

# 14<sup>th</sup> CCM Meeting

Report of the:  
Working Group on High Pressure

20 February 2013, BIPM

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# Terms of Reference

Taken as a whole, the WGHP takes care of the gauge and differential pressure, and absolute pressure  $> 100$  kPa. Between 1 kPa and 100 kPa, absolute pressure, the two working groups (WGLP and WGHP) make a common agreement in consideration of the primary or secondary standards used and the transfer standard and/or unit under calibration. The main tasks are:

- To define and organise the CIPM Pressure Key Comparisons in its field of competence,
- To validate the final reports of all the comparisons before proposing their publication in the BIPM database,
- To collect the needs and the difficulties which may happen in drafting and validating the CMCs,
- To watch and anticipate for future needs of society,
- To be a forum of exchange between the pressure laboratories of NMIs, through the Regional Metrological Organisations.

The WG for the next 5 years will endeavor itself to:

- Membership definition and active participation of all members.
- Rules for membership and participation clear and followed by members.
- Two KC underway and KC priority definition to cover worldwide measurements comparability.
- Meetings carried out to exchange ideas and make clear development program for our WGHP.
- International Conference on HP and LP performed. Including the up to date trends.

# Membership

**Active participating member**

*Proposed substitute or new member*

*Member who will no longer be in the WG*

	<b>Institute</b>	<b>Country</b>	<b>Name</b>
1	CEM	Spain	<b>Nieves Medina</b>
2	CENAM	Mexico	<b>Jorge Torres-Guzman</b>
3	INMETRO	Brasil	<i>L. H. Paraguassú de Oliveira / Jackson da Silva Oliveira</i>
4	INRIM	Italy	<b>Mercede Bergoglio</b>
5	KRISS	Korea, Rep.	Sam-Yong Woo
6	LNE	France	<b>Pierre OTAL</b>
7	MSL	New Zealand	<b>Mark Fitzgerald / Mark Clarkson</b>
8	NIM	China	<i>Li Yanhua / ?</i>
9	NIST	USA	<b>Douglas A. Olson, Jay H. Hendricks</b>
10	NMIA	Australia	John Man
11	NMi VSL	The Netherlands	<i>Jos Verbeek / ?</i>
12	NMIJ	Japan	<b>Tokihiko Kobata, Hiroaki Kajikawa</b>
13	NPLi	India	<i>A. K. Bandyopadhyay / Sanjay Yadav</i>
14	NRC-CNRC	Canada	Anil Agarwal
15	PTB	Germany	<b>Wladimir Sabuga</b>
16	SMU	Slovakia	Peter Farar
17	UME	Turkey	<i>Ilknur Kocas / ?</i>
18	VNIIFTRI	Russia	<i>V. Borovkov?</i>
19	VNIIM	Russia	Youri Kisseliov

- Christian Wütrich

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Another application for membership has been received but only this week (yesterday). The proposal will be send and once the decision has been taken at the WGHP, the application will be forwarded.

On the other hand, some members have change, retired or are no longer with us and replacements are suggested by the previous member or person involved.

- Our last meeting was on May 2011, during the last conference on pressure held in Berlin, Germany.

- We are planning a meeting to be held next year (2014), place and exact date to be defined.



# Major WG issues handled by correspondence

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- Review of CMCs.
- Membership and information up dates.
- Review of information and opinions.

- Euramet, APMP and SIM are very active regions. All are conducting RMO KC and SC.
- Afrimets and Coomet are low activity regions for the WGHP, but have started to performed RMO KCs.

- Before the last CCM meeting several comparison were performed.
- No KC is underway at this time.
- One has finished last year and has already been sent the final report to the KCDB.
- Also, several comparisons are been carried out in the related CCM WGLP.

- Range: 0 to 500 kPa (differential) line pressure  
7 MPa to 20 MPa. Possible pilot laboratories,  
KRISS and PTB. 2014.
- Range: 0 kPa to -95 kPa negative gauge – gas.  
2016.
- Repetition of some KC is necessary since many  
of them are more than 10 years old (since the  
report has finished).

# Are the current and planned KCs sufficient for CMCs?

We have a wider KC plan, presented in the following table, but since the comparisons may interfere with the CCM WGLP the period and frequency of the KC must be carefully planned and in coordination with the WGLP.

<b>Comparison</b>	<b>Range</b>	<b>Required resources</b>	<b>Pilot lab.</b>	<b>Date</b>
Relative pressure	4 MPa to 20 MPa	Dead weight balance (with p-c & masses)	To be defined	2018
Absolute and gauge pressures	100 kPa to 7 MPa	Dead weight balance (with p-c & masses)	To be defined	2020

- A very successful Conference took place in Berlin Germany in 2011. The Conference was carried out in collaboration among CCM WGHP, CCM WGLP and IMEKO TC16.
- Many papers presented at the Conference were published in 2 special issues of the journals.
  - PTB-Mitteilungen.
  - Measurement special issue.
- The edition of the strategy document for our WGHP.

# Highlight of technology trends and challenges in HP

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- Dynamic pressure measurements and dynamic pressure standards.
- Optically based standards for static and dynamic pressures.
- Replacement of primary mercury manometers by alternative standards – special pressure balances or oil manometers.
- Low differential pressures with high accuracy and low line pressure.
- High pressure measurements (above 1 GPa).
- Standards for industrial high pressure technologies.

- We have had some representatives no longer participating in our CCM WGHP. Also, the number of members actively participating is limited.
- We tried to publish papers from our Conference in our journal Metrologia but no success was achieved.