

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

Wednesday, August 4, 2021

TIME: 2:00 – 3:00 pm (Eastern Standard Time)

Minutes

Attendees

**Antonio Ruiz
Carl Rivkin
Chris LaFleur
Christina Daniels
Connor Dolan
Eric Prause
Ian MacIntire
Iris Monner**

**Jay Keller
Jennifer Gangi
Juana Williams
Karen Quackenbush
Laura Hill
Mike Steele
Morry Markowitz
Nick Barilo**

**Quailan Homann
Ray Rahaman
Rich King
Rob Early
Spencer Quong
Stella Papasavva
Will James**

I. Welcome and Housekeeping Items

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

II. DOE/HQ Update

Laura Hill

CRADA call closed recently. That review is ongoing.

Sign up for the DOE newsletter for more details and the latest updates.

<https://www.energy.gov/eere/fuelcells/hydrogen-and-fuel-cell-technologies-office-newsletter>

A DOE Hydrogen Earthshot webinar may be held in early September. (Update: August 31 – September 1: <https://web.cvent.com/event/15f0aaca-7ab2-4dcd-9482-183d30a66374/summary>)

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

The next IWG meeting will be in late September / early October. In the meantime, Task Forces will be continuing their work. The drafting task force has a goal for another edition of their draft document available for the next IWG.

V. Codes and Standards Organization Updates

Institute of Electrical and Electronics Engineers

Mark Siira

IEEE has recently provided a presentation to FCHEA's Stationary Power Working Group on developments with IEEE 1547.

International Electrotechnical Commission IEC TC 105

Kelvin Hecht

IEC TC 105 plenary will be planned for Seoul, Korea will be a hybrid meeting that will accommodate virtual participants. This will be held on October 27th – 28th.

International Standards Organization ISO/TC 197

Karen Quackenbush/Jay Keller

There are upcoming meetings tomorrow and next week.

WG 24 is proceeding with its Task Groups. TF 1 that is working on developing the conditions and items needed for any refueling protocol recently worked through a questionnaire that was circulated at the end of June, we are waiting to see results from that. WG 24 Task Force 2 will be meeting on August 9th at 3 PM US Eastern. Task 2 is focused on the communications.

WG 5 gaseous hydrogen land vehicle refueling connection devices – Meeting on August 5th at 9 AM US Eastern.

WG 32 hydrogen generators using water electrolysis will be meeting on October 29th at 11:30 AM US Eastern.

Andrei Tchouvelev is rotating off of being the Chair of ISO TC 197. Ikeda-san from Japan with HySut will be taking over in December.

A new Technical Sub-Committee (SC 1) is being proposed to begin looking at hydrogen applications beyond what the historical TC 197 has explored. Andrei will be leading that activity. This will include applications including locomotives, aviation, maritime, material / industrial applications such as steel and cement manufacturing.

National Fire Protection Association NFPA 2

Chris LaFleur

The extended public comment period was closed on July 14th. This was extended due to a miscount on one of the votes on the inputs on the official ballot.

The second draft meeting is no longer planned for the Fall, but would be held in January/February. However, by pushing out this meeting we are at risk of slipping the publication of NFPA 2 a bit. If the revised version receives a certified amending motion, then it would not be issued until 2023, instead of late 2022. This would mean that the expected 2023 version could become a 2024 version.

International Codes Council (ICC)

Spencer Quong

IFC second draft Public Comment Hearing is coming up on September 19-22 in Pittsburg, PA. There were no public comments regarding the few hydrogen proposals that we had.

Active / Recently Published Projects		
TSC	Designation/Title	Status
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 late June and the Chairs have been dispositioning the 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.
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**

J2600 Interface document is still being worked on. There are several issues with WG 5 on the geometry and other topics that need to be resolved before publication.

There are several documents due for a five-year review soon.

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, <i>Hydrogen</i>	8 th (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, <i>Commodity specification for hydrogen</i>	7 th (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, <i>Standard for hydrogen piping systems at user locations</i>	6 th (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, <i>Hydrogen vent systems</i>	3 rd (2014)	The 5 th 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 is planned for later this summer. The goal is for the task force to review test results at a meeting in conjunction with the Hydrogen Technology committee meeting the week of October 25.
CGA G-5.6, <i>Hydrogen pipeline systems</i>	1 st (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, <i>Service conditions for portable,</i>	2 nd (2011)	Deadline to submit proposed changes for next edition is 2/3/2022.

Standard	Current edition	Status
<i>reversible metal hydride systems</i>		https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=22-033
CGA H-2, <i>Guideline for classification and labeling of hydrogen storage systems with hydrogen absorbed in reversible metal hydrides</i>	2 nd (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, <i>Standard for cryogenic hydrogen storage</i>	3 rd (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, <i>Terminology associated with hydrogen fuel technologies</i>	3 rd (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, <i>Standard for bulk hydrogen supply systems</i>	3 rd (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, <i>Combustion safety for steam reformer operation</i>	2 nd (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, <i>Safe start-up and shutdown practices for steam reformers</i>	2 nd (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, <i>Mechanical integrity of syngas outlet systems</i>	1 st (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, <i>Hydrogen pressure swing adsorber (PSA) mechanical integrity requirements</i>	1 st (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
CGA H-14, <i>HYCO plant gas leak detection and response practices</i>	1 st (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, <i>Safe catalyst handling in HYCO plants</i>	1 st (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), <i>Small scale hydrogen production and delivery</i>	New publication not released yet	Task force is creating first draft that will then go to the CGA membership for review.

Standard	Current edition	Status
CGA P-28, <i>OSHA process safety management and EPA risk management plan guidance document for bulk liquid hydrogen supply systems</i>	4 th (2014)	The draft of the 5 th edition is in staff review before going to Standards Council for final review.
CGA PS-31, <i>Position statement on cleanliness for proton exchange membranes hydrogen piping / components</i>	1 st (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, <i>Position statement on the use of LPG or propane tanks as compressed hydrogen storage buffers</i>	1 st (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, <i>Position statement on roofs over hydrogen storage systems</i>	1 st (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, <i>Position statement on clarification of existing hydrogen setback distances and development of new hydrogen setback distances in NFPA 55</i>	1 st (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

Tabled until next meeting.

American Society of Mechanical Engineers (ASME)

Ray Rahaman

B31.12 work is ongoing. We will be holding a meeting on September 16, 1-5 PM US Eastern. More details are available on the ASME site.

Upcoming discussion will be revision of items for the 2022 edition, which we hope to begin work on between now and summer of 2022 to have available by the end of the year.

VI. Discussion Topics

Facilitating Deployment

All

CAFCP just released its Heavy-Duty Fuel Cell Electric Truck Vision document for California and Beyond. An email blast was circulated this morning circulating the piece.

Link - <https://app.greenrope.com/content/Fuel-Cell-Electric-Trucks-Vision-CaFCP.pdf> [PDF].

CaFCP staff and members will discuss the role of heavy-duty fuel cell electric trucks and hydrogen in helping California and other states meet their climate and air quality goals on an upcoming webinar on August 12.

California Hydrogen Policy Series

Heavy-duty trucking in California: The role of fuel cell technology and hydrogen

Thursday, August 12, 12pm–1pm

Link - <https://register.gotowebinar.com/#register/2016556419136156939>

Center for Hydrogen Safety

Nick Barilo

Two webinars were held recently, one on electrolyzer safety and one on international standards. There was very high attendance for these meetings. CHS is putting out hydrogen safety e-learning courses which are now available. A third is in development and should be available soon. A total of nine courses are expected to be available by the end of the year.

Hydrogen as an Energy Carrier - <https://www.aiche.org/academy/courses/ela201/hydrogen-energy-carrier>

Properties and Hazards of Hydrogen -

<https://www.aiche.org/academy/courses/ela202/properties-and-hazards-hydrogen>

In September, CHS will be holding a workshop on setting up a framework for sharing information with the public.

Regulatory Matrix Review and Comment

Karen Quackenbush

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

Tabled until next meeting.

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

Hydrogen field test standard is ready to go out and conduct testing again. This works on the point of sale system and confirms the mass of hydrogen delivered.

We continue to do hydrogen quality field testing as well. This is for testing the contaminants in the fuel.

Legal Metrology Standards Hydrogen Fuel Quality and Measurement

Juana Williams/Ralph Richter

No updates at this time.

VII. Open Discussion & Other Issues

We will add a standing Hydrogen Aviation item to our agenda moving forward.

- SAE AE7F for hydrogen fuel tanks for aircraft is also in development
- ASTM F38.01 WK60937 hydrogen fuel cell standard for drones, EVTOL, and general aviation
- ASTM F.44 also has an electronics standard for managing and operating hydrogen gas

VIII. Next Meeting – Wednesday, September 8, 2021 at 2:00 PM US Eastern