

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

**Wednesday, February 16, 2022
TIME: 2:00 – 3:00 pm (Eastern Standard Time)**

Minutes

Attendees

**Connor Dolan
Karen Quackenbush
Juana Williams
Trey White
Shawn Cole
Sara Marxen
Rob Kaminsky
Rob Early
Norman Newhouse**

**Clark Crawford
Michael Cox
Kelvin Hecht
Laura Hill
Ian MacIntire
Eric Prause
Jay Keller
Christine Watson
Christine Daniels**

**Bob Boyd
Alan Lang
Amy Ryan
Mark Luth
Jennifer Gangi
Yuk Wong
Rudolf Coertze
Jennifer Hamilton
William Chernicoff**

I. Welcome and Housekeeping Items

- FCHEA's anti-trust guidelines
- Meeting agenda - Approved
- Previous meeting minutes - Approved

II. DOE/HQ Update

Laura Hill

- Two RFIs just released:
 - BIL Hubs Implementation Strategy RFI: <https://eere-exchange.energy.gov/Default.aspx#Foald5d96172f-e9b6-48ff-94ac-5579c3531526>
 - RFI on Clean Hydrogen Manufacturing, Recycling, and Electrolysis: <https://eere-exchange.energy.gov/Default.aspx#Foalda1255029-22c4-4c18-9e90-356e92cbb795>
- RFI webinar – February 24 – 12:00 PM US Eastern - https://doe.webex.com/mw3300/mywebex/default.do?nomenu=true&siteurl=doe&service=6&rnd=0.3778811569807127&main_url=https%3A%2F%2Fdoe.webex.com%2Fec3300%2Feventcenter%2Fevent%2FeventAction.do%3FtheAction%3Ddetail%26%26%26EMK%3D4832534b000000047e8e4a30b186525d9083a4bbbb957a314f1b06f034d6f1f90b5b743026d6792c%26siteurl%3Ddoe%26confViewID%3D218856886720552822%26encyptTicket%3DSDJTSwAAAASQ94zDmsKxHRuqDpToujnliRtfbq8ySbwfdjqkRPTI6w2%26
- Senate Energy and Natural Resources Hearing on Clean Hydrogen: <https://www.energy.senate.gov/hearings/2022/2/full-committee-hearing-on-clean-hydrogen>
- H2Matchmaker: <https://www.energy.gov/eere/fuelcells/h2-matchmaker>
- Liquid Hydrogen Technologies Workshop Registration – February 22 at 11:00 AM US Eastern:

<https://www.zoomgov.com/meeting/register/vJlscuCoqjsuHcVpdNDzYmRa3Wrg5gQ2-ec>

The DOE Annual Merit Review will remain virtual for 2022. The dates for the AMR are June 6-9, 2022.

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 (kquackenbush@fchea.org) or Connor Dolan (cdolan@fchea.org).

IV. Global Technical Regulations

Ian MacIntire

Progress is being made to Phase 2 of GTR 13. Task 2 is finishing up work. Task force 3 on test procedures just had its last meeting today and resolved the majority of its remaining issues (a few final areas will be dealt by a smaller group). Task force 4 has its last meeting scheduled later this month. The task force focused on heavy-duty vehicles is also close to resolving as well.

The next GTR 13 IWG meeting is scheduled for March 15 – 17. The drafting committee meeting in advance of the IWG meeting.

The GTR is on track for submission of an informal document for the May GSRP meeting.

V. Codes and Standards Organization Updates

Institute of Electrical and Electronics Engineers

Mark Siira

The P1547.2, P1547.3 and P1547.9 projects are all in the balloting and comment resolution stages and will likely be published in 3Q2022.

We will be launching at least 2 new IEEE 1547 Interconnection related projects by the end of 2Q2022.

International Electrotechnical Commission IEC TC 105

Kelvin Hecht

- **IEC 62282-3-201**
 - Stationary fuel cell power systems – Performance test methods for small fuel cell power systems
 - Proposed starting next revision
 - Comments to 2.1 edition invited by 3/25/22
- **IEC 62282-4-102**
 - Fuel cell power systems for electrically industrial trucks – Performance test methods
 - Committee draft for vote on 2nd edition posted
 - Comments invited until 4/29/22

International Standards Organization ISO/TC 197

Karen Quackenbush/Jay Keller

WG 23 – fittings – still dealing with scope issue. It is now down to about 1 sentence. That will be coming out for committee internal ballot soon.

WG 22 – hoses and hose assemblies – just went through all proposed changes to seed document that may impact the national document. Will be reviewing those one last time before sending out. That document is in its first revision and there are many expected updates since its first publication in 2019.

WG 5 – meeting coming up

WG 24 – meeting next week.

WG 29 – recently posted working documents and cleaned up version of what have been working on. Next meeting will be next week.

National Fire Protection Association NFPA 2

Chris LaFleur

The second draft meeting is scheduled for the week of February 28. We will vote on 109 Public Comments. The Bulk storage task group has made excellent progress and will be briefing the entire Technical Committee in the last Task group meeting Feb 23 so that will allow questions to be answered and the discussion voting on this issue more efficient during the Second Draft Meeting. Anyone can attend the task group meeting. Let me (Chris) know if you want to listen in.

International Codes Council (ICC)

Spencer Quong

The ICC is between cycles and nothing to report at this time.

Society of Automotive Engineers (SAE)

Mike Steele

- The Interface Task Force is having a webex 2/16/22 to further discuss revisions to the pressure corridors in J2601.
- The voting for J2601/3 (Industrial truck refueling) has completed. Comments are being discussed and incorporated.

CSA

Sara Marxen

Technical Committee Activity – Call for Participation
<p><u>CSA Fuel Cell Technical Committee:</u> CSA Group, an ANSI-accredited SDO, is seeking additional experts to serve on the bi-national Fuel Cell Technical Committee. The Fuel Cell Technical Committee develops and maintains minimum safety standards and essential requirements for the design construction and maintenance of:</p> <p>a) stationary, portable, and micro fuel cells; b) hydrogen generation technologies using all fuels (e.g., electrolysis, coal, natural gas); c) related components and equipment for stationary, portable and micro fuel cells; and</p>

d) related components and equipment installed for hydrogen generation technologies using all fuels.

We are seeking interested stakeholders who will actively participate and contribute to the development and maintenance of these important standards through CSA's accredited Standards Development Process(es).

The Technical Committee is seeking members in the following categories:

User interest — those who predominantly represent consumer interests or end users of the subject product(s), material(s), or service(s), and who are not involved in any way in production or distribution of the subject product(s), material(s), or service(s).

Regulatory authority — those who are predominantly involved in regulating the use of the subject product(s), material(s), or service(s).

What is expected?

- Strong interest and knowledge of the subject matter
- Active participation and willingness to work on a Technical Committee electronically and in-person
- Ability to represent a stakeholder category outlined above
- Ability to work in a multi-stakeholder environment, following the principles of consensus

If you are interested in participating as a new member of the CSA Fuel Cell Technical Committee, please submit a brief bio along with a statement outlining your interest and ability to contribute to the work to Mark Duda at mark.duda@csagroup.org. If you know of a colleague who may be interested in this project, feel free to have them contact CSA Group.

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. The Technical Committee Ballot closed 12/4/2021. The new edition will be published later this week.
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). The Technical Committee Ballot closed with a negative vote. A Recirculation Ballot of the Technical Committee closed in January with no additional negative votes, and no procedural appeals. The document is expected to publish by the end of February.
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 completed content development. The draft was available for public review (closed January 18, 2022). The Technical Subcommittee Chairs are working to pre-disposition comments, and additional TSC

		meetings to review the comment will be scheduled for late February / early March.
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 Technical Subcommittee is currently working through the public review comments received.
HGV 2	HGV 2, Compressed hydrogen gas vehicle fuel containers	This project is a revision of an existing standard. Content development meetings continue to be held on a bi-weekly basis.
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 early 2022.
C22.2 No. 22734	Hydrogen generators using water electrolysis	The CSA technical subcommittee continues to work on a binational adoption of ISO 22734. Contact Mark Duda (mark.duda@csagroup.org) with questions or for additional information.

Compressed Gas Association (CGA)

Rob Early

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 ongoing. The goal is for the task force to review test results as soon as they are completed.

Standard	Current edition	Status
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, reversible metal hydride systems</i>	2 nd (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, <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.

Standard	Current edition	Status
		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 has created the first draft that will then go to the CGA membership for review.
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 publication has been sent to Standards Council for review, where an issue with calculations has been found. The publication will be corrected and sent back to Standards Council.
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
CGA work item 21-126, <i>Hydrogen system siting and personnel exposures distances</i>		CGA members supported the NFPA 2/55 hydrogen storage task group to update liquid hydrogen system setback distances. The work was not finished before the November 3-5 NFPA 55 second draft meeting but is expected to be finished by the NFPA 2 second draft meeting in 1Q 2022. In the meantime, NFPA 55 has added a pointer to NFPA 2 in anticipation of the new distances being added to NFPA 2. CGA will support the new distances going to NFPA 2 and will support the removal of NFPA 55 extract tags for hydrogen separation distances.

Standard	Current edition	Status
CGA work item 21-127, <i>Transfer and unloading of hydrogen at near-consumer use points</i>	New publication not released yet	Develop new standard to update traditional hydrogen delivery practices for industrial users to improve practices for retail applications.
CGA work item 21-128, <i>Noise from hydrogen venting and hydrogen systems operations</i>	New publication not released yet	Develop new standard to reduce the noise from hydrogen system operations, including venting, particularly at retail applications where hydrogen system noise is greater than ambient noise

CGA has launched a “Hydrogen Safety is Step One” campaign – see the attached link: <https://www.cganet.com/cga-launches-hydrogen-safety-is-step-one-campaign/>

American Society for Testing & Materials (ASTM)

Jennifer Hamilton

Fuel spec for hydrogen use in aviation turbine engines – if there is interest in this space, please contact Jennifer Hamilton or Christina Daniels. Meeting tomorrow at 10 AM Pacific.

American Society of Mechanical Engineers (ASME)

Ray Rahaman

PTC 50 – Performance Test Code for Fuel Cell Power Systems

PTC 50 provides test procedures, methods, and definitions for the performance characterization of fuel cell power systems. This includes the evaluation of system energy inputs and electrical and thermal outputs to determine fuel-to-electrical energy conversion efficiency and where applicable, the overall thermal effectiveness. The last edition of PTC 50 was published in 2002. The document was last reaffirmed in 2019. ASME has recently begun a revision of the 2002 edition to include recent industry updates. The Code is used as the basis for manufacturer’s performance acceptance testing.

The Committee is seeking more participation from the industry and would welcome participation if you are interested. The PTC 50 Committee meets on a monthly basis. Please contact Robert Ryan (ryanr@asme.org) for any additional information.

The Japanese use the international performance standards. Part of this review of the PTC 50 will be to look at the international standard for any new work that can be incorporated into the new US standard.

VI. Discussion Topics

Facilitating Deployment

All

Center for Hydrogen Safety

Nick Barilo

No update at this time.

Regulatory Matrix Review and Comment

Karen Quackenbush

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

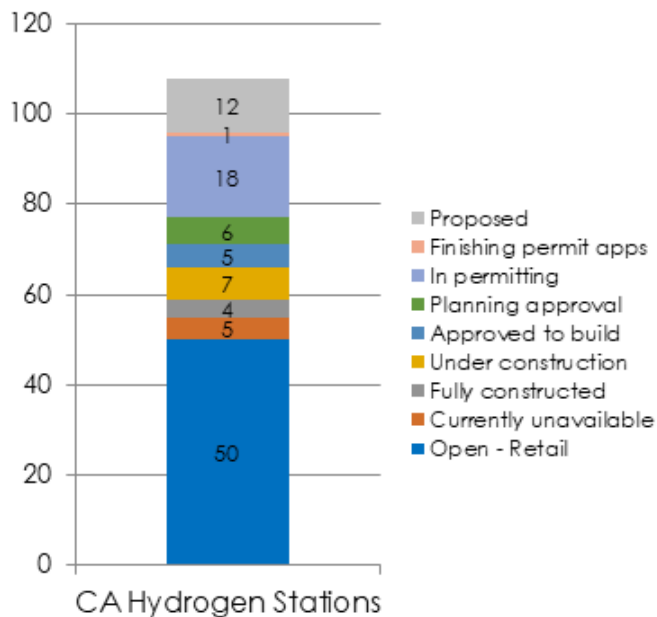
December 31, 2021 version was published and available online at <https://static1.squarespace.com/static/5668416ddc5cb4375e2a9ef8/t/61dc74da3f9e08005e455950/1641837787283/FCHEA+Regulatory+Matrix+Markup+December+31+2021.pdf>.

Permitting and Installation of Hydrogen Fueling Stations

California Station Implementation

Jennifer Hamilton

New First Element station opened recently in Baldwin Park. It has 4 fueling positions and LH2 storage, and brings the count of open retail fueling stations in CA to 50



*Includes 100% privately funded stations.

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

The metrology device is currently down. They are looking into purchasing a new one with expanded capabilities. At this time, DMS testing is on hold.

Legal Metrology Standards Hydrogen Fuel Quality and Measurement

Juana Williams/Ralph Richter

No report at this time.

VII. Open Discussion & Other Issues

VIII. Next Meeting – Wednesday, March 16, 2022 at 2:00 PM US Eastern.