Regulations, Codes and Standards Working Group
Update Report

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Marc Steen (Pietro Moretto alternate) **
Co-Chairs
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May 27 - 28, 2015
Wuhan, China
Overview

• Membership
• Meetings
• Background
• Update on
  – Component Material Compatibility Learning (RR)
  – Fuel Quality on Performance
  – Metrology
• Relevance of RCSWG activities to international regulatory and standardization activities
• Activities Relevant to IPHE Global Dimension
• Reply to SC action items
Countries noted in dark blue are the most active

- No contacts yet from Australia, Iceland and South Korea
- Canada and India have been dropped from our list due to inactivity

<table>
<thead>
<tr>
<th>Country</th>
<th>Point of Contact</th>
<th>Alternate</th>
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<tbody>
<tr>
<td>Brazil</td>
<td>Sergio Oliveira</td>
<td>Newton Pimenta</td>
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<td>China</td>
<td>Jinyang Zheng</td>
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<td>European Commission</td>
<td>Marc Steen</td>
<td>Pietro Moretto</td>
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<td>France</td>
<td>Pierre Serre-Combe</td>
<td>Laurent Antonii</td>
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<td>Germany</td>
<td>Thorsten Herbert</td>
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<td>Italy</td>
<td>Romano Borchelliini</td>
<td>Massimo Santarelli</td>
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<td>Japan</td>
<td>Kazuo Koseki</td>
<td>Akiteru Maruta</td>
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<td>New Zealand</td>
<td>Alister Gardiner</td>
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<td>Norway</td>
<td>Gerd Petra Haugom</td>
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<td>Russian Federation</td>
<td>Sergey V.Korobtsev</td>
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<td>South Africa</td>
<td>Brian North</td>
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<td>United Kingdom</td>
<td>Stuart Hawksworth</td>
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<tr>
<td>United States</td>
<td>Sunita Satyapal</td>
<td>Jay Keller</td>
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RCSWG meetings

- Brussels, Belgium September 12, 2013
- Fukuoka, Japan November 18, 2013
- Washington DC, USA June 17, 2014
- Karlsruhe, Germany April 27, 2015
- Next Meeting Scheduled: Yokohama, Japan Oct 2015
Challenge and Approach

Harmonized regulations, codes and standards (RCS) are essential to establishing a market-receptive environment for commercialization of Hydrogen and Fuel Cell Technologies. In May 2010 (Essen, Germany), IPHE SC endorsed the importance of the RCS Working Group (WG) in taking a leading role in harmonizing RCS. RCSWG is a standing working group for IPHE.
Background

Benefit

The RCSWG’s role is to create and conduct a forum where potentially contentious and controversial issues of RCS are handled. The RCSWG can recommend a consensus solution and promote resolution of contentious issues within the technical realm of RCS. The RCSWG also conducts pre-normative work to globally harmonize the execution of testing relevant to RCS.
RCSWG Tasks Status Update

1. Type IV Tank Testing Round Robin
   - September 2011: Launched a multi-phase Round Robin (RR) testing program for composite pressure vessels (Japan, UK, Brazil, EC, France, Canada, China, U.S.) (Noted in Bold are the enduring active contributors.)
   - Round Robin for Hydraulic Testing – Completed ✓
   - Final Report submitted to IPHE at the SC 2014/5/20 Oslo meeting
   - Report in submitted to ICHS2015

2. Pneumatic Fast Fill Physics – JRC – Completed ✓

3. SoA Meter Performance (Metrology) – JRC On going
Overall Objectives are to:

- Support an International effort in providing validated test results for fuel quality
- Ensure at an International level a “Common Approach” in performing fuel quality studies
RR on Fuel Quality Effects Performance – JRC Lead

• **Targets**
  – Identification of tolerance levels for $H_2$ contaminants accepted at an international level
  – Provide feedback to standardization bodies with a validated analytical control chain procedure
  – Lower the hydrogen analytical costs
RR on Fuel Quality Effects Performance – JRC Lead

• **Targets**
  – Lower the hydrogen analytical costs
    • Identification of the most relevant contaminants to be used as canary alarms for quality assurance
    • Develop / identify the cheapest analytical method in the field

**Note:** ISO / TC 197 is restarting WG 12 on Fuel Quality which will include assurance – Making this work very timely.
Update on Metering – JRC

• Main Message
  – At least one commercially available mass flow rate meeting claims an accuracy of 2%
  – Max difference between PT calculation and integrated MF is 4% (Promising)
Component Material Compatibility Learning RR
Approved SC and RCSWG

- There is a disparate need to understand and refine material testing in high pressure hydrogen environments
  - Current testing is not repeatable even within the same laboratory. A learning RR is being pursued to address this issue.
Component Material Compatibility Learning RR Approved SC and RCSWG

- Draft work plan has been circulated to the WG
  - Seeking feedback
  - Participation – commitment (pending funding)
    - Germany (MPA), U.S. (Sandia), China (Zhejiang University), France (CEA)
  - Participation - expression of interest
    - Japan (Kyushu University), Korea, UK (HSL), HFC
Component Material Compatibility Learning RR Approved SC and RCSWG

- Draft work plan has been circulated to the WG
  - Participation – Observers, technical contributors
    - South Africa (HySA)
  - Activity structure is still being discussed
    - Round Robin or
    - Multilateral collaboration
International Activities Relevant to IPHE Global Dimension

• **IA-HySafe, IEA Activities** (Canada, Denmark, EU, France, Germany, Italy, Ireland, Japan, Norway, Russia, Spain, U.K., U.S.)
  – IEA Hydrogen Safety Kick off meeting (Task 37): Karlsruhe (April 20-22)
  – ICHS2015 Organization Meeting (OC), Karlsruhe (April 23, 2015) IA-HySafe wants to get more involved with IPHE RCSWG
    – Held Joint IEA Task 37 (Safety), RCSWG – (many of the same people were also at the ICHS2015 OC meeting)
    – Dr. Jay Keller will be the liaison between IA-HySafe & RCSWG
Relevance to International Standardization and Regulatory Initiatives

_Involvement by RCSWG co-chairs:_

- ISO TC 197 Hydrogen Technologies –
  - Technical Program Director for the Built Environment and Safety.
    - Provides direct feed-in of RCSWG experiences and PNR results into ISO and visa versa.
      - For example: Fuel Quality for station qualification, Filling Protocol (SAEJ2601), QRA …
    - Other topics currently addressed by TC 197
      - Risk mitigation, Station acceptance, hoses, valves, dispensers …
Involvement by RCSWG co-chairs contd.:

- Liaison-A of Commission (through JRC) with ISO TC 197 and with IEC TC 105 facilitates
  - Consideration of (EU, but also IPHE) policy-priorities in international performance-based standardization of FCH technologies, products and processes
  - Ex-ante harmonization at global level of standards to be developed
  - Due consideration of safety issues in standards (as per Regulation EU No 1025/2012)
Relevance to International Standardization and Regulatory Initiatives

- ISO TC197
  - Active Working Group Meetings to be held during the week of June 15, Paris (AFNOR):
    - Fueling Stations
      - WG12 H2 Quality & Quality Control (NWIP)
        - EIGA WG11 Quality Control
        - Analytical Methods (TC 158)
      - WG19 Dispensers
      - WG20 Valves
      - WG24 Fueling Risk Assessment Mtg
      - WG24 Plenary Meeting.
  - TC197 Plenary Meeting: Washington DC, Nov. 30 thru Dec. 4, 2015
<table>
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<th>SC Action Item</th>
<th>RCSWG position</th>
<th>WG action and update</th>
<th>IPHE dimension</th>
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<tr>
<td>IPHE / RCSWG / IA-HySafe Webinar(s) on Safety Data base for ICHS2015 &amp; Public Acceptance</td>
<td>• Improve Communication and outreach.</td>
<td>Yes Planning in progress</td>
<td>• Policy: Yes</td>
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<td>• Member countries coverage: Yes</td>
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| RCSWG presence on IPHE Web site, safety database portal.                     | • Impact on commercialization  
• Improve communication and out reach                                              | Yes                               | • Policy: Yes                                                                  |
<p>|                                                                              |                                                                                 | May 2015 – working issues on safety database portal                           | • Member countries coverage: Yes                                                |</p>
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| Fuel quality: Effects on the Stack                | • Impact on commercialization  
• Resolve scientific & technical issues                                                | Yes  
RR Active                                                                              | • Policy: Yes  
• Member countries coverage: Yes                                                                 |
| Fuelling station: Metrology (metering)            | • Impact on commercialization  
• Resolve scientific & technical issues                                                | Yes  
– In progress, JRC data shows current meter accuracy is inadequate - some claim to have achieved required accuracy | • Policy: Yes  
• Member country different                                                                 |

International Partnership for Hydrogen and Fuel Cells in the Economy
Thank you for the official IPHE endorsement of ICHS-6, 2015
In view of renewed interest in Hydrogen and Fuel Cell technology deployment and infrastructure build up in IPHE member countries:

- the RCSWG re-iterates its recommendation to the SC to secure the political and/or financial support in the member countries to ensure success of this IPHE sanctioned working group.
Thanks to the SC and all IPHE member countries