ISO/TC 197
Hydrogen technologies

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ISO TC197 Meeting Highlights

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ISO TC197 Meeting Highlights

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The purpose of ISO/TC 197 is to promote the safe use and commercialization of hydrogen technologies including, for example, hydrogen stations and equipment for the dispensing of hydrogen to fuel cell vehicles (FCVs).

The 2019 ISO/TC 197 Plenary meeting was held in Grenoble, France, on December 12-13, 2019. This report provides a summary of that meeting.

A special introductory thank you was given to M. Pierre Serre-Combe who was essential in organizing the location and the event.

The following recent changes to ISO directives were presented:

1. New ISO *Rules of Conduct* (respect, behave ethically, dispute resolution, create consensus development environment, etc. have been developed.
2. Guests are allowed to attend single meetings if acceptable to convenor. Continued attendance requires the expert to join a TAG.
3. Role of Chairman Advisory Groups (CAGs) like the TC 197 TAB has been clarified.
4. "Secretary" title for working groups changed to "committee mangers".
5. Guidance on citing regulations are provided in Annex AR of ISO rules.
6. Form 8B allows minor changes to documents.
7. Editing tool for virtual meetings being piloted.
8. Allowable time frame reduced from 48 months to 36 months. Work initiated before May 2020 can still use 48 months.

<u>Working Group (WG) Highlights:</u>

WG 5, which recently completed ISO 17268: *Gaseous hydrogen land vehicle refuelling connection devices*, will work to develop the next revision of the document to include H70HF nozzles/receptacles, where significant industrial activity is anticipated. The ISO FDIS 17268 ballot was underway during the Plenary meeting, and the International Standard has since been published.

WG 18 documents – fuel container, ISO 19881, and thermally activated relief device, ISO 19882, both passed vote previously and were published in December 2018. WG 18 planned to meet in March 2020 in Tokyo, but the meeting was postponed to a later date due to Covid-19 concerns. The next steps are:

- to restart work on ISO 19881 to address technical comments received at FDIS, for instance incorporating Type 3 designs based on developments in the UN Global Technical Regulation (GTR) on hydrogen and fuel cell vehicles or GTR 13.
- to restart work on ISO 19882 to address technical comments received at FDIS and other developments in the GTR 13.

As part of the WG 18 scope of future work on the standard for vehicular containers is harmonization with the GTR 13 and SAE J2579.

WG 19: Dispensers - Now that the hydrogen fueling station standard (19880-1) has been recently published, work on a standard for dispensers can resume. The Convenor indicates that the intent is to harmonize with 19880- 1 and to prepare the 19880-2 document for ballot. WG 19 will hold a meeting by mid-2020 and late 2020, with the FDIS ballot to be launched by mid-2021.

WG 22: Hoses and Hose Assemblies:

- ISO 19880-5 was published in November 2019.
- A meeting was held on December 10, 2019, with a view to addressing FDIS comments plus a number of outstanding issues and preparing a new draft. Additionally, the Convenor has requested preparing an amendment to address a number of editorial issues, missed prior to publication.

WG 23: Fittings:

- WG 23 anticipates having a CD in early 2020, to restart the process formally.

WG 24: *Gaseous Hydrogen Fueling Stations – General Requirements*, has just been published (March 2020).

- WG 24 was officially disbanded, however, for knowledge preservation purposes its number and web space at ISO portal will likely be inherited by the future WG on fueling protocols. A proper procedure is currently being discussed by ISO/TC 197 leadership with ISO CS.

Preliminary New Work Items:

There were two new Preliminary Work Items (PWIs), including pre-normative research from European Project PreslHy and one on "Hydrogen Energy – Vocabulary", which is an activity at CEN/CLC JTC 6, which has been given the number ISO PWI 24078.

It was noted that CSA has also initiated an activity to harmonize pressure terminology.

WG 21 (Compressors) is progressing now that experts are available for the various types of compression. WG 21 meetings were held in Cleveland, Ohio, on October 24-25, 2019, then subsequently in Grenoble, France, on December 9, 2019, prior to the ISO TC 197 Plenary Meeting. A further meeting is planned in 2020, in the U.S., to try to progress the document to Committee Draft (CD) stage. A CD will follow in 2020, at which point the project will officially be restarted.

WG 27: ISO 14687 - *Hydrogen Fuel Product Specification* was approved with no negative comments and is now published (November 2019).

WG 28 - ISO FDIS 19880-8 - *Gaseous hydrogen — Fueling stations — Part 8: Fuel quality control*, has been approved with no negative comments and is now published (October 2019).

A joint meeting of WG 27 and WG 28 was held on December 9, 2019 to begin to address ongoing work, broken out into three Task Groups:

- Task 1: Grade D (FCEV PEM fuel cell)
- Task 2: Grade E (stationary PEM fuel cell)
- Task 3: Grade A (combustion appliances for heating, cooking etc.)

M. Webster proposes some technical feedback with respect to the purity of the hydrogen used for testing according to ISO 14687.

ISO/TC 197 agreed to extend the work of WG 28 to develop an editorial clarification that aligns ISO 19880-8 with ISO 14687 2019; then open a new revision of ISO 19880-8 in parallel with new version of ISO 14687 to harmonize with the ISO 19880 family of documents and other necessary changes. A formal call for additional members will take place in order to have this task started in 2020.

Systematic reviews

Five documents are identified that will be reviewed during 2020:

- ISO 26142:2010 *Hydrogen detection apparatus -- Stationary applications*
- ISO 16110-2:2010 *Hydrogen generators using fuel processing technologies -- Part 2: Test methods for performance*
- ISO 13985:2006 *Liquid hydrogen -- Land vehicle fuel tanks*
- ISO 13984:1999 *Liquid hydrogen -- Land vehicle fueling system interface*
- ISO/TS 19883:2017 *Safety of pressure swing adsorption systems for hydrogen separation and purification*

Also, ISO/TR 15916: *Basic considerations for the safety of hydrogen systems*- is 4 years old, and, had it been a standard or Technical Specification, would soon be due for systematic review. Comments have been received on content within the document, specifically on the table concerning material compatibility. To address this, a new Working Group will be formed with Jay Keller as the convenor. The initial plan is to simply address this change, but other comments will also be considered.

<u>New Work Item Proposals</u>

<u>Electrolyzer performance testing for grid balancing purposes</u>

From the European project Qualygrids, (see http://www.qualygrids.eu/), Lennart de Waart from NEN (with support from Regine Reissner from DLR) followed up a presentation given by Cyril Bourasseau during the SPM the previous day. Qualygrids has prepared a proposal for testing protocols for electrolyzers to be used as dynamic loads on the electrical grid. These were submitted to IEC TC 105 as an NWIP, who proposed forming a Joint Working Group with ISO TC 197. It is proposed to also include IEC TC 8.

It was clarified that there is no intention for this standard to replace existing Transmission System Operators (TSOs) and Distribution System Operators (DSOs) requirements on loads, which are different nationally, but that it would define a test, or series of tests, to cover TSO and DSO requirements in numerous different countries – which could then be an indication to a manufacturer/customer (or even regulator) that an electrolyzer that has performed this testing is suitable for deployment in any country.

ISO/TC 197 looks forward to a formal NWIP from Norway. The document title would be determined, but the document number is proposed to be 22734-2.

Communication protocol for heavy duty, high-flow applications

Pre-NWIP ideas for fueling protocol standards was presented by G.W.Scheffler and then the specific NWIP on high fuel flow fueling protocol was presented by Antonio Ruiz (Nikola Motors). Discussions on both items were positive, and the chair (with consensus agreement of the TC 197 membership) requested that the U.S. re-cast the NWIP into 3 parts.

The TC asks that United States resubmit a NWIP for a 3-part international standard to be developed by a single WG with a single convenor on fueling protocols for compressed hydrogen vehicles with the Parts' preliminary titles:

- Part 1: Design and development process for fueling protocols
    - Note: Although the primary motivation for this standard is related to high flow heavy duty applications, it is expected that the Scope covers all road and off-road applications including LD, MD and HD HF (that would span from cars to rail and marine applications)
- Part 2: Definition of communications between the vehicle and dispenser control systems
    - Note: The Scope covers basic principles and minimum requirements for communication for the above applications
- Part 3: High flow hydrogen fueling protocols for heavy duty road vehicles
    - Note 1: The Scope covers buses and trucks with the primary focus on H70 HD HF road vehicles
    - Note 2: It is worth noting that the title of the original NWIP is somewhat misleading as it says "Heavy Duty Applications" while the narrative talks about heavy duty road vehicles only. Hence, a distinction with what is above.

Note: "3-part standard" could and likely will be 3 individual standard documents.

A project proposal on use of 100% hydrogen appliances

The TC discussed a potential project focused on appliances, particularly those that use 100% hydrogen as a fuel. Australia, with support from the UK, was encouraged to investigate ways where ISO/TC 197 can work with others to identify a route forward for International standards in this area, for instance, in conjunction with CEN TC 234.

Hydrogen vehicle fuel system components

This NWIP would look at valves, filters, fittings, etc. Excluded in the NWIP are pressure relief valves. This would align the component requirements with the GTR#13 (and UNECE R134) requirements and fill the gap that will be left following the withdrawal of the EC79 regulations in Europe. The HGV 3.1 CSA seed document that will be used is already covered in a previous licensing agreement between ISO and CSA.

O-Rings

The proposal discusses self-sealing mechanisms and work completed by TC 131 SC7 WG 3, referencing ISO 3601 which has 5 parts. Additional consideration (beyond the existing ISO 3601 standard) may be required for hydrogen service.

The Chair indicated that there is value in the work and proposes that the scope of the work be clarified, but that the document would fit in the 19880-X family.

NWIP on the topic of hydrogen sampling of impurities

The project was initially discussed in 2015. This pre-NWIP for sampling hydrogen would replace Annex A in FDIS 19880-1. It was withdrawn in 2015 due to the WG 24 workload. If approved, this NWIP would help reduce the weight of the 19880-1 document.

The device is called HySam, the timeframe as a new project is 3 years. ISO/TC 197 encourages submission of the NWIP and to establish a Joint Working Group between ISO/TC 158 and 197 under the responsibility of TC 197.

Criteria for approval of proposed convenors

To assist all proponents in finalizing their respective NWIPs, ISO/TC 197 leadership communicated the criteria for the approval by the TC of the proposed convenors (see N1157 on ISO/TC 197 webpage). The key points are listed below:

First is a demonstrated adherence to the ISO Code of Conduct. This includes the ability to divest from the country and particularly the company interests and act entirely in the best interest of the international community. Note: it is worth reminding the proponents that ISO develops consensus-based standards in the interests of all international stakeholders, not solely industry standards.

Second is a demonstrated successful experience in a leadership position within a standard development community (at the national or international level) and preferably within ISO/TC 197 and other ISO committees. N1157 lists a number of international committees and groups that would satisfy this criterion.

Only the candidates that satisfy both the above criteria will be considered for approval by the TC.

Mini-Round Table: “FDIS 19884 Lessons Learned and Path Forward”

Following a robust discussion related to the failed ISO FDIS 19884 document, ISO/TC 197 agreed to welcome New Work Item Proposals to restart an activity to develop an International Standard on Gaseous Hydrogen — Cylinders and Tubes for Stationary Storage.

(NOTE: At the time of writing this summary, the ISO TC 197 Technical Advisory Board was currently reviewing a NWIP to restart ISO 19884 and the Committee Internal Ballot is expected to be launched soon.)

Future ISO TC 197 meetings

The next plenary meeting will be held in Seoul, Korea during the 2nd week of December 2020. The dates proposed are:

- Working group meetings on December 7-8;
- Strategic planning meeting on December 9;
- Plenary meeting on December 10-11.