

SIM MWG7 Report

Mass and related quantities

Mass, Force and Torque, Pressure, Density, Hardness



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SIM MWG7 is divided in 5 sub-working groups.
Each sub-working group has a “co-chair”.

Mass	Force & Torque	Pressure	Density	Hardness
Fernando Kornblit, INTI, Argentina ferk@inti.gob.ar	Christian Villarroel, IDIC, Chile cvillarroel@metrologia.cl	Juan Forastieri, INTI, Argentina jaforast@inti.gob.ar	Luis Omar Becerra, CENAM, México lbecerra@cenam.mx	Sérgio Pinheiro de Oliveira, INMETRO, Brasil spoliveira@inmetro.gov.br

SIM MWG7 has 93 contacts from 30 countries of the five SIM subregions. Some contacts participate in more than one sub-working group.

Etiquetas de fila	Density	Force and Torque	Hardness	Mass	Pressure	Total general
▼ ANDIMET	4	8		6	6	24
Colombia	1	3		1	2	7
Bolivia	1	2		1	2	6
Ecuador	1	2		2	1	6
Perú	1	1		2	1	5
▼ CAMET	4	3		11	4	22
Costa Rica	1	2		4	1	8
Panamá	3	1		3	1	8
El Salvador				1	1	2
Nicaragua				1	1	2
Guatemala				1		1
Honduras				1		1
▼ CARIMET	2	1		16	1	20
Jamaica	2	1		2	1	6
Belize				2		2
St. Vincent & Grenadines				2		2
Trinidad & Tobago				2		2
Antigua & Barbuda				1		1
Bahamas				1		1
Barbados				1		1
Dominica				1		1
Grenada				1		1
Guyana				1		1
Haiti				1		1
St. Lucia				1		1
▼ NORAMET	4	4		2	5	20
México	2	2		1	2	10
USA	1	2		1	1	6
Canada	1			2	1	4
▼ SURAMET	9	9		2	13	42
Chile	5	1		7	1	14
Argentina	1	2		1	4	8
BRASIL	1	3	2	1	1	8
Paraguay	1	1		3	2	7
Uruguay	1	2		1	1	5
Total general	23	25	4	51	25	128

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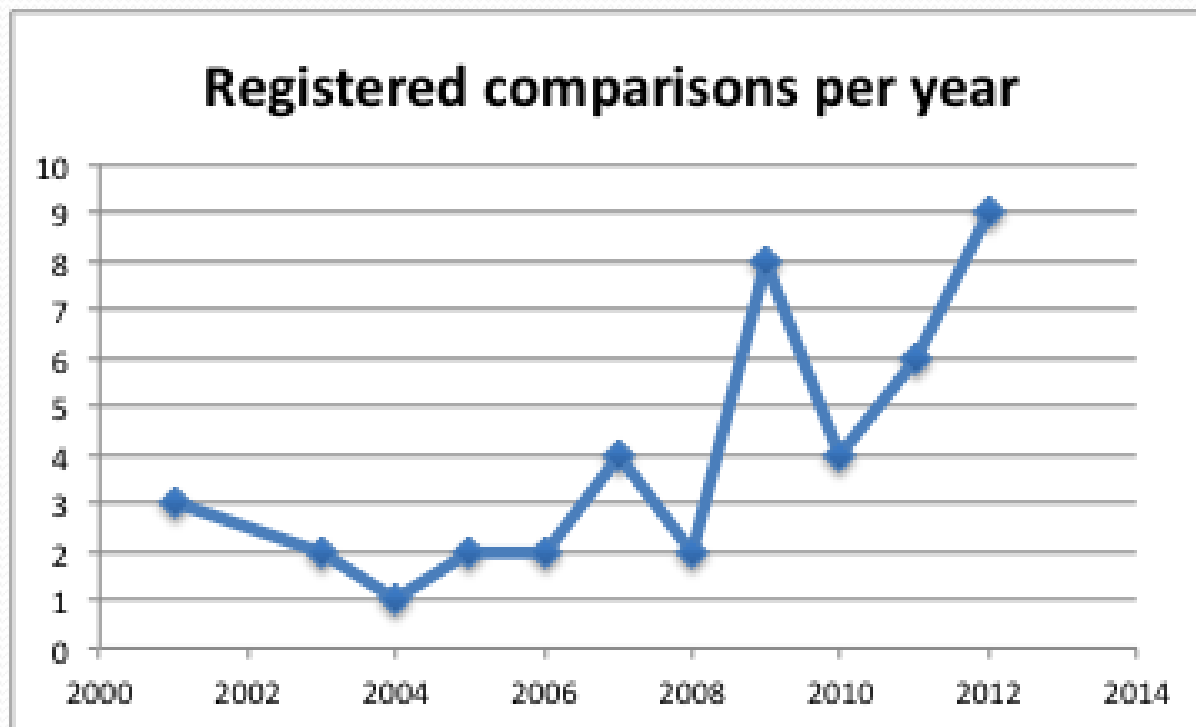
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There are 43 SIM comparisons in the KCDB registered since 2001

Etiquetas de fila	Density	Mass	Pressure	Force and Torque	Total general	
▼ KC		2	2	10	14	
Approved and published				1	1	
Approved for equivalence		1		3	4	
In progress		1	2	4	7	
Protocol complete				1	1	
Report in progress				1	1	
▼ S		4	13	9	3	29
Approved and published		3	7	1	11	
In progress			2	2	4	
Planned			1	3	1	5
Protocol complete		1	1	2	1	5
Report in progress			2	1	1	4
Total general		6	15	19	3	43

The number of registered comparisons per year had increased since 2008.



SIM.M.M-S9 - Determination of the susceptibility and magnetic polarization of weights by means of the susceptometer method

The determination of the magnetic properties of weights is a relevant activity to ensure the Calibration and Measurement Capabilities of the laboratories performing calibration of mass standards.



BIPM	Bureau International des Poids et Mesures <i>Organisation intergouvernementale</i>
CENAM	Centro Nacional de Metrologia <i>Mexico, SIM</i>
CENAMEP AIP	Centro Nacional de Metrología de Panama AIP <i>Panama, SIM</i>
CESMEC Ltda.	Centro de Estudios, Medicion y Certificacion de Calidad <i>Chile, SIM</i>
INDECOPI	Instituto Nacional de Defensa de la Competencia y de la Proteccion de la Propiedad Intelectual <i>Peru, SIM</i>
INTI	Instituto Nacional de Tecnologia Industrial <i>Argentina, SIM</i>
LACOMET	Laboratorio Costarricense de Metrologia <i>Costa Rica, SIM</i>
LATU	Laboratorio Tecnolico del Uruguay <i>Uruguay, SIM</i>
SIC	Superintendencia de Industria y Comercio <i>Colombia, SIM</i>

SIM.M.F-S3 - Supplementary Comparison of Instrumented Charpy Impact Machines

The Charpy test is more than 100 years old and is widely used in laboratories and industries all over the world to obtain information on the impact toughness of materials.



Source. www.nist.gov

NIST – USA
INMETRO - Brazil



Source: Figueira et al., DEVELOPMENT AND MANUFACTURE OF CHARPY STANDARDS TEST SPECIMENS FOR XVIII IMEKO WORLD CONGRESS, XVIII IMEKO WORLD CONGRESS , 2006, Brazil

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Meetings and training activities were focused on workshops 2011-2012

- Workshop magnetic properties of weights
 - Place: INMETRO, Perú
- Workshop on Liquid Density
 - Place: CENAM, México.
- Workshop on Absolute Pressure
 - Host: INMETRO, Brasil.

We will have in mind to invite other RMOs!

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SIM has 15 CIPM MRA signatories: 12 have CMCs covered by SIM MWG7

Number of CMCs in the KCDB that are covered by SIM MWG7 sub-working groups							
Country	Mass	Density	Pressure	Force	Torque	Hardness	Total
USA	38	7	22	18		17	102
México	28	20	18	15	4		85
Argentina	29	16	13	11			69
Brazil	27	4	14	16	1		62
Canada	32	8	9				49
Uruguay	35	10					45
Chile	24			9			33
Costa Rica	24						24
Paraguay	23						23
Ecuador	20						20
Panamá	20						20
Perú	19	1					20
Bolivia							0
CARICOM							0
Jamaica							0
Total	319	66	76	69	5	17	552

CMCs recognition 2010-2013

- Approved:
 - CENAM (Update regarding to density CMCs)
 - INDECOPI (first CMC on density)
 - INMETRO (first CMCs on torque)
 - Paraguay, mass standards. (very first set of CMCs)
 - USA, density (hydrometers calibration).
 - Peru, mass standards (very first set of CMCs)
 - Argentina, pressure.
 - Ecuador (mass standards)
- In approval process:
 - LATU (first CMCs on density)
 - INDECOPI (Update regarding to CMCs on mass)
 - Peru (pressure)

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Plan of future activities for 2013

(budget submitted to SIM)

	Place	Sub-Working Group	Number of participants that require support	Amount of support per participant /USD	Type of support	Total Amount
Three weeks coaching of an NMI for developing technical knowledge in the Caribbean	BSJ	Mass	1 (one trainer)	9000	Acommodation, food, local transport + flight ticket	9000
Workshop on GUM Supplement 1 and bayesian statistics + Workshop on Force Metrology (ISO 376) +SIM MWG7 meeting	CENAM	All	30	1500	Flight ticket	45000
Workshop on vaccum metrology	Gaithersburg	Pressure	10	1500	Flight ticket	15000
Workshop on liquid density comparison with the use of oscillation type density meter and development of a technical guide on oscilatory density meters calibration	CENAM or INMETRO	Density	10	1500	Flight ticket	15000
3 weeks internship in an NMI o DI	To be defined	Force and torque	2	6000	Acommodation, food, local transport	12000
3 weeks internship in an NMI o DI	To be defined	Density	2	6000	Acommodation, food, local transport	12000
						108000

Plan of future activities for 2014

(budget submitted to SIM)

Activity	Place	Sub-Working Group	Number of participants that require support	Amount of support per participant /USD	Type of support	Total Amount /USD
Presentation of results of liquid density comparison with the use of oscillation type density meter and development of technical guide on hidrometers calibration	CENAM	Density	10	1500	Flight ticket	15000
Workshop on SIM CMCs submission requirements + Workshop in force metrology for the evaluation of comparisons results +SIM MWG7 meeting	To be defined	All	30	1500	Flight ticket	37500
3 weeks internship in an NMI o DI	To be defined	Density	2	6000	Acommodation, food, local transport	12000
3 weeks internship in an NMI o DI	To be defined	Pressure	2	6000	Acommodation, food, local transport	12000
						91500

Plan of future activities for 2015

(budget submitted to SIM)

Activity	Place	Sub-Working Group	Number of participants that require support	Amount of support per participant /USD	Type of support	Strategic objective
Three weeks coaching of an NMI for developing technical knowledge in the Caribbean	BSJ	Mass	1 (one trainer)	9000	Acommodation, food, local transport + flight ticket	9000
Workshop on the development of a technical guide for hydrometer calibration.	To be defined	Mass	15	1500	Flight ticket	22500
3 weeks internship in an NMI o DI	To be defined	Force and torque	2	6000	Acommodation, food, local transport	12000
3 weeks internship in an NMI o DI	To be defined	Density	2	6000	Acommodation, food, local transport	12000
Workshop on the redefinition of the mass unit and its implications to other mass related quantities	To be defined	All	30	1500	Flight ticket	45000
+ WG meeting Workshop on the repair and maintenance of standards	To be defined	Pressure	10	1500	Flight ticket	15000
						115500

Expected results

KPI	Value
New SIM comparisons in the KCDB	> 20
New CMCs lines	> 95
Mass	> 25
Density	> 15
Pressure	> 25
Force and Torque	> 30

The objective is to cover present gaps in CMCs

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Uruguay	35	10					45
Chile	24			9			33
Costa Rica	24						24
Paraguay	23						23
Ecuador	20						20
Panamá	20						20
Perú	19	1					20
Bolivia							0
CARICOM							0
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New requirement 7.2 of CIPM MRA-D-05 seems difficult to be fulfilled in practice.

- Section 7.2 of CIPM MRA-D-05, Measurement comparisons in the CIPM MRA.
- *[...]Reports approved by the RMO must be forwarded to the CC Executive Secretary and the Chair of the relevant working group (e.g. Key Comparison or CMC Working Group) of the CC to allow for a six-week period of comment and editorial control. If at the end of the period, no objections have been raised within the working group of the CC, the final report, accompanied by a statement that the control and comment procedure has been completed, will be sent by the RMO TC Chair to the KCDB Office for publication in the KCDB. Those CCs that wish to discuss RMO supplementary comparison reports and formally approve them at the meetings of their relevant CC working groups may do so as an alternative [...]*

New requirement 7.2 of CIPM MRA-D-05 seems difficult to be fulfilled in practice.

- Only comments by the KCDB Office were received.
- Pilot laboratories do not show willingness for preparing a new version.
- It's necessary to review the objective and implementation of this requirement.
 - Objective:
 - To fulfill Metrologia Editorial policies?
 - To get CMCs published?
 - Both? If so; which one is more relevant?
- Possible intermediate solution: apply this requirement to Draft A or B, not to the final report. Then the pilot laboratory gets the information during the review process...
quality assurance, not quality control.

**Thank you for your
attention!**