

Codes and Standards for Hydrogen Energy Technologies - ISO/TC 197 meets in Brisbane

By Karen Hall

The 2008 ISO/TC 197 plenary meeting was held at the Brisbane Convention and Exhibition Centre, in conjunction with the World Hydrogen Energy Conference (WHEC 2008).

Twelve countries were represented at the Plenary. They were Argentina, Austria, Canada, China, France, Italy, Japan, Korea, Norway, Sweden, USA and the United Kingdom. The meeting provided an opportunity to review the current program of activities, including the anticipated timeframe of the development of International Standards for hydrogen energy technologies under the purview of ISO/TC 197.

Australia welcomed participants to Australia. A representative from BOC – part of the Linde Group, provided a presentation on hydrogen production in Australia. They also discussed their Integrated Management Systems and Standards (IMSS) program, which includes all documents from high level policies down to detailed work instructions.

Working Group Updates

ISO/TC 197 has many active working groups, developing international standards for hydrogen tanks, fuel quality for demonstration fleets, refueling stations, hydrogen detectors, reformers, and electrolyzers, to name a few. An update of the Working Group activities is provided below. These activities are coordinated with other international technical committees where appropriate – including TC 22 for cards, TC 58 for tanks, and IEC/TC 105 for detectors.

WG 5: Joint with ISO/TC 22; Convener: Livio Gambone, Canada

Work item: ISO 17268 *Compressed hydrogen surface vehicle refueling connection devices*

The international standard was published on 1 April 2006. The Joint WG5 initiated the revision of the standard to address some technical issues that were deferred as well as the incorporation of the 70 MPa profile. The meeting was held on 28 February 2008 in Tokyo, Japan. The US noted that as it had been some time since WG 5 had met, the US experts to this WG were no longer active – some had retired and others had been reassigned. After some discussion, the Chairman agreed that it could be beneficial to include the member country Secretaries on WG correspondence to facilitate more active participation.

Agreed target dates

CD: 2008-08

DIS: 2009-02

FDIS: 2010-02

IS: 2010-08

WG 6: Joint with ISO/TC 22 and ISO/TC 58/SC 3

Convener: Craig Webster, Canada

Work item: ISO 15869 *Gaseous hydrogen and hydrogen blends—Land vehicle fuel tanks*

The WG has been actively working on the preparation of a third DIS text, which was released for a two month circulation on 26 March 2008. At the request of the US, the

ballot was extended from 2 to 5 months. Comments are currently being solicited to establish national positions before the ballot closes on August 26, 2008.

Agreed target dates**FDIS:** 2008-12**IS:** 2009-06**WG 8:** Convener: Randy Dey, Canada**Work item: ISO 22734-1** *Hydrogen generators using water electrolysis process — Part 1: Industrial and commercial applications*

This standard is in its final stage of preparation. The FDIS was released by the ISO/TC 197 Secretariat on 28 March 2008 for a two-month approval period. The deadline for voting was 28 May 2008. The FDIS received sufficient votes for approval.

The WG met in Brisbane to review the comments. Most of these comments were editorial. The handful of technical comments was reviewed by WG 8, with a view toward avoiding non-critical changes at this stage in the development of the International Standard. The only technical comment accepted for the present draft was relating to touch current and protective conductor current. The US asked to remove a reference to IEC 60950-1, which is too restrictive, as it is a product safety standard for office (IT) equipment. This document covers an industrial piece of equipment and therefore industrial standards are more appropriate.

The Convenor will review the editorial comments to determine whether these can be incorporated at this time. All unincorporated comments received, both technical and editorial, will be held for consideration for the future update of this document.

It is worth noting that once Part-2 is complete, Part-1 will be reviewed to address harmonization.

Agreed target dates**IS:** 2008-08**WG 8:** Convener: Randy Dey, Canada**Work item: ISO 22734-2** *Hydrogen generators using water electrolysis process — Part 2: Residential applications*

The working group has been meeting to discuss the comments received from the CD circulation. A task group was set up to look into the particular safety issues for residential electrolysers. Comments received were reviewed at the meeting. The convener requested that the Task Group complete their work in early September so it can be circulated to WG 8 for comments. The WG plans to meet in mid-late October to prepare a DIS.

Agreed target dates**DIS:** 2008-11**FDIS:** 2009-11**IS:** 2009-05**WG 9:** Convener: Falco Thuis, Netherlands**Work item ISO 16110-2** *Hydrogen generators using fuel processing technologies — Part 2: Test methods for performance*

The working group has been preparing the DIS, which was circulated on 11 April 2008 for a five-month voting period. The deadline for voting is 11 September 2008.

Agreed target dates**FDIS:** 2009-04**IS:** 2009-10**WG 10:** Convener: Ned Stetson, USA**Work item ISO 16111** *Transportable gas storage devices — Hydrogen absorbed in reversible metal hydrides*

ISO/TS 16110:2007 was published by the ISO Central Secretariat on 15 October 2007. The WG is continuing to work towards the development of the international standard. The DIS was released by the ISO Central Secretariat on 28 September 2007 for a five-month voting period. The DIS was approved on 28 February 2008. The preliminary report of voting was released on 3 March 2008 with the instruction that the comments received be returned to the WG for its consideration in preparation for the FDIS text. The FDIS is currently undergoing review by the Permanent Editing Committee. The target is to have the international standard published in time for the Dec. 2008 Meeting of the ECOSOC Sub-Committee of Experts on the Transport of Dangerous Goods.

Agreed target dates**IS:** 2008-10**WG 11:** Convener: Randy Dey, Canada**Work item ISO 20100** *Gaseous hydrogen — Fuelling stations* (formerly ISO 20012)

NOTE: Due to some ISO administrative issues, this document has been given a new number.

The Report of the Secretariat indicated the Draft Technical Specification (DTS) was circulated for approval as ISO/TC 197 on 5 September 2007. It was approved and the preliminary report of voting was released on 8 January 2008 with the instructions that some of the comments - consisting of items of importance for which consensus should be reasonably easy to reach, be looked at by ISO/TC 197 WG 11. The result of this effort was incorporated in a revised DTS, which was circulated on 25 February 2008 for final review before the publication of the TS. The deadline for receiving input was 25 March 2008. The ISO/TC 197 Secretariat reported that only editorial comments were received and the document was forwarded to the ISO Central Secretariat for publication.

The WG is continuing its work towards the publication of the international standard. A special effort has been made to get a broader group of stakeholders involved in the development of this international standard. A consultation inviting the P-members to nominate additional experts from the fuelling infrastructure (manufacturers, integrators, regulators) and vehicle OEMs was initiated at the request of the convener.

It is worth noting that the schedule for this activity has been adjusted to allow an additional nine months to work on the issues raised during circulation of the DTS. This WG met in Brisbane, following the Plenary, to prepare a strategy for addressing the numerous comments received.

The Working Group discussed issues including comments relating to the scope. The WG agreed it would like to reinstate indoor fueling in the scope, and identify appropriate experts to address this topic. Liquid hydrogen dispensing could also be included, again if appropriate experts are willing to participate in the development of these

requirements. Underground storage would be more fully addressed, as well as canopy storage. Operation and maintenance issues would be addressed only at a high level, relying on manufacturer recommendations. Cryogenic high-pressure hydrogen was considered by the working group. It was determined that this should be considered for a future revision, to allow time for industry to determine any necessary requirements.

The WG formed two task groups. Task Group 1 will address safety distances and hazardous areas. Task Group 2 will address dispensing systems and fuelling protocol.

Agreed target dates**CD:** 2008-12**DIS:** 2009-12**FDIS:** 2010-12**IS:** 2011-06**WG 12:** Convener: Yasuo Takagi, Japan**Work item ISO 14687-2** *Hydrogen Fuel — Product Specification — Part 2: Proton exchange membrane (PEM) fuel cell applications for road vehicles*

The Technical Specification (TS) and Technical Corrigendum 2 to ISO 14687:1999 were published on 1 March 2008. The WG is further advancing the preparation of the international standard.

It is worth noting that the schedule for this activity has been adjusted to allow an additional six months to work on the issues raised during circulation of the DTS.

The WG 12 convener reported that WG 12 does not wish to take on the Systematic Review of ISO 14687-1, as the expertise of WG 12 is predominately PEM fuel cells for road vehicles.

A workshop is being planned for 2009 to include a broader set of stakeholders. The TC 197 Chair advised the WG Convener to work directly with him on the planning for this workshop.

Agreed target dates**CD:** 2008-10**DIS:** 2009-10**FDIS:** 2010-10**IS:** 2011-04**WG 13:** Convener: Ichiro Matsubara, Japan**Work item ISO 26142** *Hydrogen detection apparatus*

The DIS text was received from the working group on 11 March 2008. It is under review by the technical editing committee. The WG plans to meet in Berlin in February.

The Secretary of TC 197 reported that there had been some confusion regarding the status of this activity, as the ISO Central Secretariat had the activity listed as cancelled in the official Programme of Work. This was being resolved, and TC 197 had been assured the activity was being reinstated. The UK noted the Programme of Work issues at the end of May also had not picked up the change in title that had been approved at the 2007 Plenary, and recommended that TC 197 ensure the agreed changes in both Title and Scope are confirmed as the project is reinstated.

IEC TC31 indicated a desire to work closely with TC197 with regard to classification of explosive atmospheres in IEC 60079-10 and hydrogen sensors (WG13). A meeting

notice will follow with regard to a meeting on explosive atmospheres in November. TC 197 members are encouraged to participate.

Agreed target dates:**DIS:** 2008-07**FDIS:** 2009-07**IS:** 2010-01**Acronym Key:****TS: Technical Specification****CD: Committee Draft****DIS: Draft International Standard****FDIS: Final Draft International Standard****IS: International Standard****Country Presentations**

Eight countries provided updates on their national hydrogen activities. These were Canada, Japan, Norway, Sweden, the USA, China, Korea, and Italy.

Canada described the Hydrogen Airport Project, which had been presented at the NHA Annual Conference on April 2, 2008.

Japan described "Cool Earth 50", a program to reduce global CO₂ emissions by 50% of the current levels by 2050.

Norway described HyNor, established in 2003, with a goal to be able to drive hydrogen vehicles between Stavanger and Oslo in 2009, as well as the Scandinavian Hydrogen Highway Partnership (SHHP).

Sweden, also a member of the SHHP, described their hydrogen activities with respect to telecom power and methane refuelling stations.

The USA provided a brief update from the presentation made at the 2007 Plenary, to show how the standards activities in TC 197 fit into the US National Roadmap.

China described their program for hydrogen from high-temperature nuclear energy and renewable energy. They also announced plans for five fuel cell buses and 20 fuel cell vehicles for the Beijing Olympics.

Korea provided a brief overview of the Four-phase hydrogen roadmap in Korea:

21st Frontier Program: www.h2.re.kr

National RD&D organization: www.h2fc.or.kr

Nuclear hydrogen development and demonstration: www.hydrogen.re.kr

Korea IGCC RDD&D organization: www.igcc.or.kr

Italy highlighted their involvement in the European Joint Technology Initiative (JTI), as well as other Italian hydrogen activities through ENEA. They also described Italy's efforts to link regional activities through a strategic agreement between regions.

Discussions of New Work Items

There were also several announced intentions to submit New Work Item Proposals (NWIPs) for new activities under TC 197 in the near future:

Canada stated that following the publication of ISO 16111 as an International Standard, it would formally propose splitting the document into two parts, so that a new two could fully address hydride Microsystems of less than 120 ml.

France indicated an interest in submitting two NWIPs: Hydrogen refuelling dispensers as a self-standing subsystem; and Stationary storage of hydrogen in composite containers. The US noted a similar activity at ASME that may be considered as input for harmonization.

Japan would like to submit a NWIP for a Part-3 for ISO 14687 to address hydrogen fuel quality for PEM Fuel Cells for stationary systems. This would also require a change to remove this from the scope of Part 1.

The US noted subsequently (outside of the Plenary) an interest in a NWIP for terminology, to help harmonize the use of pressure terms used throughout the ISO/TC 197 documents, which are inconsistent at present.

Ad Hoc Group on Hydrogen Components

The Ad Hoc Group on Hydrogen Components continues its work, and is presently quality-checking the draft matrix of components and existing standards. There are four categories in the matrix:

- An international standard exists and can be used.
- A national standard exists and can be used.
- A standard exists but needs work.
- No standard exists.

The US noted that CSA America vehicular and stationary component standards could be a resource.

A report is expected June 2009.

Other Business

The TC 197 Chairman noted the passing of former Chairman Tapan Bose of Canada earlier this year. Argentina noted how instrumental Dr. Bose was in encouraging hydrogen activities in Argentina, as well as many other countries.

Next Meeting

The next ISO/TC 197 Plenary will be held in Seoul, Korea, probably in September 2009.

Social Event

Following the Plenary meeting, participants were treated by our Australian hosts to a uniquely Australian experience. We were taken by ferry to the Lone Pine Koala sanctuary for an Australian barbeque dinner, and had an opportunity to cuddle the koalas and hand-feed the kangaroos.