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

Thursday, July 6, 2023
TIME: 1:00 PM ET

Minutes

Andrew Adkins	**Kelvin Hecht**	**Karen Quackenbush**
Natalie Alvarado	**Owen Hopkins**	**Spencer Quong**
Bob Boyd	**Will James**	**Amy Ryan**
Christina Daniels	**Jay Keller**	**Mark Siira**
Rob Early	**Chris LaFleur**	**Mike Steele**
Brian Ehrhart	**Ian MacIntire**	**Christine Watson**
Mark Fasel	**Douglas Olenick**	**Juana Williams**
Jennifer Hamilton	**Haboon Osmond**	**Yuk Wong**
Tobias Hanson	**Eric Prause**	

I. Welcome and Housekeeping Items

a. The NHFCCSCC reviewed FCHEA's anti-trust guidelines, approved previous minutes, and approved the meeting agenda.

II. DOE/HQ Update — Christine Watson

- DOE Hydrogen Program 2023 Annual Merit Review Proceedings and Presentations are available online: DOE Hydrogen Program: 2023 Annual Merit Review Proceedings : DOE Hydrogen Program (energy.gov)
- Zero-Emissions Shipping Mission (ZESM): Progression to Net-Zero Emission Fuels State of the Industry: Request for Information due 5:00pm (ET) on July 14th, 2023. More information can be found here: https://eere-exchange.energy.gov/Default.aspx#FoaIda6c86548-3308-4e47-ae8f-83114d0de608
- DOE Office of Clean Energy Demonstrations issued a Notice of Intent: Bipartisan Infrastructure Law: Additional Clean Hydrogen Programs (Section 40313): Regional Clean Hydrogen Hubs. Responses to Questions for Stakeholder Feedback due no later than 5:00pm ET on July 24, 2023. Biden-Harris Administration to Jumpstart Clean Hydrogen Economy with New Initiative to Provide Market Certainty And Unlock Private Investment | Department of Energy
- DOE and FCHEA will be co-hosting a permitting listening session on the afternoon of Wednesday, July 26th. A specific time will be determined soon.

III. Codes & Standards Events and Fuel Cell Safety Information — Karen Quackenbush

- Calendar of events: https://www.hydrogenandfuelcellsafety.info/safety-report-calendar
- Any committee members with materials they would like hosted on the website can send them to Karen Quackenbush (kquackenbush@fchea.org) or Haboon Osmond (hosmond@fchea.org).

IV. Global Technical Regulations — Ian MacIntire

- GTR 13 Phrase 2 has been adopted at the WP 29 meeting on June 21st, 2023.

V. Codes and Standards Organization Updates

Institute of Electrical and Electronics Engineers — Mark Siira

- The revision process for the 2027 edition of IEEE 1547 is underway. If any members are interested in revising IEEE 1547 to allow hydrogen storage, full cell technologies, and electrolyzers to be grid connected in the process, please reach out to Karen Quackenbush via email at kquackenbush@fchea.org.

International Electrotechnical Commission IEC TC 105 — Kelvin Hecht

- MAJOR USA INTEREST
  - IEC 62282-3-100 3rd edition *Stationary fuel cell power systems – Safety*
    - Committee will meet in Germany September 26-28

- MINOR USA INTEREST
  - IEC 62282-8-301 1st edition *Energy storage systems using fuel cell modules in reverse mode – Power to methane energy systems based on solid oxide cells including reversible operation – Performance test method*
    - Published May 2023
  - IEC 62282-3-200 3rd edition *Stationary fuel cell power systems – Performance test methods*
    - Posted comments
  - IEC 62282-3-201 3rd edition*Stationary fuel cell power systems – Performance test methods for small fuel cells*
    - Posted comments
  - IEIEC 62282-3-202 1st edition *Stationary fuel cell power systems – Performance test methods for small fuel cells with supplementary heat generator*
    - Posted comments
  - IEC 62282-6-101 1st edition *Micro fuel cell power systems – Safety- General Requirements*
    - Posted results of voting – CD approved
  - IEC 62282-6-106 1st edition *Micro fuel cell power systems -Safety- Indirect Class 8 (corrosive) compounds*
    - Registered as a FDIS
  - IEC 62282-6-107 1st edition *Micro fuel cell power systems – Safety- Indirect water-reactive (Division 4.3) compounds*
    - Registered as a FDIS
  - IEC 62282-6-401 1st edition *Micro fuel cell power systems – Power and data interchangeability – Performance test methods for laptop computers*
    - Posted CD for vote

International Standards Organization ISO/TC 197 — Karen Quackenbush

- WG 22 (Gaseous hydrogen fueling station hoses) is working on revising ISO 19880-5 (Gaseous hydrogen — Fuelling stations — Part 5: Dispenser hoses and hose

assemblies). WG 22 will meet on July 14th, 2023 to request to relaunch the project; thus, the CD will be ready as soon as the votes are in for relaunching the project.

- WG 23 (Gaseous hydrogen fueling station fittings) project has stopped and is expected to move forward as soon as the draft international standards are ready.
    - WG 21(Gaseous hydrogen fueling station compressors) will also move forward soon.
- Past meetings:
    - WG 27 (Hydrogen fuel quality), WG 28 (Hydrogen quality control), and WG 33 (Sampling for fuel quality analysis) met June 13 - 14 in Oslo, Norway.
        - WG 27 and WG 28 are moving toward DIS before the end of the year.
        - WG 33 has gone to DIS and should be out soon.
    - SC1/WG1 (Methodology for Determining the Greenhouse Gas Emissions Associated with the Production, Conditioning and Transport of Hydrogen to Consumption Gate) met June 26 - 27 in Saint-Denise, France.
    - WG 24 (Gaseous hydrogen- fuelling protocols for hydrogen-fuelled vehicles) met June 27 - 29 in Versailles, France.
    - WG 5 (Gaseous hydrogen land vehicle refuelling connection devices) met on June 30th in Versailles, France as well.
- Future meetings:
    - WG 27 will have a virtual meeting on July 12th
    - WG 22 will have a virtual meeting on July 14th
    - TC 197 and SC 1 Plenary will meet in Vienna, Austria, from November 13th to November 17th.

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

- NFPA Technical Committee on Hydrogen Technology (HYD-AAA) is having its NFPA 2 Pre-First Draft Meeting (F2025) on July 18th , 2023 from 11:00 AM to 3:00 PM US Eastern Time/

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

- The 2027 I-Code Hydrogen Working Group met on June 29th. There were a few submitted code proposals for the WG's consideration. Some of the proposals address blending hydrogen and natural gas in the built environment (e.g., piping systems and valves).
- The deadline for proposal submissions for the 2027 edition of the international codes depends on the code group.
    - Code A deadline is January 8th, 2024.
    - Code B deadline is January 10th, 2025.
- The Hydrogen Fuel Gas WG will meet on July 13th from 12:00 PM – 2:00 PM US Eastern Time.

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

Task Force	Document	*	Title	Date	Status
Interface	J2600_201510	S	Compressed Hydrogen Surface Vehicle Fueling Connection Devices	21-Oct-15	Being revised in conjunction with ISO 17268
Interface	J2601_202005	S	Fueling Protocols for Light Duty Gaseous Hydrogen Surface Vehicles	29-May-20	Being revised
Interface	J2601/2_201409	TIR	Fueling Protocol for Gaseous Hydrogen Powered Heavy Duty Vehicles	24-Sep-14	Stabilization vote closes June 18
Interface	J2601/4	TIR	Ambient Temperature Refueling	21-Nov-16	Voting in process, ends June 8
Interface	J2601/5	TIR	MC Formula High Flow General (MCF-HF-G) *(title may change)*	1-Jul-22	Draft posted
Safety	J1766_201401	RP	Recommended Practice for Electric, Fuel Cell and Hybrid Electric Vehicle Crash Integrity Testing	10-Jan-14	Revised - Action required. Awaiting GTR 13 Phase 2
Safety	J2990/1_201606	RP	Gaseous Hydrogen and Fuel Cell Vehicle First and Second Responder Recommended Practice	3-Jun-16	Voting in process, closes June 27
Safety	J3294	TIR	Guidance for Material Selection for use in Hydrogen Systems	20-Apr-23	Project initiated
Fuel Economy	J3202	RP	Recommended Practice for Measuring and Simulating Fuel Consumption and Range of Heavy Duty Fuel Cell Hybrid Road Vehicles Fueled by Compressed Gaseous Hydrogen	25-Apr-19	Being developed. No draft posted
Fuel Economy	J2572_201410	RP	Recommended Practice for Measuring Fuel Consumption and Range of Fuel Cell and Hybrid Fuel Cell Vehicles Fuelled by Compressed Gaseous Hydrogen	16-Oct-14	Stabilization project initiated

CSA **Sara Marxen**

Technical Committee Meetings		
• CSA Group's U.S. Committee Week is planned for October 2-5 in Cleveland, Ohio. US Committee Week Details		
Active Projects		
TSC	**Designation/Title**	**Status**
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). Working with the TC and TSC Chairs to disposition ballot comments. Meetings are being planned for TSC to discuss.
HGV 5	HGV 5.1, Residential hydrogen fuelling appliances	This project is to develop a NEW standard for Residential fueling appliances. Project was kicked off in October. Content development continues.

HGV 2	HGV 2, Compressed hydrogen gas vehicle fuel containers	This project is a revision of an existing standard. **This standard published in June.**
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. Draft document is being balloted to CSA Technical Committee – closes July 10, 2023.
HGV 4.3	HGV 4.3, Test methods for hydrogen fueling parameter evaluation	This project is a revision of an existing standard. TSC meetings will be scheduled to review the draft document as a certification standard.
B107	Enclosed Hydrogen Equipment	Work has begun on a new standard that will address safety requirements related to hydrogen equipment use inside an enclosure. Contact Mark Duda (mark.duda@csagroup.org) with questions or for additional information.
FC 6	Fuel cell/water electrolysis module	CSA Group is seeking volunteers to develop the first edition of the binational CSA FC 6 * C22.2 No. 62282-2-100 – Fuel Cell Technologies – Part 2-100: Fuel cell modules – Safety (IEC 62282-2-100, MOD). The new edition will supersede CSA / ANS FC 6 – Fuel cell technologies – Part 2: Fuel cell modules (IEC 62282-2:2012, MOD) and CAN / CSA C22.2 No. 62282-2 - Fuel cell technologies – Part 2: Fuel cell modules (IEC 62282-2:2012, MOD). Volunteers will be participating on the CSA Fuel Cell / Water Electrolysis Module Technical Subcommittee. This project will be adopting IEC 62282-2-100 - Fuel Cell Technologies – Part 2-100: Fuel cell modules – Safety for US and Canada. The committee will be expanding the scope of the adoption to include water electrolysis modules including cell stacks as the requirements will be similar to fuel cell modules and there is an immediate industry need for a water electrolysis module safety standard. Contact Mark Duda (mark.duda@csagroup.org) with questions or for additional information.
SPE-701	SPE-701 – Hydrogen fuel storage containers for aviation applications	The project is to develop a new document for requirements and recommendations for the material, design, manufacture, marking, and testing of serially produced, refillable hydrogen fuel storage containers intended only for the storage of compressed hydrogen gas or liquid hydrogen fuel for aviation applications. Contact Mark Duda (mark.duda@csagroup.org) with questions or for additional information.

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

Updates from last month's report are highlighted.

Status of current and future publications:

Standard	Current edition	Status
CGA G-5, *Hydrogen*	8th (2017)	The ANS committee has resolved all propose changes, and the update is moving through the ANSI review process. For updates on the work item progress see https://portal.cganet.com/WorkItem/Details.aspx?id=22-019
CGA G-5.3, *Commodity specification for hydrogen*	7th (2017)	Deadline to submit proposed changes for next edition was 5/1/2023. A total of 7 PCs have been submitted. The next step is to resolve the PCs. 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 is ongoing. The goal is for the task force to review test results as soon as they are completed.
CGA G-5.6, *Hydrogen pipeline systems*	1st (2005 – reaffirmed 2013)	Deadline to submit proposed changes for next edition is 8/1/2023. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=19-018
CGA H-3, *Standard for cryogenic hydrogen storage*	3rd (2019)	The ANS consensus body finished resolving PCs on 28 February 2023. Members who did not attend the final meeting were given 2 weeks to vote, concluding on 17 March 2023. This publication is now in staff review prior to Council Ballot.
CGA H-4, *Terminology associated with hydrogen fuel technologies*	3rd (2020)	Deadline to submit proposed changes for next edition is 12/1/2024. However, all the content has been added to the updated version of CGA

Standard	Current edition	Status
		G-5. Once CGA G-5 has been issued, CGA H-4 will be retired. For updates use the following link: 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 6/1/2023. 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 was 11/12/2022. Publication is in staff review. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=22-027
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-17, *Small scale hydrogen production and delivery*	New publication not released yet	Task force has created the first draft that is out for proposed changes; the deadline to submit proposed changes was 12/15/2022. Publication is in final staff review. https://portal.cganet.com/WorkItem/Details.aspx?id=18-093
CGA P-28, *OSHA process safety management and EPA risk management plan guidance document*	5th (2022)	Deadline to submit proposed changes for next edition is 08/01/2027. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=25-49

Standard	Current edition	Status
for bulk liquid hydrogen supply systems		
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 was 2/12/2021. Standard has been on hold until NFPA 2:2023 has been issued. Now that NFPA 2:2023 has been issued, work will restart on updates to PS-48 to point to NFPA 2 for hydrogen. The ad hoc committee will meet to resolve the changes and move the updated version along for publication. For updates see the link below: https://portal.cganet.com/WorkItem/Details.aspx?id=21-062
PS-69, *Liquid Hydrogen Supply Systems Separation Distances*	1st (2022)	CGA has developed a position statement pointing users to the new liquid hydrogen system distances in NFPA 2:2023. The position statement covers the process of requesting a variance to use the numbers from the NFPA 2 section of the NFPA web site. PS-69 is free for downloading at https://www.cganet.com/wp-content/uploads/PS-69_1.pdf
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.
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

Standard	Current edition	Status
		noise. The task force held a meeting November 1 and is working on developing content for the publication.
CGA work item 22-107, *Hydrogen system best practices*	New publication not released yet	Develop a new standard to capture recommended best practices for handling hydrogen, filling containers, starting up systems, maintaining hydrogen systems, and similar topics to ensure safe practices for those new to the hydrogen space and to share best practices with those already experienced with hydrogen. The first draft is being prepared for a two-month membership review. Links to the review copy will be posted once the process starts.
CGA work item 22-116, *Hydrogen separation distances*	New publication not released yet	CGA is developing a globally harmonized standard on the methodology for developing separation distances between hydrogen systems and exposures. The standard will provide details on mitigation techniques for reducing required distances, particularly in near-consumer locations (such as vehicular fueling) where room is limited. The working group has a first outline and continues to add content. The JWG met on 5 April 2023, 4 May 2023, 18 May 2023, and 8 June 2023. Future meetings are scheduled for 7 July 2023, 30 August 2023, 29 September 2023, and 27 October 2023.
CGA work item 22-127, *Hydrogen education plan*	New publication not released yet	CGA is developing a globally harmonized standard on hydrogen emergency response and safe hydrogen handling training. The JWG met on 17 April 2023, 11 May 2023, and 9 June 2023. Future meetings are scheduled for 27 June 2023, 8 August 2023, and 15 September 2023.

Upcoming events:

CGA is working on a hydrogen seminar for 17-18 October 2023 with support from CGA members and partners. A call for papers has gone out. We are seeking technical safety and reliability presentations on the following topics:

- Hydrogen production (including SMR/ATR/POX with renewable gas and electrolyzers)
- Hydrogen liquefaction
- Hydrogen storage (including gaseous and liquid storage)
- Hydrogen material compatibility
- Hydrogen system standard operating procedures and maintenance requirements

- Hydrogen blending
- Hydrogen trailer design and emergency response considerations
- Hydrogen delivery to near consumer locations
- Near consumer hydrogen risk management
- Near consumer hydrogen facility design considerations for safe operation
- Safe design and operation of hydrogen systems
- Carbon capture utilization and sequestration
- New industry research and testing
- Any other topic from which others could benefit

CGA has established a new hydrogen membership category for those interested in hydrogen activities and not the whole range of industrial gases. The new membership category has a lower fee structure. More details can be found at https://www.cganet.com/cga-announces-formation-of-hydrogen-membership/ . Those who are interested are encouraged to review the material at the CGA web site and/or contact Rob Early at rearly@cganet.com .

CGA has launched https://www.safehydrogenproject.org/ to grow awareness and access to standards and safety information. More details can be found at https://www.cganet.com/compressed-gas-association-announces-landmark-hydrogen-initiative/

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

ASTM met last week for our semi-annual in person meeting. During the meeting, we discussed standards that require review.

- D7606 Practice for Sampling of High Pressure Hydrogen and Related Fuel Cell Feed Gases
  - This standard has a working group that meets monthly to review the standard. We have finished Sections 1-6 and start Section 7.0 this month.
- D7634 Test Method for Visualizing Particulate Sizes and Morphology of Particles Contained in Hydrogen Fuel by Microscopy
  - Standard requires an ILS. This ILS is in progress.
- D7651 Test Method for Gravimetric Measurement of Particulate Concentration of Hydrogen Fuel
  - Standard needs an ILS. Looking for a laboratory who can spike the filters for the ILS study.
- D7653 Test Method for Determination of Trace Gaseous Contaminants in Hydrogen Fuel by Fourier Transform Infrared (FTIR) Spectroscopy
  - ILS is complete. Plan to review the standard and ballot the ILS in the next 6 months
- D7676 Practice for Screening Organic Halides Contained in Hydrogen or Other Gaseous Fuels
  - Standard is up for a renewal ballot. There are no technical changes. Will send to the editorial committee and then ballot in the next 6 months.
- D7649 Test Method for Determination of Trace Carbon Dioxide, Argon, Nitrogen, Oxygen and Water in Hydrogen Fuel by Jet Pulse Injection and Gas Chromatography/Mass Spectrometer Analysis

    - Standard is being changed to a standard practice. It will remove the GC-MS analysis and be a standard dedicated to the Jet-Pulse Injection Technique. This will allow other detectors to be used in combination with this injector.
- D7675 Determination of Total Hydrocarbons in Hydrogen by FID-Based Total Hydrocarbon (THC) Analyzer
    - ILS is closer to getting started. ASTM has tentatively agreed to pay for the standards once the final number of labs have been confirmed and they get a final price.
- D7892 Determination of Total Organic Halides, Total Non-Methane Hydrocarbons, and Formaldehyde in Hydrogen Fuel by Gas Chromatography/Mass Spectrometry
    - ILS is closer to getting started. ASTM has tentatively agreed to pay for the standards once the final number of labs have been confirmed and they get a final price.

Reminder that ASTM D03 is hosting a workshop December 6, 2023 in New Orleans, LA in conjunction with our December semi-annual meeting. Workshop on Blending Hydrogen into Natural Gas. More information here. Currently, this is an in-person only event.

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

- The 2023 ASME PVP is being held July 16-21 at the Westin Peachtree Plaza in Atlanta, Georgia. To register, click here.

VI. Discussion Topics

Center for Hydrogen Safety **Jennifer Hamilton**

- CHS translated its Properties and Hazards of Hydrogen course into French and will be on the Academy website in the near future.

Regulatory Matrix Review and Comment **Karen Quackenbush**

- This Matrix is updated quarterly and keeps FCHEA members up-to-date in the development of codes, standards, and regulations.
- As of June 30, 2023: https://static1.squarespace.com/static/5668416ddc5cb4375e2a9ef8/t/64a5c9213a13167fb28acb40/1688586529543/FCHEA+Regulatory+Matrix+Markup+June+30+2023.pdf
- Please direct any updates, questions, or comments to Karen Quackenbush via email at kquackenbush@fchea.org or Haboon Osmond at hosmond@fchea.org.
- H2Tools' Hydrogen and Fuel Cell Codes and Standards database.

California Station Implementation **Ben Xiong**

- No updates.

California Div. of Measurement Standards/Fuel Quality / Metrology **Yuk Wong**

- Southern and Northern CA laboratories continue performing hydrogen quality sampling and analysis testing.
- We recently got the particulate samplers back from the manufacturer after the retrofit. Planning to start particulate sampling next month in August.

Legal Metrology Standards Hydrogen Fuel Quality and Measurement Juana Williams

U.S. Weights and Measures Standards Development Process

The final 2023 Interim Meeting Reports (National Conference on Weights and Measures (NCWM) Publication 16) on the status and points considered January 8-11, 2023 by the NCWM Committees that addressed the proposals to modify hydrogen gas commercial measurement standards (to require compliance to SAE J2601, ISO 14687, and dispenser filters) were published mid-April 2023 and made available on the NCWM website at: https://www.ncwm.com/publication-16. Proposals assigned a "Voting" status (i.e., L&R Agenda Item FLR 23.4; Dispenser Filters see below) will be up for adoption during the July 30 - August 5, 2023 108th NCWM Annual Meeting in Norfolk, VA. An abbreviated report on those hydrogen proposals is listed in the table below:

NCWM Committee	Committee Agenda Item Status, No., Title	Submitter's Stated Purpose	Proposed Modification to the NIST Handbook Code	NCWM Agenda Item Status
Specifications and Tolerances (S&T)	**Developing** HGM-23.1 UR.3.8. Safety Requirement	Add safety requirement for hydrogen gas measuring devices to NIST Handbook 44 Section 3.39.	Add a new user requirement paragraph UR. 3.8. to read: ***UR.3.8 Safety Requirement – All hydrogen gas-measuring devices subject to this code shall maintain verification of testing demonstrating conformance with the latest version of SAE J2601 Fuel Protocols for Light Duty Gaseous Hydrogen Surface Vehicles, as determined by the latest version of ANSI/CSA HGV 4.3 "Test Methods for Hydrogen Fueling Parameter Evaluation. (Nonretroactive as of January 1, 20XX)***	The Committee made this proposal a developing item requesting additional information on the proposed new safety requirement. NIST Handbook 44 includes legal metrology requirements and does not include safety requirements. California has indicated SAE J2601 is more than a safety requirement because it is also a performance requirement applied to its public stations. The submitter has indicated the dispenser's fueling protocol can harm test equipment. The Submitter acknowledges that handbooks do not address safety and requested informational status and that the proposal undergo further development. The S&T Committee has requested more information on the metrological effects of the fueling protocol on hydrogen gas vehicle fueling dispensers. On review of these comments the NCWM S&T Committee assigned the

NCWM Committee	Committee Agenda Item Status, No., Title	Submitter's Stated Purpose	Proposed Modification to the NIST Handbook Code	NCWM Agenda Item Status
				proposal "Developing" status.
Laws and Regulations (L&R)	**Developing** FLR-23.3 Section 2.20. Hydrogen Fuel	Add equivalent hydrogen quality standard, ISO 14687 to NIST Handbook 130 Part IV. F. Section 2.20.	Modify Section 2 Standard Specification 2.20 as follows: **2.20. Hydrogen Fuel.** – Shall meet the latest version of SAE J2719, "Hydrogen Fuel Quality for Fuel Cell Vehicles." **or ISO 14687 "Hydrogen fuel quality — Product specification".** (Added 2012) **(Amended 20XX)**	Recommended for further development by the submitter of the proposal. Comments were heard recommending the fuel quality standard include the publication dates for each standard and to specifically cite the relevant part of ISO 14687 which applies for this standard. Additionally, there could be a six-month gap in the revision cycle before the two standards would be completely aligned. Based on these points the Committee agreed there remains concern about the confusion that would result from citing two fuel quality standards instead of one. On review of these comments the Committee assigned the proposal "Developing" status and requested the submitter determine the standard which will resolve these issues. On May 8, 2023 the submitter indicated that the standards organizations work to coordinate their updates occurs after one is updated then work begins to harmonize the other standard. Consequently, the submitter recommended an alternative modification of Section 2.20 to recognize "whichever has the most

NCWM Committee	Committee Agenda Item Status, No., Title	Submitter's Stated Purpose	Proposed Modification to the NIST Handbook Code	NCWM Agenda Item Status
				recent publication date" to read: 2.20. Hydrogen Fuel. – Shall meet ~~**the latest version of**~~ SAE J2719, "Hydrogen Fuel Quality for Fuel Cell Vehicles." or **ISO 14687 Grade (D) "Hydrogen fuel quality – Product specification", whichever has the most recent publication date.** (Added 2012) **(Amended 20XX)**
L&R	**Voting** FLR-23.4 Section 4.3. Dispenser Filters	Add filter requirements for commercial hydrogen dispensers to NIST Handbook 130 Part IV. F. Section 4.3.	Add a new hydrogen dispenser filter Subsection 4.3.3 as follows: 4.3.3 Delivery Gas of Hydrogen **(a) All gaseous hydrogen dispensers shall have a 5 micron or smaller nominal pore-sized filter, and** **(b) Shall be fitted with a coalescing filter that is size appropriate to the dispensing system to protect the vehicle from liquid contamination.** **(Added 20XX)**	Proposal has Voting status, recommended for adoption in July 2023. The Committee agreed to the submitter's further modification of the proposal in response to comments indicating the proposed regulation did not address critical filter specifications for the contaminant filter pore size nor specify a type and filter sized appropriately for protecting the vehicle systems from liquid contaminants. The L&R Committee also concurred with recommendations for placing the filter requirements in separate new subsections 4.3.3. Delivery of Hydrogen Gas (a) and (b). In May 2023 CWMA heard input that with coalescing type filters the flow rate is more of a factor than the pore size. One additional option proposed in June 2023 for the new liquid filter requirement in Section

NCWM Committee	Committee Agenda Item Status, No., Title	Submitter's Stated Purpose	Proposed Modification to the NIST Handbook Code	NCWM Agenda Item Status
				4.3.3.(b) was developed by industry to provide further clarity on the filter specification to read: **(b) Shall be fitted with a suitable coalescing filter which is size appropriate to the dispensing system, and will effectively protect the vehicle from liquid contamination**

The NCWM Specifications and Tolerances Committee and Laws and Regulations Committee addressing the proposals for the hydrogen codes to include a hydrogen dispenser fueling safety protocol in NIST Handbook (HB) 44 Section 3.39 and for recognizing a second hydrogen fuel quality standard and filter requirements (i.e., for particulates & liquids) in NIST HB 130 have requested further input on the safety and fuel quality agenda items. Current editions of NIST Handbooks are available on the NIST OWM website at: https://www.nist.gov/pml/owm/owm-products-and-services/publications-and-documentary-standards.
Input on all proposals should be sent to either NCWM S&T Committee Chair Jason Glass (KY) available by email at: jason.glass@ky.gov or L&R Committee Chair Doug Rathbun (IL) available by email at: doug.rathbun@illinois.gov.
Comments on these proposals are encouraged and can be provided in-person or in writing or electronically to the chairperson of the Committee addressing these proposals up through the July 30 - August 5, 2023 NCWM Annual Meeting in Norfolk, VA.
If you have questions or comments regarding these handbook proposals, the NIST USNWG or NIST OWM's work on hydrogen projects in the areas of device standards, test procedures, or hydrogen fuel specifications, please contact Juana Williams by email at: juana.williams@nist.gov or by telephone at (301) 975-3989.

VII. Open Discussion & Other Issues

a. None.

VIII. Next Meeting – Wednesday, August 2nd at 2:00 PM US Eastern Time