with the CCL-KC, is as follows. Changes since the last TCC meeting are shown in **red**.

Designation	Title	Status
EURAMET.L-K1	Gauge blocks	Executive report, KCDB
EUROMET.L-K1.1	Gauge blocks	Executive report, KCDB
EURAMET.L-K1.2	Gauge blocks	Final & executive reports, KCDB
EURAMET.L-K1.2011	Gauge blocks	In progress
EUROMET.L-K2	Long gauge blocks	Executive report, KCDB
EUROMET.L-K3.1	Optical polygons	Final report, KCDB
EURAMET.L-K3.2009	Angle comparison using an autocollimator	In progress
EUROMET.L-K4.2005	Diameter standards	Final & executive reports, KCDB
EUROMET.L-K5.2004	Step gauge	Final & executive reports, KCDB
EUROMET.L-K6	2D-CMM artefacts	Final & executive reports
EUROMET.L-K7.2006	Line scales	Final & executive reports, KCDB
EURAMET.L-K8	Surface texture - Roughness	In progress
EURAMET.L-K8.2013	Surface texture - Roughness	Just started

Now when the EUROMET.L-K6 is finished and accepted TC-L has successfully ended the first round of the original set of key comparisons agreed for MRA by CCL in 1997. The first TC-L comparison EUROMET.L-K1 was started 1998. From the original set of KCs K2 and K5 have been closed down but K7 and K8 added few years ago. The second round has already been started with K1.2011.

Supplementary Comparisons

Three supplementary comparisons are running currently.

Designation	Title	Status
EURAMET.L-S20	Comparison of laser distance measuring instruments	Draft A
EURAMET.L-S21	Comparison of parallel thread gauges	In progress
EURAMET.L-S22	Calibration of gauge blocks by mechanical comparison	In progress
EURAMET.L-S23	High precision roundness measurement by multi-step method	About to start

Corrective actions due to bad performance in KC/SC

CCL guidance is that so called executive reports are made after each KC/SC by pilot and accepted by participants and RMO/CCL. In these reports those laboratories with problems to demonstrate their CMC capability are listed and the nature of the problem is explained. If corrective actions have been performed they are also listed. In annual TC-L meetings we go through pending issues and update a table where problems are listed.

4. CMCs

An overview of the past and present CMC submission is given in the table below.

Red entries changed status during the period reported.

Designation	Comment	Status
EUROMET.L.1.2001	Full submission, almost all services, most EUROMET NMIs	published, 2001-10-30
EUROMET.L.2.2002	Minor updates/submissions from GB and FI.	published, 2003-01-09
EUROMET.L.3.2004	Submissions from AT, CH, CZ, DE, HU, IT, NO. Also first submission from BG, LT, LV, RO, SI, YU.	published, 2005-03-23
EUROMET.L.4.2006	24 minor updates and 35 new submissions.	published, 2006-05-10

EUROMET.L.5.2007	19 updated or new CMCs from 7 NMIs	published, 2007-05-21
EUROMET.L.6.2008	37 CMCs (new and updated) from 8 countries including EG	published, 2009-02-11
EUROMET.L.7.2009	33 CMCs (new and updated) from 8 countries	published, 2009-11-21
EUROMET.L.8.2010	35 CMCs (new and updated) from 12 countries	published, 2010-04-21
EUROMET.L.9.2010	14 CMCs (new and updated) from 5 countries	published, 2010-09-19
EURAMET.L.10.2011	29 CMCs / 8 countries	published, 2011-08-18
EURAMET.L.11.2011	47 CMCs / 11 countries	published, 2012-10-12
EURAMET.L.12.2012	7 CMCs / 1 country	published, 2012-12-08
EURAMET.L.13.2012	11 CMCs / 3 countries	published, 2013-02-26
EURAMET.L.14.2013	14 CMCs / 3 countries	inter RMO review

In the period reported a total of 2 CMC sets from other RMOs were treated by TC-L (1 from COOMET, 1 from SIM).

5. Activities of the Sub-Committees

There are no sub-committees in TC-L.

6. EMRP

In February 2012 EURAMET TC-L organised EMRP CALLS 2012 Open workshop at PTB for preparation of the PRTs for 2012 Call. The workshop proved its profitability when 7 length JRPs and 2 length related JRPs were accepted for funding by review conference.

Length related accepted JRPs of EMRP 2010, 2011 and 2012 calls are listed below:

Call	Project name	Status
EMRP 2010; Metrology for industry	Optical and tactile metrology for absolute form characterization	started
	Dynamic Mechanical Properties and Long-term Deformation Behaviour of Viscous Materials	started
	Thermal design and time-dependent dimensional drift behaviour of sensors, materials and structures	started
	Metrology of Small Structures for the Manufacturing of Electronic and Optical Devices	started
	Metrology to Assess the Durability and Function of Engineered Surfaces	started
	New generation of frequency standards for industry	started
EMRP 2011; SI broader scope	Traceability of sub-nm length measurements	started
EMRP 2011; New Technologies	Traceable measurement of mechanical properties of nano-objects	started
	Traceability for computationally-intensive metrology	started
EMRP 2012; Metrology for industry	Large volume metrology in industry	contract negotiation
	Metrology for movement and positioning in six degrees of freedom	contract negotiation
	Multi-sensor metrology for microparts in innovative industrial products	contract negotiation
	Traceable in-process dimensional measurement	contract negotiation
EMRP 2012; SI broader scope	Angle metrology	contract negotiation
	Metrology for long distance surveying	contract negotiation
	Crystalline and self-assembled structures as length standards	contract negotiation

There are approved projects with some length related research:

Call	Project name	Status
EMRP 2011; New Technologies	Traceable characterisation of nanostructured devices	started
	Metrology with/for NEMS	started
	Metrology of electro-thermal coupling for new functional materials technology	started
EMRP 2011; Health	Metrological characterisation of microvesicles from body fluids as non-invasive diagnostic biomarkers	started
EMRP 2012; Metrology for industry	Novel electronic devices based on control of strain at the nanoscale	contract negotiation
	Metrology to enable high temperature erosion testing	contract negotiation

Last 3 calls have been reasonably successful for length related topics.

7. Meetings

Previous meetings:

- 2009 TC-L CP meeting, 19-21 October 2009, IPQ, Porto, Portugal
- 2010 TC-L CP meeting, 19-22 September 2010, SP, Borås, Sweden
- 2011 TC-L CP meeting, 3-4 October 2011, METAS, Wabern, Switzerland
- 2012 TC-L CP meeting, 22-24 October 2012, GUM, Warsaw, Poland
The annual meeting of 2012 was followed by TC-L 2012 Workshop Open excellence. In workshop NMIs presented they latest research results.
- TC-L EMRP 2012 Open workshop, 14-15 February 2012, PTB, Braunschweig, Germany
After open workshop the roadmap updating of TC-L was discussed and the needed steps for completion were agreed.

Next occasions:

- 2013 TC-L CP meeting, 22-24 October 2012, PTB, Braunschweig, Germany
- Nanoscale 2013, Conference, 25-26 April 2013, Paris, France
This conference is arranged by LNE, PTB and EURAMET TC-L. During or around this conference many JRPs have their project meetings

8. Strategic planning

The biggest task related to strategic planning in 2012 was updating of the TC-L roadmaps. In February workshop it was decided that TC-L keeps mostly the previous division of the 4 roadmaps, but updates the content as was asked by EURAMET chair. The work was finished in time and the length roadmaps:

- Dimensional metrology for micro- and nanotechnologies
- Dimensional metrology as enabling technology for long-term fundamental research
- Large volume and long range dimensional metrology
- Dimensional metrology for advanced manufacturing technologies

can be found from EURAMET website <http://www.euramet.org/index.php?id=roadmaps>.

9. Outlook for 2013

- New round of KCs
- EMRP call 2013

Antti Lassila

TC-Length Chairman, May 23rd, 2013