

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

**Wednesday, January 11, 2022
TIME: 2:00 – 3:00 pm (Eastern Standard Time)**

Minutes

Attendees

**Connor Dolan
Heath Plagmann
Jay Keller
John Eihusen
Juana Williams
Kelvin Hecht
Laura Hill
Norman Newhouse
Ray Rahaman
Trey White
Jennifer Gangi**

**Mark Luth
Christine Watson
Eric Prause
Shawn Cole
Rob Kaminsky
Stella Papsavva
Nick Barilo
Owen Hopkins
Karen Quackenbush
Michael Cox
Clark Crawford**

**Ian MacIntire
Frank Wolak
Mike Steele
Doug Olenick
Will James
Sara Marxen
Rudolf Coertze
Chris LaFleur
Antonio Ruiz
Amy Ryan**

I. Welcome and Housekeeping Items

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

II. DOE/HQ Update

Laura Hill

<https://www.energy.gov/eere/fuelcells/subscribe-hydrogen-and-fuel-cells-news>

Preparation is underway for the Annual Merit Review.

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

Task force meetings have resumed in the New Year. Task force 4 had a meeting yesterday. Task force 0 will be meeting soon. Timing to finish the work is being discussed.

On January 24th and 27th the full IWG meetings will be held.

OMB Office of Regulatory Affairs recently filed its Fall 2021 unified regulatory agenda to take up a proposal to incorporate GTR 13 into the FMVSS. Link: <https://www.reginfo.gov/public/do/eAgendaViewRule?pubId=202110&RIN=2127-AM40>

V. Codes and Standards Organization Updates

Institute of Electrical and Electronics Engineers

Mark Siira

IEEE recently opened a document to cover cybersecurity requirements for grid connected systems. Those requirements had previously been in another document and have been pulled out for review.

Written update as follows:

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

US is taking the lead in the third edition of the stationary fuel cell power plant safety standard. A third three-hour meeting will be held tomorrow, January 13.

New participants are being sought for several areas including a fuel cell for maritime sector ad hoc committee (seeking participants and a convenor).

IEC is working with ISO TC20 SC16 on a new group for unmanned aircraft systems – seeking experts and a convenor.

A new convenor is being sought for the portable advisory group (advisory group 4). This is for coordination of activities in all portables, but primarily for micro fuel cells.

International Standards Organization ISO/TC 197

Karen Quackenbush/Jay Keller

Virtual plenary held in beginning of December. Special strategic planning meeting was held then as well.

ISO headquarters has invoked more stringent language on writing of technical reports, which effects a few areas. This may cause switching to Technical Standards vs Technical Reports.

WG 29 – Technical report is exploring liquid, as well as materials science work. The next meeting will be held in February.

There are several other WG meetings coming up.

Nearly every document has progressed in ISO TC 197. There are a wide-range of updates to that effect in the FCHEA Regulatory Matrix.

WG 5 – addressing separation force for breakaways for the hose and dispenser. The force varies among published documents and there is an effort to harmonize this single set of numbers.

WG 24 – Task Force 3 meeting for January is being delayed. Task Force 3 effort is to develop a fueling standard for heavy-duty.

National Fire Protection Association NFPA 2

Chris LaFleur

Dates set for NFPA 2 second draft meeting for the week of February 28th – March 1st.

International Codes Council (ICC)

Spencer Quong

As reported on the last meeting, the ICC is currently between cycles with nothing to report at this time.

Society of Automotive Engineers (SAE)

Mike Steele

<i>Task Force</i>	<i>Document</i>	<i>Title</i>	<i>Date</i>	<i>Status</i>
Interface	J2600_201510	Compressed Hydrogen Surface Vehicle Fueling Connection Devices	21-Oct-15	Being revised in conjunction with ISO 17268
Interface	J2601_202005	Fueling Protocols for Light Duty Gaseous Hydrogen Surface Vehicles	29-May-20	Being revised
Interface	J2601/2_201409	Fueling Protocol for Gaseous Hydrogen Powered Heavy Duty Vehicles	24-Sep-14	Needs affirmation ballot of existing content
Interface	J2601/3_201306	Fueling Protocol for Gaseous Hydrogen Powered Industrial Trucks	12-Jun-13	Ballot passed. Comment reconciliation process underway.
Interface	TIR J2601/4	Ambient Temperature Refueling		Being developed
Interface	J2719_202003	Hydrogen Fuel Quality for Fuel Cell Vehicles	18-Mar-20	Revised
Interface	J2799_201912	Hydrogen Surface Vehicle to Station Communications Hardware and Software	13-Dec-19	Revised
Interface	TIR J3219	Hydrogen Fuel Quality Screening Test of Chemicals for Fuel Cell Vehicle		Ballot passed. Comment reconciliation process underway.
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Safety	J1766_201401	Recommended Practice for Electric, Fuel Cell and Hybrid Electric Vehicle Crash Integrity Testing	10-Jan-14	Revised - Action required
Safety	J2578_201408	Recommended Practice for General Fuel Cell Vehicle Safety	26-Aug-14	Revised - Action required
Safety	J2579_201806	Standard for Fuel Systems in Fuel Cell and Other Hydrogen Vehicles	15-Jun-18	Revised

Safety	J2594_201611	Recommended Practice to Design for Recycling Proton Exchange Membrane (PEM) Fuel Cell Systems	15-Nov-16	Reaffirmed
Safety	J2990/1_201606	Gaseous Hydrogen and Fuel Cell Vehicle First and Second Responder Recommended Practice	3-Jun-16	Issued
Safety	J3089_201810	Characterization of On-Board Vehicular Hydrogen Sensors	43382	Issued
Fuel Economy	TIR J3202	Recommended Practice for Measuring and Simulating Fuel Consumption and Range of Heavy Duty Fuel Cell Hybrid Road Vehicles Fueled by Compressed Gaseous Hydrogen		Being developed
Fuel Economy	J2572_201410	Recommended Practice for Measuring Fuel Consumption and Range of Fuel Cell and Hybrid Fuel Cell Vehicles Fueled by Compressed Gaseous Hydrogen	16-Oct-14	Needs affirmation ballot of existing content

Performance	J2615_201110	Testing Performance of Fuel Cell Systems for Automotive Applications	20-Oct-11	Stabilized
Performance	J2616_201108	Testing Performance of the Fuel Processor Subsystem of an Automotive Fuel Cell System	12-Aug-11	Stabilized
Performance	J2617_201108	Recommended Practice for Testing Performance of PEM Fuel Cell Stack Sub-system for Automotive Applications	12-Aug-11	Stabilized
Safety	J2574_201109	Fuel Cell Vehicle Terminology	6-Sep-11	Stabilized
Safety	J2760_201106	Pressure Terminology Used in Fuel Cells and Other Hydrogen Vehicle Applications	1-Jun-11	Stabilized

CSA

Sara Marxen

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 ANSI final steps are being completed and the document is being prepped to publish.
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 is closing on 1/8/2022.
HGV 5	HGV 5.2, Compact hydrogen fueling	This project is to develop a NEW standard for Compact Hydrogen Fueling Systems (HGV 5.2). The TSC completed

	systems	content development. The draft is available for public review (closing January 18, 2022). Click here to access: https://publicreview.csa.ca/Home/Details/4410
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 draft is available for public review (closing January 6, 2022). Click here to access: https://publicreview.csa.ca/Home/Details/4400
HGV 2	HGV 2, Compressed hydrogen gas vehicle fuel containers	This project is a revision of an existing standard. A kickoff meeting was held in December 2021. Content development meetings are starting in January 2022.
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.

Standard	Current edition	Status
		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 this fall. The goal is for the task force to review test results this fall.
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

Standard	Current edition	Status
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 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,		CGA members supported the NFPA 2/55

Standard	Current edition	Status
<i>Hydrogen system siting and personnel exposures distances</i>		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.
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

Nothing new to report at this time.

American Society of Mechanical Engineers (ASME)

Ray Rahaman

B31.12 will be scheduling its next meeting at the end of March or Mid-April.

VI. Discussion Topics

Facilitating Deployment

All

Sandia tunnel study – getting results and scenarios being modeled should be available in coming weeks.

Center for Hydrogen Safety

Nick Barilo

Workshop on February 8th on failure rates for hydrogen. This will examine existing failure rates and understand what can be developed for use globally with wide acceptance.

<https://www.aiche.org/chs/resources/forms/hydrogen-equipment-and-component-failure-rates>

An applied hydrogen safety conference will be held in Anaheim, CA on September 20-22. An organizing committee is being formed now. Please contact Nick if you would like to participate.

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

There was a new station opening recently.

Preliminary conversations are ongoing for ways the state can help speed up permitting and deployment.

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

None at this time.

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