

**Consultative Committee for Mass and Related Quantities (CCM)**  
**President P Richard, Executive Secretary H Fang**

<b>Meets every</b> - 1-3 years <b>Last meeting</b> - May 2017 <b>Members/Observers</b> 22/6	<b>Working groups:</b> Density and Viscosity (WGDV); Force and Torque (WGFT); Fluid Flow (WGFF); Gravimetry (WGG); Hardness (WGH); Pressure and Vacuum (WGPV); Dissemination of the kilogram (WGD-kg); Strategy and MRA coordination (WGS); Realization of the kilogram (WGR-kg)		
<b>Comparison activity</b>	<b>Completed</b>	<b>In progress</b>	<b>Planned</b>
CCM KCs (& CC Supplementary)	87	10	4
RMO KCs (& SCs)	61 + (82)	43 + (50)	10 + (21)
BIPM comparisons (all on-going)			1
CC Pilot studies	7	3	0
CMC	2771 CMCs in 36 service categories		
<b>Pointers to the future, stakeholder needs and technological developments</b> <ul style="list-style-type: none"> <li>• <b>Density and Viscosity:</b> More accurate and precise thermodynamic properties of refrigerants for efficiency improvement of heat pump systems, new ozone-depletion free and low Global Warming Potential fluids for environment, refractive index of liquids for food industry and agriculture, pressure dependence of fuels and of heat transfer liquids; measurements under pressure, non-Newtonian liquids, viscometers beyond glass capillaries, density determination on porous materials, powders and particulates.</li> <li>• <b>Force and Torque:</b> Big force (up to 50 MN), very high torque (1MN m to 16 MN m) power generation, control of ships propulsion. Consideration of small force and multi-component force needs as well as needs for traceability of dynamic measurements.</li> <li>• <b>Fluid Flow:</b> Cryogenic flow (liquefied natural gas), micro-flow in liquid and gas for manufacturing and medical, dynamic or transient flow (gaseous vehicle refueling, better process control).</li> <li>• <b>Gravimetry:</b> Increasing the number of CMCs and decreasing the declared uncertainties.</li> <li>• <b>Hardness:</b> Development of primary definitions. Need for PS/KCs in 7 different hardness scales.</li> <li>• <b>Pressure and Vacuum:</b> Special pressure balances, oil manometers or optical standards, low differential pressures, standards for industrial high pressure technologies; leak, outgassing and partial pressure measurement; optically based standards for pressure, dynamic pressure measurements.</li> <li>• <b>Mass:</b> Realization and dissemination of the redefined kilogram, more independent and new realizations, commercial realization instruments at the kilogram and at other mass value; direct realization experiments for small masses and forces; traditional mass standards to continue, and below 100 mg should be considered.</li> </ul>			
<b>Workload Trend &amp; Workload Management</b> <ul style="list-style-type: none"> <li>• Future merging of the WGD-kg and the WGR-kg after the revision of the SI,</li> <li>• Addressing the key recommendations of the CIPM MRA Review to further improve the efficiency of the KCs and the CMC review processes,</li> <li>• Encourage common views across the CCs to analyze KC data and aim at an improved coordination work across the CCs.</li> </ul>			
<b>BIPM – references to laboratory activity at the BIPM</b> <ul style="list-style-type: none"> <li>• Realization of the new definition through the BIPM Kibble balance and the dissemination at 1 kg,</li> <li>• Use of the Ensemble of reference mass standards together with the set of Pt-Ir working standards as a stable mass reference for comparisons and for dissemination after the redefinition,</li> <li>• Organization of future ongoing comparison of the realizations of the kilogram after the redefinition.</li> </ul>			