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

Wednesday, July 9th, 2025
TIME: 2:00 – 3:00 pm (Eastern Standard Time)

Minutes
Attendees

Mhamed Samet	Sara Marxen	Jennifer Hamilton
Karen Quackenbush	Kelvin Hecht	Laura Hill
Rob Early	Andrew Adkins	Jaqueline Tsai
Eric Prause	Steve Maurer	Mark Fasel
Amy Ryan	Ian McIntire	Norman Newhouse

I. Welcome and Housekeeping Items

- Antitrust guidelines – Reviewed.
- Previous Meeting Minutes – Approved.

II. Codes & Standards Events and Fuel Cell Safety Information — Mhamed Samet

- Hydrogen and Fuel Cell Safety Report – May edition here.
- Hydrogen and Fuel Cell Calendar can be found here.
- Regulatory Matrix of Codes and Standards can be found here.

III. Global Technical Regulations — Ian MacIntire

- FMVSS 307 & 308 Update
- No changes to the Congressional Review Act affecting FMVSS 307 and 308, with no expected House action by July 16.

IV. Codes and Standards Organization Updates

Institute of Electrical and Electronics Engineers — Mark Siira

None.

International Electrotechnical Commission IEC TC 105 — Kelvin Hecht

TC105 – Fuel Cell Technologies

RESULTS OF VOTING

- **IEC 63341-3 Ed 1, *Railway applications – Fuel Cell Systems for Rolling Stock – Performance test methods***
  - Final Draft International Standard - Approved
  - To be published
- **IEC 62282-3-201 Ed 3, *Stationary Fuel Cell Power Systems – Performance test methods for small fuel cell power systems***
  - Final Draft International Standard - Approved
  - To be published
- **IEC 62282-3-200 Ed. 3, *Stationary Fuel Cell Power Systems - Performance***
  - Final Draft International Standard - Approved

- To be published

- **IEC 62282-3-300 Ed.1, *Stationary Fuel Cell Power Systems - Installation***
  - Approved to initiate next edition
  - CDV target date – 11/20/2026
- **IEC 62282-5-200, Portable Fuel Cell Systems – Performance**
  - Approved to initiate activity
  - CD target date – 6/30/2026
- **IEC 62282-2-401, Fuel cell Modules – PEM modules size and interface definitions**
  - Approved to initiate activity
  - CD target date – 4/3/2026

International Standards Organization ISO/TC 197 Karen Quackenbush / Sara Marxen

- Seven publications in 2025 and ongoing activities on various standards.
- WG 21 – Compressors holding a meeting next week to restart the work. Call for new participants.
- US hosting ISO TC 197 and SC1 meeting

Publications / Ballots

- 7 Publications to date in 2025 (updates in blue)
- 24078 (w/ CEN/CLC/JTC 6 (CEN Led), Hydrogen in energy systems – Vocabulary)
- 22734-1 (WG 34, Hydrogen generators using water electrolysis – Part 1:Safety)
- 19881 (WG 18, Gaseous hydrogen — Land vehicle fuel containers)
- 19880-5 (WG 22, Dispenser hoses and hose assemblies)
- 19880-2 (WG 19, Dispensers and dispensing system)
- 14687 (WG 27, Fuel Quality – Product Specification)
- 19882 (WG 18, TPRDs)
- 1 Publication expected in coming weeks
- 17268-1 (WG 5, Connection devices – Part 1) – slowed due to need to update drawings – CIB ballot closes 7/18
- 3 DIS Ballots closed – WG will need to determine next step (FDIS or Publication)
- 19880-7 (WG 31, O-rings) – closed 6/25
- 19880-5 (WG 22, Hoses) – closed 6/6
- 13984 (WG 35, LH2 – Land vehicle fueling protocol) – closed 5/19
- 0 Active DIS/FDIS Ballots
- 5 Active CD Ballots
- ISO/CD 19883-2 (WG 38, Communication)
- ISO/CD 19885-3 (WG 24, GH2 Fueling Protocols)
- ISO/CD 19870-2 (SC 1/WG 5, Methodology for Determining the Greenhouse Gas Emissions Associated with the Conditioning and Transport of LH2 up to Consumption Gate)
- ISO/CD 19870-3 (SC 1/WG 6, Methodology for Determining the Greenhouse Gas Emissions Associated with the Conversion and Transport of Ammonia up to Consumption Gate)

- ISO/CD 19870-4 (SC 1/WG 7, Methodology for Determining the Greenhouse Gas Emissions Associated with the Conversion and Transport of Liquid Organic Hydrogen Carrier up to Consumption Gate)

1 Ballot coming soon

- ISO/DTS 15916 (WG 29, Basic safety considerations)

Other Activity:

- SC 1 Chair Nomination for Dr. Laurent Antoni approved by TC 197
- Call for Experts for the following WGs. U.S. Experts are encouraged to reach out to CGA with interest (kmastromichalis@cganet.com).
- SC 1/JWG 3 - Fuel system components for hydrogen fuelled rail vehicles
- SC 1/WG 4 - Water electrolysers in electricity grid services
- SC 1/WG 5 - Methodology for Determining the Greenhouse Gas Emissions Associated with the Conditioning and Transport of LH2 up to Consumption Gate
- SC 1/WG 6 - Methodology for Determining the Greenhouse Gas Emissions Associated with the Conversion and Transport of Ammonia up to Consumption Gate
- SC 1/WG 7 - Methodology for Determining the Greenhouse Gas Emissions Associated with the Conversion and Transport of Liquid Organic Hydrogen Carrier up to Consumption Gate

2025 Plenary planned for December 8-12, 2025 in California

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

The second draft meeting ballot was issued. Recirculation ballot was issued. Some TC members have raised some issues. Vote is due next week.

International Code Council (ICC) **Mark Fasel**

ICC Guide 8 for professional qualification standards for hydrogen systems: Moving forward, the goal is to have draft for public review before end of 2025. Based on feedback, the committee will decide how to edit or revise. Document will be seed document for ANSI 1700 series for professional qualifications for H2 systems.

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

CSA **Sara Marxen/ Mark Duda**

Technical Committee Meetings
• If you are interested in joining the Hydrogen Transportation Technical Committee (H2TTC) or the Fuel Cell Technical Committee (FCTC), please contact Mark Duda (mark.duda@csagroup.org) or Sara Marxen (sara.marxen@csagroup.org). • We are actively recruiting Gas Suppliers (GS) and User Interest (UI) category members for the H2TTC, and Regulators and UI representative for the FCTC. If you or someone you know is interested, please reach out to Mark Duda (mark.duda@csagroup.org)

- CSA U.S. Committee Week is planned for week of November 10 in Cleveland, OH. TC/TSC meeting schedule is being finalized.

Active Projects	
Designation/Title	**Status**
HGV 4.1, Hydrogen fueling dispensers	A project to revise HGV 4.1 to include medium and heavy-duty fueling, as well as address cryogenic hydrogen, continues to meet to review member comments. Next meeting planned for July 23. Please contact Sara Marxen (sara.marxen@csagroup.org) for additional information.
HGV 4.9, Hydrogen fueling stations	A project to revise HGV 4.9 to include medium and heavy-duty fueling, as well as address cryogenic hydrogen, and coordinate requirements with HGV 4.1 and HGV 4.3, as applicable. Next meeting date TBD. Please contact Sara Marxen for additional information.
TS 5.3, Portable and mobile fueling systems	A project to develop a new guidance document for mobile and portable fueling systems is currently active. Next meeting is planned for July 24. Please contact Sara Marxen for additional information.
CHMC 1, Test methods for evaluating material compatibility in compressed hydrogen applications - Metals	This project is to revise the existing edition of CHMC 1 to address updates in testing methods and clarify requirements. The leadership of the TSC is addressing some final issues. The document is open for public review until July 27, 2025. Link to the public review document: https://publicreview.csa.ca/Home/Details/5656. Please contact Stephanie Kasperski (stephanie.kasperski@csagroup.org) for additional information.
TS 4.3.5, Test methods for high flow hydrogen fuelling parameter evaluation	This project is to coordinate with the recent release of SAE TIR J2601/5, *High-Flow Prescriptive Fueling Protocols for Gaseous Hydrogen Powered Medium and Heavy-Duty Vehicles*. CSA will circulate a Technical Specification seed document draft to the HGV 4.3 TSC Members. This TS will address verification of the SAE J2601/5 protocol. Please contact Stephanie Kasperski for additional information.
B401.3, Hydrogen vehicle and trailer maintenance facilities code	This project is a new Canadian code that will be aligned with existing maintenance facility requirements in CSA B401.1 (natural gas) and existing hydrogen requirements – BNQ 1784-000 and NFPA 2 and 30A. Public review has closed and the TSC is working to disposition comments. Please contact Julie Cairns (julie.cairns@csagroup.org) for additional information.
HGV 2, Compressed hydrogen gas vehicle fuel containers	This project is planned to start September/October 2025 with purpose to revise the existing edition of HGV 2 to address the following:

	1. Updating details on the bullet materials and construction for the gunfire test 2. Harmonizing with GTR 13 (update the factor of safety for carbon fiber to be equal to 2.0) 3. Add a definition for "max fill" (Similar to CSA HNGV 2_ 4. Discuss proposal to allow filler materials to be allowed inside the container – in order to displace volume during some tests to reduce the test time 5. Harmonize NGV 2 and HGV 2 requirements (where appropriate) If you wish to participate or wish to submit a proposal for consideration, please contact Julie Cairns.
FC 62282-2-100 * C22.2 No. 62282-2-100, Fuel cell stacks and fuel cell modules	The CSA FC 62282-2-100 * CSA C22.2 No. 62282-2-100 technical subcommittee has posted the first binational edition of CSA FC 62282-2-100 * CSA C22.2 No. 62282-2- Fuel cell technologies – Part 2-100: Fuel cell stacks and fuel cell modules - (IEC62282-2-100:2020, MOD) for review and comment. This CSA document is the North American adoption of the IEC 62282-2-100 document with deviations. The public review period has closed. The committee will be meeting to disposition the public review and CSA Editorial Staff comments. Please contact Mark Duda for additional information.
B22734, Hydrogen generation via water electrolysis:	This project will be an adoption of ISO 22734-1 with North American deviations. The project will be including requirements for solid oxide electrolyzers as part of the North American deviations. CSA will be kicking off a new edition in July. Please contact Mark Duda for additional information.
CSA TS 2.1.3 - Best practices for defueling, decommissioning, and disposal of compressed hydrogen gas vehicle fuel containers	The new edition will be published as a Technical Specification. <u>Scope of CSA TS 2.1.3</u> This document describes safe removal and disposal of compressed hydrogen gas containers from hydrogen gas vehicle (HGV) service when the container: a) has reached its end of life as indicated by the date on the container label; b) has been condemned in accordance with visual inspection guidelines; c) is no longer of value to an owner; or d) has been deemed a public nuisance or imminent hazard by the local authority (abandoned, confiscated, or seized containers). If you wish to participate or wish to submit a proposal for consideration, please contact Mark Duda.

Compressed Gas Association (CGA) — Rob Early

Updates from previous report are highlighted.
Updated 07/07/2025

Status of current and future publications:

Standard	Current edition	Status
ANSI/CGA G-5, *Hydrogen*	9th (2024)	Deadline to submit proposed changes for next edition is 03/01/2028. https://portal.cganet.com/workitem/details/28-24
CGA G-5.3, *Commodity specification for hydrogen*	8th (2024)	Deadline to submit proposed changes for next edition is 09/18/2023. https://portal.cganet.com/workitem/details/30-9
CGA G-5.4, *Standard for hydrogen piping systems at user locations*	6th (2019)	Deadline to submit proposed changes for next edition is 10/31/2025. https://portal.cganet.com/workitem/details/24-40
CGA G-5.5, *Hydrogen vent systems*	4th (2021)	All PCs have been resolved. Draft publication is out for last check for typos or errors.
CGA G-5.6, *Hydrogen pipeline systems*	1st (2005 – reaffirmed 2013)	No active work items for G-5.6. It will become part of the new H-18 publication (details below).
ANSI CGA H-3, *Standard for cryogenic hydrogen storage*	4th (2024)	Deadline to submit proposed changes for next edition is 12/01/2027. https://portal.cganet.com/workitem/details/26-70
ANSI/CGA H-5, *Standard for bulk hydrogen supply systems*	3rd (2020)	The deadline to submit proposed changes for the next edition was 02/26/2024. This standard will be issued as an American National Standard and a National Standard of Canada after the changes have been processed. 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 was 09/21/2024. https://portal.cganet.com/workitem/details/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 08/11/2025. https://portal.cganet.com/workitem/details/25-30
CGA H-12, *Mechanical integrity of syngas outlet systems*	1st (2016)	Deadline to submit proposed changes for next edition is 06/1/2024. https://portal.cganet.com/workitem/details/21-016
CGA H-13, *Hydrogen pressure swing adsorber (PSA) mechanical integrity requirements*	2nd (2023)	Deadline to submit proposed changes for next edition is 11/10/2029. https://portal.cganet.com/workitem/details/29-26

Standard	Current edition	Status
CGA H-14, *HYCO plant gas leak detection and response practices*	1st (2018)	Work continues to update and post the new version.
CGA H-15, *Safe catalyst handling in HYCO plants*	1st (2020)	Deadline to submit proposed changes for next edition is 09/01/2025. https://portal.cganet.com/workitem/details/25-59
CGA H-17, *Small scale hydrogen production and delivery*	1st (2023)	Deadline to submit proposed changes for next edition is 09/20/2029. https://portal.cganet.com/workitem/details/29-14
CGA H-18 (new), *Safe Operation of Hydrogen, Carbon Monoxide, and Syngas Pipeline Systems*	New publication not released yet	Task force will finish reviewing proposed changes June 2025. https://portal.cganet.com/workitem/details/21-159
CGA P-28, *OSHA process safety management and EPA risk management plan guidance document for bulk liquid hydrogen supply systems*	5th (2022)	Deadline to submit proposed changes for next edition is 08/01/2027. https://portal.cganet.com/workitem/details/25-49
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/workitem/details/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/workitem/details/25-41
CGA PS-46, *Position statement on roofs over hydrogen storage systems*	2nd (2024)	Deadline to submit proposed changes for next edition is 01/30/2030. https://portal.cganet.com/workitem/details/30-1
CGA PS-48, *Position statement on clarification of existing hydrogen setback distances and development of new hydrogen setback distances in NFPA 55*	2nd (2024)	Deadline to submit proposed changes for next edition is 02/12/2030. https://portal.cganet.com/workitem/details/30-3
PS-69, *Liquid Hydrogen Supply Systems Separation Distances*	1st (2022)	Deadline to submit proposed changes for next edition is 08/31/2028. https://portal.cganet.com/workitem/details/28-23
CGA work item 21-127, *Transfer and unloading of hydrogen at near-consumer use points*	New publication not released yet	Develop a new standard to update traditional hydrogen delivery practices for industrial users to improve practices for retail applications.

Standard	Current edition	Status
CGA work item 21-128, *Noise from hydrogen venting and hydrogen systems operations*	New publication not released yet	Develop a 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 H-7, *Standard procedures for hydrogen supply systems*	1st (2024)	Deadline to submit proposed changes for next edition is 01/25/2030. Training module TM-13 is being developed to cover putting a hydrogen supply system into and out of service based on content in H-7. https://portal.cganet.com/workitem/details/30-2
CGA H-8 (new), *Hydrogen separation distances*	New publication not released yet	Publication is in final stages before publication.
New publication on safe electrolyzer operation	New publication not released yet	The first draft is going through editorial and technical review by CGA staff. Once any issues have been resolved, the draft will go through review by CGA membership.
New publication on hydrogen liquefaction as part of the production process	New publication not released yet	Content is being developed.
New publication on safe oxygen outtake during electrolysis process	New publication not released yet	Content is being developed.

American Society for Testing & Materials (ASTM) **Christina Daniels**

None.

American Society of Mechanical Engineers (ASME) **Ray Rahaman / Matt Vazquez**

Code case 3078 has been published in the book of code cases.

V. Discussion Topics

Center for Hydrogen Safety **Nick Barilo**

California Station Implementation **Ben Xiong/Jennifer Hamilton**

- Chevron station opened on June 11th, in operation
- 50 stations available – increased from 41
- Network availability at 87%
- 9 stations not operational
- Iwatani and TrueZero - the return of high-pressure gaseous hydrogen tube trailers.
- Ongoing work on publications, including a white paper on fuel cell electric trucks and California recommendations.

California Div. of Measurement Standards/Fuel Quality / Metrology Yuk Wong / Andrew Adkins
Here's an update from CDFA for today's meeting:

- Both Northern and Southern CA are continuing hydrogen fuel quality sampling at retail stations throughout CA.

- The Southern CA lab began hydrogen particulate sampling this month. The particulate sampler for the Northern CA lab is still undergoing repairs.

- CDFA's rulemaking regarding natural gas fuel specifications and dispenser labeling was approved by OAL on May 22, 2025. These regulations will became effective July 1, 2025. These regulations include a fuel specification (ASTM D8487) for natural gas – hydrogen blends and respective dispenser labeling. For more information, please visit https://www.cdfa.ca.gov/dms/regulations.html or contact Andrew Adkins at andrew.adkins@cdfa.ca.gov.

Legal Metrology Standards Hydrogen Fuel Quality and Measurement **Juana Williams**
None.

Hydrogen Aviation **Karen Quackenbush**
None.

VI. Open Discussion & Other Issues
None.

VII. Next Meeting – Wednesday, August 6th, at 2:00 PM US Eastern.