National Hydrogen and Fuel Cell Codes and Standards Coordinating Committee (NHFCCSCC)

Wednesday, July 7, 2021
TIME: 2:00 – 3:00 pm (Eastern Standard Time)

Minutes

Attendees

Antonio Ruiz	**Eric Prause**	**Jennifer Gangi**
Carl Rivkin	**Ian MacIntire**	**Jennifer Hamilton**
Connor Dolan	**Jay Keller**	**Karen Quackenbush**
Kelvin Hecht	**Sara Marxen**	**Spencer Quong**
Laura Hill	**Will James**	**Stella Papasavva**
Martin Hering	**Juana Williams**	**Christina Daniels**
Quailan Homann	**Morry Markowitz**	
Rob Early	**Mike Steele**	

I. Welcome and Housekeeping Items

- FCHEA's anti-trust guidelines reviewed.
- Agenda approved
- Minutes approved.

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II. DOE/HQ Update — Laura Hill

FOA selections have been announced.

DOE Announces $52.5 Million to Accelerate Progress in Clean Hydrogen | Department of Energy

DOE Hydrogen Program: 2021 Annual Merit Review Proceedings (energy.gov)

DOE Hydrogen Energy Earthshot RFI Responses are due by 5:00 PM US Eastern today - https://www.federalregister.gov/documents/2021/06/08/2021-11604/notice-of-request-for-information-rfi-on-hydrogen-programs-demonstration-opportunities-aligned-with

III. Codes &Standards Events and Fuel Cell Safety Information

http://www.hydrogenandfuelcellsafety.info/events/ — **Karen Quackenbush**

Request: technical resource updates for the Hydrogen and Fuel Cell Safety website. Any committee members who have materials they would like hosted on the website can send them to Karen Quackenbush (khall@fchea.org) or Connor Dolan (cdolan@fchea.org).

IV. Global Technical Regulations — Ian MacIntire

An IWG meeting held last week. Agreement was reached on material compatibility issue we have been discussing – the test procedure and rationale will be included in GTR 13 but only in Part 1 which is not the official requirements.

The potential use of a sled test as a replacement for a crash test is still under discussion.

The receptacle proposal has been reconsidered based on US suggestion that specific receptacle designs not be listed to leave the potential open for future innovative designs. The suggestion now is to provide a reference to current designs, but allow for future developments. This is still under discussion as well.

The Task Forces will continue working between now and the next IWG meeting in September/October. A specific date will be determined.

V. Codes and Standards Organization Updates

Institute of Electrical and Electronics Engineers — Mark Siira

IEEE will be providing a presentation to FCHEA's Stationary Power WG next week to discuss developments with IEEE 1547.

International Electrotechnical Commission IEC TC 105 — Kelvin Hecht

- IEC 62282-4-401
  - Micro fuel cell power systems – Power data interchangeability and performance test methods for laptop computers
    - Will have its initial (virtual) meeting July 15th
    - The US TAG questioned the need for this activity
    - Karen & I will participate
- IEC 62282-3-200
  - Stationary fuel cell power systems – Performance test methods
    - Proposal has been issued to initiate a 3rd edition
    - ASME PTC 50 is initiating a similar activity
      - Working to coordinate activities
- IEC 62282-4-101 / 102
  - Fuel cell power systems for industrial electric trucks – Safety
  - Fuel cell power systems for industrial electric trucks – Performance test methods
    - Comments received
    - No active US participation
- Next Plenary to be held in Seoul, Korea October 27-28, 2021.

International Standards Organization ISO/TC 197 — Karen Quackenbush/Jay Keller

WG 24 Task 1 has a working group consultation out right now that provides an opportunity for a comment on a draft protocol. There is a long deadline for review with comments due by August 31st.

WG 24 Task 2 on Communications has a meeting on fueling protocols for hydrogen vehicles coming up on August 9th.

WG 22 Hoses - The revision for the hoses document is in coordination with CSA 4.2. There were folks from WG 22 participating in that effort and will be working on harmonizing those decisions with the working group activities.

WG 5 Interface Receptacles meeting on July 9th meeting. Working on H35 high flow compatibility of nozzle to receptacle. That starts at midnight US Eastern on July 9th or 9 PM Pacific on July 8th.

WG 29 has been tasked with an additional section on liquid hydrogen.

ISO 14687 will have a meeting on hydrogen quality soon.

National Fire Protection Association NFPA 2 **Chris LaFleur**

NFPA 2 staff sent out the following memo extending the NFPA 2 comment deadline.

Error Identified in NFPA 2 First Draft Report - reopening for Public Comment (comment closing date: July 14, 2021)
*Following the posting of the First Draft Report, an error was identified by staff. Specifically, First Revision No. 120 passed ballot of the responsible Technical Committee but was erroneously identified as failed and marked as a Committee Input (CI) No. 120. This error has now been corrected within the text (note: the changed text does not show as such in the First Draft Report, but rather is clearly noted), the Technical Committee has been made aware, and submitters of Public Comments (PC) on the affected section(s) have additionally been notified and provided opportunity to submit additional PCs on the section(s) (should they so desire based upon the corrected text) for Technical Committee consideration at the Second Draft Meeting. Additionally, to ensure full opportunity for participation for anyone who wishes to submit additional Public Comments as a result of this correction, the Public Comment closing date is being extended until **July 14, 2021** for submissions.*

International Codes Council (ICC) **Spencer Quong**

Public comments to ICC were due on July 2nd. We do not expect opposition to the on-demand hydrogen fueling or other hydrogen comments. The next draft will hopefully be out in a couple of months.

CSA Group **Sara Marxen/Brent Hartman**

Technical Committees		
Hydrogen Transportation Technical Committee	CSA's Hydrogen Transportation Technical Committee held a virtual meeting on June 22. Our in-person committee meetings scheduled for October 2021 have been canceled. Another virtual technical committee meeting will be scheduled for Fall 2021.	
Active / Recently Published Projects		
TSC	**Designation/Title**	**Status**

HGV 4.4	HGV 4.4, Gaseous hydrogen – Fuelling stations – Valves	This project is to replace CSA's HGV 4.4, 4.6 and 4.7 standards with an adoption of ISO's 19880-3 Valve standard (a consolidation the 3 CSA standards) with North American deviations. The document published in June 2021.
HGV 4.3	HGV 4.3, Test methods for hydrogen fueling parameter evaluation	This project is a revision of an existing standard, and will include content related to MC formula. Public review closed on June 27, 2021 and generated over 50 comments. All comments received will be reviewed with the Chairs, and TSC meeting(s) will be scheduled to address substantive Public Review comments.
HGV 4.2	HGV 4.2, Hoses for dispensing compressed gaseous hydrogen	This project is a revision of an existing standard, and will update to align with current hose technology, and remove requirements for on-board vehicle hoses (content will be transferred to HGV 3.1). We've been fortunate to have hydrogen hose experts from ISO/TC 197 Working Group 22 from Japan and Europe join the meetings to harmonize the next edition of HGV 4.2 with the content/requirements in ISO's 19880-5 Hose Standard. The TSC completed review of comments, and the draft document is being prepped for Technical Committee Ballot.
HGV 5	HGV 5.2, Compact hydrogen fueling systems	This project is to develop a NEW standard for Compact Hydrogen Fueling Systems (HGV 5.2). The TSC continues to meet for content development.
HGV 3	HGV 3.1, Onboard vehicle components for hydrogen gas vehicles	This project is a revision of an existing standard for technology updates, as well as inclusion of the on-board vehicle hose requirements (transferred from HGV 4.2). The TSC continues to meet for content development.
HGV 4.1	HGV 4.5, Priority and sequencing equipment for hydrogen vehicle fueling	This project is to develop a standard to REINSTATE an updated edition of a Priority and Sequencing standard. A seed document draft has been prepared and a kickoff meeting with the HGV 4.1 TSC is being scheduled for Summer 2021.
FC 4 * C22.2 No. 22734	Hydrogen generators using water electrolysis	The TSC will be initiating work on a binational adoption of ISO 22734. Members interested in participating in the project should contact mark.duda@csagroup.org.

Society of Automotive Engineers (SAE) **Mike Steele**

Task Force	*Document*	*Status*	*2021*	*2022*	*2023*	*2024*	*2025*	*2026*
ITF	J2600_2015	Published						
	J2601_2020	Published						
	J2601/2_2013	Reaffirm						
	J2601/3_2014	Reaffirm						
	J2601/4_dev							
	J2719_2019	Published						
	J2799_2019	Published						
	J3219_dev							
Fuel Econ	J2572_2014	Reaffirm						
	J3202_dev							
Safety	J1766_2014	Published	Awaiting results of GTR 13 Phase 2 process					
	J2578_2014	Published	Awaiting results of GTR 13 Phase 2 process					
	J2579_2018	Published	Awaiting results of GTR 13 Phase 2 process					
	J2574_2011	Stabilized	No further review necessary as per TSB					
	J2594_2016	Published						
	J2760_2011	Stabilized	No further review necessary as per TSB					
	J2990-1_2016	Published	(recently updated)					
	J3089_2018	Published						
Performance	J2615_2011	Stabilized	No further review necessary as per TSB					
	J2616_2011	Stabilized	No further review necessary as per TSB					
	J2617_2011	Stabilized	No further review necessary as per TSB					

TF action required as per SAE TSB

Compressed Gas Association (CGA) **Rob Early**

CGA's 2021 Young and Emerging Professionals Summit is scheduled for August to provide four weeks of technical webinars (one basic session and one advanced session per week). Week three will cover hydrogen (August 17 and August 19). Session 1 (basics) will cover the following:

- Hydrogen properties, production, and applications
- Bulk liquid and gaseous storage of hydrogen
- Hydrogen used in vehicles – past, present, and future
- Panel discussion

Session 2 (advanced) will cover the following topics:

- Metal dusting in HYCO facilities
- Roofs over hydrogen storage, siting, and area classifications

More details can be found at https://www.cganet.com/resources/events/cgaconnect-events/young-emerging-professionals-summit-2021/

Status of current and future publications:

Standard	**Current edition**	**Status**
CGA G-5, *Hydrogen*	8th (2017)	Deadline to submit proposed changes for next edition is 7/7/2022. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=22-019
CGA G-5.3, *Commodity specification for hydrogen*	7th (2017)	Deadline to submit proposed changes for next edition is 6/4/2022. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=22-013
CGA G-5.4, *Standard for hydrogen piping systems at user locations*	6th (2019)	Deadline to submit proposed changes for next edition is 12/22/2024. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=24-54
CGA G-5.5, *Hydrogen vent systems*	3rd (2014)	The 5th edition has been published and can be found at https://portal.cganet.com/Publication/Details.aspx?id=G-5.5 Deadline to submit proposed changes for next edition is 03/04/2026. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=26-3 Heat radiation testing at Chart Industries in New Prague, MN date (summer 2021) is to be determined.

Standard	Current edition	Status
CGA G-5.6, *Hydrogen pipeline systems*	1st (2005 – reaffirmed 2013)	Deadline to submit proposed changes for next edition is 8/1/2022. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=19-018
CGA H-1, *Service conditions for portable, reversible metal hydride systems*	2nd (2011)	Deadline to submit proposed changes for next edition is 2/3/2022. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=22-033
CGA H-2, *Guideline for classification and labeling of hydrogen storage systems with hydrogen absorbed in reversible metal hydrides*	2nd (2018)	Deadline to submit proposed changes for next edition is 6/4/2022. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=22-012
CGA H-3, *Standard for cryogenic hydrogen storage*	3rd (2019)	Deadline to submit proposed changes for next edition is 12/1/2023. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=23-036
CGA H-4, *Terminology associated with hydrogen fuel technologies*	3rd (2020)	Deadline to submit proposed changes for next edition is 12/1/2024. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=24-59
ANSI/CGA H-5, *Standard for bulk hydrogen supply systems*	3rd (2020)	The deadline to submit proposed changes for the next edition is 2/26/2024. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=24-010
CGA H-10, *Combustion safety for steam reformer operation*	2nd (2018)	Deadline to submit proposed changes for next edition is 12/1/2023. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=23-038
CGA H-11, *Safe start-up and shutdown practices for steam reformers*	2nd (2020)	Deadline to submit proposed changes for next edition is 8/11/2025. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=25-30
CGA H-12, *Mechanical integrity of syngas outlet systems*	1st (2016)	Deadline to submit proposed changes for next edition is 3/1/2022. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=21-016
CGA H-13, *Hydrogen pressure swing adsorber (PSA) mechanical integrity requirements*	1st (2017)	Deadline to submit proposed changes for next edition is 8/1/2022. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=22-027

Standard	Current edition	Status
CGA H-14, *HYCO plant gas leak detection and response practices*	1st (2018)	Deadline to submit proposed changes for next edition is 12/8/2023. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=23-045
CGA H-15, *Safe catalyst handling in HYCO plants*	1st (2020)	Deadline to submit proposed changes for next edition is 9/1/2025. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=25-59
CGA H-XXX (TBD), *Small scale hydrogen production and delivery*	New publication not released yet	Task force is creating first draft that will then go to the CGA membership for review.
CGA P-28, *OSHA process safety management and EPA risk management plan guidance document for bulk liquid hydrogen supply systems*	4th (2014)	The draft of the 5th edition is in staff review before going to Standards Council for final review.
CGA PS-31, *Position statement on cleanliness for proton exchange membranes hydrogen piping / components*	1st (2007 – reaffirmed 2019)	Deadline to submit proposed changes for next edition is 6/12/2025. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=25-16
CGA PS-33, *Position statement on the use of LPG or propane tanks as compressed hydrogen storage buffers*	1st (2008 – reaffirmed 2020)	Deadline to submit proposed changes for next edition is 12/10/2026. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=25-41
CGA PS-46, *Position statement on roofs over hydrogen storage systems*	1st (2017)	Deadline to submit proposed changes for next edition is 3/6/2023. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=23-012
CGA P-48, *Position statement on clarification of existing hydrogen setback distances and development of new hydrogen setback distances in NFPA 55*	1st (2016)	Deadline to submit proposed changes for next edition is 2/12/2021. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=21-062

American Society for Testing & Materials (ASTM) **Jennifer Hamilton**

We are still seeking abstracts for in line fuel quality workshop in December.

American Society of Mechanical Engineers (ASME) **Ray Rahaman**

No report at this time.

VI. Discussion Topics

Facilitating Deployment **All**

CAFCP / CHC will be hosting an outreach event and ride and drive on July 27th.

Center for Hydrogen Safety **Nick Barilo**

A codes and standards webinar will be held on July 21st.

https://www.aiche.org/academy/webinars/global-hydrogen-safety-codes-and-standards

Regulatory Matrix Review and Comment **Karen Quackenbush**

The latest version was updated as of June 2021 and was provided with today's meeting notice.

Please direct any updates, questions, or comments to Karen Quackenbush by email at kquackenbush@fchea.org.

Permitting and Installation of Hydrogen Fueling Stations

California Station Implementation **Jennifer Hamilton**

Four or five new stations have opened in the last few months, with nearly 50 stations now open and 130+ in various stages of development.

There are more than 10,000 fuel cell vehicles and 48 fuel cell buses in operation in California.

CARB will be releasing a final sustainability report very soon.

The CAFCP will be releasing a heavy-duty fuel cell electric truck vision document in the coming weeks as well.

California Div. of Measurement Standards/Fuel Quality / Metrology **Christina Daniels**

No updates at this time.

Legal Metrology Standards Hydrogen Fuel Quality and Measurement **Juana Williams/Ralph Richter**

No updates at this time.

VII. Open Discussion & Other Issues

The International Conference on Hydrogen Safety will be held in September 21-24. This will be a virtual / in-person hybrid event.

VIII. Next Meeting – Wednesday, August 4th at 2:00 PM US Eastern