



Regulatory Affairs Matrix

March 31, 2025 Version

FCHEA’s Regulatory Affairs Matrix is a tool designed to report progress in the development of codes, standards, and regulations of interest to our members. Redline/strike-out markings depict changes over the past quarter. In addition to status updates on each document, position of items within the matrix provides information regarding application, activity level, and importance of the effort to commercialization.

The matrix is divided into clusters based upon application, such as infrastructure, portable power, stationary, etc. Applications are depicted in the far-right column. Level of activity is represented vertically, with items with the highest level of activity appearing towards the top of the matrix. Position within the columns represent the importance of the effort to industry commercialization timeframes.

The matrix is updated on a quarterly basis and reviewed with members during our technical working group meetings. Feedback is used to evaluate importance to commercialization and identify new efforts for future tracking.

For questions or updates regarding this matrix, please contact Karen Quackenbush by email at kquackenbush@fchea.org.

Significance to Commercialization
 More Critical ←
Highest Effort

A. Essential To or Enables Commercialization	B. Important to Commercialization	C. Supports Commercialization	
ISO 24925: Cryo-compressed hydrogen refuelling protocol – Work is now underway.	ISO 19880-2: Gaseous hydrogen filling station dispensers – <u>Published 2025. To be removed in next revision of this matrix.</u> ISO 17268 Gaseous Hydrogen Land Vehicle Refuelling Connection Devices: ISO/TC 197	NFPA 55: Compressed Gases and Cryogenic Fluids Code: <u>The second draft meeting is scheduled for May 27 through May 29 at NFPA headquarters in Quincy, MA. The meeting will be a hybrid meeting held in person with the option to connect virtually.</u>	INFRASTRUCTURE Transportation WG (all)

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ISO/DIS 13984 - Liquid hydrogen — Land vehicle fueling protocol – at DIS stage.

agreed to create a multipart series, based ISO/AWI 17268; to revise ISO/AWI 17268 “Gaseous hydrogen land vehicle refuelling connection devices” as ISO/AWI 17268-1 for a 24-month project duration. New title is proposed to be Gaseous Hydrogen land vehicle refuelling connection devices – Part 1: Flow capacities up to and including 120 g/s. Registered as FDIS.

ISO 17268-2: Gaseous Hydrogen land vehicle refuelling connection devices – Part 2: Flow capacities greater than 120 g/s. This project will be developed by WG 5, with Livio Gambone as project leader, under Vienna agreement. Now in CD stage.

ISO/AWI 17268-3.2 Gaseous hydrogen land vehicle refuelling connection devices — Part 3: Cryo-compressed hydrogen gas: A working group has prepared a draft.

ISO 19880-4: Gaseous Hydrogen Fueling Stations – Part 4 – Compressors: New Schedule to be confirmed once CD is circulated and project is officially restarted.

NFPA has not released the list of public comments (PCs) yet.

Some topics to be addressed:

Removal of all requirements for hydrogen use and storage and now to be resident in NFPA 2.

▲ Change of chapter 10 from gaseous hydrogen to cover all flammable gases other than hydrogen.

▲ Change of chapter 11 from cryogenic hydrogen to cover all cryogenic fluid flammable gases other than hydrogen.

Rewrite of chapter 14 for carbon dioxide systems.

▼ **ISO 19885-2: Definition of communications between the vehicle and dispenser control systems**

Provides basic information needed by the developer of fueling protocols to define the methodology and data to be transmitted between the vehicle and dispenser control system. A working group has prepared a draft.

ISO 19885-3. High Flow Hydrogen Fueling Protocols for Heavy Duty Road Vehicles

**Distribution WG (NFPA 55, CSA B107)
Commercial WG (NFPA 55, CSA B107)**

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		<p>A universal and versatile HF (above 60 g/s) hydrogen fuelling protocol for HD applications including buses and trucks with primary focus on H70 Heavy-Duty High-Flow road vehicles and systems with large hydrogen capacity at gaseous hydrogen fueling stations. A working group has prepared a draft.</p>	
	<p>▼ ISO/AWI 14687: Hydrogen fuel quality Product specification – FDIS ballot initiated.</p> <p>CSA HGV 4.1, Hydrogen fueling dispensers - A project to revise HGV 4.1 to include medium and heavy-duty fueling, as well as reference cryogenic hydrogen, continues to meet to review member comments.▼</p> <p>CSA HGV 4.9, Hydrogen fueling stations - This project is to revise the existing edition of HGV 4.9 to address updates in technology and coordinate requirements with HGV 4.1 and HGV 4.3, as applicable. Ongoing. ▼</p>	<p>ISO TS 19870 Methodology for Determining the Greenhouse Gas Emissions Associated with the Production, Conditioning and Transport of Hydrogen to Consumption Gate- Published December 2023. During the plenary meeting in November, ISO/TC 197/SC 1 agreed to create a multi-standard series based on ISO/TS 19870 “Methodology for determining the greenhouse gas emissions associated with the production, conditioning and transport of hydrogen to consumption gate” as a seed document as follows:</p> <ul style="list-style-type: none"> • ISO 19870-1.2 on H2 production to production gate. In CD stage. • ISO 19870-2 on LH2 to consumption gate. • ISO 19870-3 on NH3 to consumption gate. • ISO 19870-4 on LOHC to consumption gate. <p>Technology annexes were distributed for comment. Out for DIS ballot.</p> <p>ISO 13985: Liquid hydrogen — Land vehicle fuel tanks: CD under review.</p>	<p>FUELS</p> <p>Transportation WG (All)</p> <p>Production WG (ISO/AWI 14687; ISO/NP TS 19870)</p>

Deleted: ISO 19880-8- Gaseous hydrogen -- Fueling stations -- Part 8: Hydrogen quality control. ¶
Published. To be removed in the next revision of this matrix.¶

Deleted: This project is to revise the existing edition of HGV 4.1 to consider medium and heavy-duty fueling, as well as liquid and cryo-compressed. The project kick-off meeting is planned for October 21.

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		<p>CSA TS 5.3, Portable and mobile fueling systems - This project is to develop a new guidance document. <u>Ongoing.</u></p>	
	<p>Drones/UAS Commercial drones must be registered with the FAA. Non-commercial drones (hobby) no longer need to be registered with the FAA, but rules are in flux.</p> <p>Further FAA guidance for UAS: https://www.faa.gov/uas/resources/uas_regulations_policy/</p> <p>Rules for UAS are also being developed by ISO/TC 20 SC 16. Although there are no rules currently under development specific to hydrogen or fuel cells, this SC is very active developing and revising rules that would apply to such systems. https://www.iso.org/committee/5336224.html.</p>	<p>IEC 62282-6-401: Fuel cell technologies – Part 6-401: Micro fuel cell power systems – Power, data interchangeability and performance test methods for laptop computers: In FDIS <u>approved</u>, <u>To be published.</u></p> <p>Airworthiness certification guidelines: To fly a UAV above 55lbs in FAA airspace requires three types of additional certification. These include airworthiness certification of the aircraft. Guidelines exist for this but they are designed for manned airplanes and rotorcraft. Monitor for hydrogen and/or fuel cell applicability. See CFR, Title 14: Aeronautics and Space, PART 21— CERTIFICATION PROCEDURES FOR PRODUCTS AND ARTICLES</p> <p>ASTM WK60937: New Specification for Design of Fuel Cells for Use in Unmanned Aircraft Systems (UAS) under development. Negative vote in ballot requires addressing and reballoting.</p>	<p>MICRO</p> <p>Power WG (IEC docs) Transportation WG (all)</p>
<p>NFPA 2: Hydrogen Technologies Code: The 2026 edition is underway. The <u>Second</u> Draft posting date is October 3, 2025.</p>	<p>ASME B31.12 Hydrogen Piping and Pipelines, will be due for its next revision soon. B31.12 was last published in 2019. B31.12 European International Working Group is in the works.</p>	<p>IEC 62282-7-2 ED 2 Fuel cell technologies – Part 7-2: Test methods – Single cell and stack performance tests for solid oxide fuel cells (SOFCs): FDIS <u>approved</u>, <u>To be published.</u></p>	<p>GENERAL</p> <p>Distribution WG (all)</p> <p>All WGs (NFPA 2)</p>

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CSA 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. Content development continues with monthly meetings.

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Significance to Commercialization
More Critical ⇐
Moderate Effort

A. Essential To or Enables Commercialization	B. Important to Commercialization	C. Supports Commercialization	
<p>SAE/EuroCAE AS6858: Installation of Fuel Cell Systems in Large Civil Aircraft: This document is starting revision. It will be a joint SAE/EuroCAE publication. Experts are being sought.</p>	<p>International Maritime Organization (IMO) SUB-COMMITTEE ON CARRIAGE OF CARGOES AND CONTAINERS: Developing Requirements for use of low flashpoint fuels on marine vessels – including provisions for fuel cells, bulk liquid hydrogen storage, and other fuels. http://www.imo.org/en/OurWork/Safety/Pages/Default.aspx</p> <p>SAE AS6679 - Liquid Hydrogen Storage for Aviation: This document defines the technical guidelines for the safe integration, operation and maintenance, and for certification of Liquid Hydrogen Storage Systems (LHSS) in aircraft. This document also defines guidelines for safe refuelling operation of hydrogen for aircraft. It is currently under revision. Hydrogen experts are sought.</p> <p>SAE AS7373 - Gaseous Hydrogen Storage for General Aviation - This document defines the technical guidelines for the safe integration, operation and maintenance, and for certification of Gaseous Hydrogen Storage Systems (GHSS) in general aviation. This document also defines guidelines for safe refuelling operation of gaseous</p>	<p>ASME BPV Code Case 3078: Section VIII committee opened a project to explore options for proposed changes to mandate requirements for cell stack assemblies. ▲ revision to Code Case 3078 has been approved for electrolyzers, and a task group continues work to set requirements for cell stack assemblies for fuel cells and electrolyzers. ▼</p> <p>CSA SPE-701 – Hydrogen fuel storage containers for aviation applications - New project.</p> <p>ISO/AWI 19888-1: Hydrogen Technologies Aerial Vehicles - Part 1: Liquid Hydrogen Fuel Storage System New project launched in ISO/TC 197 SC1. This project specifies the requirements for design, material, construction, manufacture, testing, and inspection of a refillable fuel system for liquid hydrogen used in the hydrogen-powered aerial vehicle, including manned and unmanned aerial vehicles. This work will consider an appropriate fuelling protocol that</p>	<p>TRANSPORTATION</p> <p>Transportation WG (all except IEC, ASME and CGA)</p> <p>Power WG (IEC, ASME)</p> <p>Distribution WG (CGA)</p>

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	hydrogen for aircraft. It is currently under revision. Hydrogen experts are sought.	reflects conditions during the liquid hydrogen fuelling process.	
<p>Global Technical Regulations (GTRs) for Vehicles: GTR for H2 and FC vehicles Phase II underway http://www.unece.org/fileadmin/DAM/trans/doc/2017/wp29/ECE-TRANS-WP29-2017-056e.pdf.</p> <p>Notice of Proposed Rulemaking by DOT NHTSA for FMVSS for Hydrogen Fuel Systems and Hydrogen Containers is open for public comment through June 17, 2024</p>		<p>SAE J2600: Compressed Hydrogen Surface Vehicle Fueling Connection Devices - Being revised in conjunction with ISO 17268. A new sponsor is needed for this effort to move forward.</p>	<p>VEHICLES</p> <p>Transportation WG (all)</p>
<p>NFPA 855: Standard for the Installation of Stationary Energy Storage Systems: 2023 edition has been published. 2026 edition was open for public input until June 1, 2023. First Draft Report Posting Date: March 21, 2024. Public Comment Closing Date: May 30, 2024.</p> <p>SAE J2601: Fueling Protocols for Light Duty Gaseous Hydrogen Surface Vehicles – open for revision</p> <p>U.S. Weights and Measures Standards - A final report on national conference of weights and measure committee reviewing hydrogen activities will be available soon.</p>	<p>ICC International Fire Code: ICC currently has 456 references of hydrogen gas in ICC codes and is engaging with industry to focus on keeping codes and standards up-to-date and addressing any code gaps regarding hydrogen technology. Work has in advance of the next revision cycles for the IFGC, IFC, and potentially others. An ICC Hydrogen Working Group has been established. The ICC The Hydrogen Fuel Gas WG recently completed their effort focusing on facilitating the use of hydrogen blends in buildings. Public comment hearings will begin this month in Long Beach, CA. The IFGC code is focused on hydrogen and natural gas blending, which will include some pointers back and forth with NFPA 2. ICC’s goals for 2024 will be to develop jurisdictional permitting and plan review guidance for US Clean Hydrogen Hub</p>	<p>ISO 19880-5 WG 22 Gaseous hydrogen fueling stations– Dispenser hoses and hose assemblies Comments from successful DIS vote were addressed in December in conjunction with the ISO/TC 197 plenary in Seoul, Korea. FDIS to be submitted in January 2025.</p> <p>ISO 19880-6 WG 23: Gaseous hydrogen fueling station fittings. WG 23 now working to resolve CD comments. Project was administratively cancelled on May 1, with an expectation to ballot restarting the work when the DIS is ready to be registered.</p>	<p>INFRASTRUCTURE</p> <p>Power WG (NFPA 855, CGA G-5.5, ICC, ISO 22734, FC 4, UL)</p> <p>Production WG (all CGA, ISO 22734, FC 4)</p> <p>Commercial WG (ICC, all CGA, ISO 22734, FC 4)</p> <p>Transportation WG (ICC, All SAE, CGA,</p>

Deleted: ISO 19887 Gaseous Hydrogen - Fuel system components for hydrogen fuelled vehicles has been published. To be removed in the next revision to this matrix.¶

ISO/AWI TS 19880-10: Gaseous hydrogen — Fuelling stations — Part 10: Mobile fuelling stations – New project underway.

projects, inspection checklists and best practice guidance documents for building and fire officials for H2 production, storage, distribution, and end use. Additionally, ICC will also seek to assist in the development and implementation of H2 installer credentialing to support safe installation and maintenance of H2 systems.

CGA G-5.5 – Hydrogen Vent Systems: Deadline to submit proposed changes for next edition was 03/31/2025. The task force continues to develop updated content before the deadline passes. The task force met in person 12/03-05/2024 at CGA headquarters.
<https://portal.cganet.com/workitem/details/26-3>

CGA G-5.4, Standard for hydrogen piping systems at user locations - 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 work item 21-127, Transfer and unloading of hydrogen at near-consumer use points – Work initiated to develop a new standard to update traditional hydrogen delivery practices for industrial users to improve practices for retail applications.

ISO 22734-1: Hydrogen generators using water electrolysis Test protocols and safety Requirements – Revision of ISO 22734:2019 is underway. DIS comments are being addressed by WG 34.

SAE J2601/4: Ambient Temperature Fixed Orifice Fueling – establishes the protocol and process limits for hydrogen fueling of light duty vehicles when the fuel delivery temperature is not pre-cooled, so called “ambient fueling” designated by Table 1 of SAE J2601-2014. Currently at MVC for approval.

SAE J2601/5: High-Flow Prescriptive Fueling Protocols for Gaseous Hydrogen Powered Medium and Heavy-Duty Vehicles -This TIR establishes high-flow fueling protocols, including their process limits for fueling of compressed gaseous hydrogen vehicles at peak flow rates from 60 to 300 g/s with compressed hydrogen storage system (CHSS) volume capacities between 248.6 and 7500 L which have been qualified to UN GTR #13. Under revision.

CSA HGV 5.1, Residential hydrogen fuelling appliances– This project is to develop a NEW standard for Residential fuelling appliances. Project was kicked off in October 2023. Content development has stalled. To be removed in next revision of the matrix until the project is reactivated.

SAE J2799: Hydrogen Surface Vehicle to Station Communications Hardware and

and ISO, except ISO 22734, US Weights and Measures)

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	<p><u>CSA B22734 - Water electrolysis systems - CSA Group has issued a call for participation to work on the North American adoption of ISO 22734-1 - Hydrogen generators using water electrolysis — Part 1: Safety.</u></p> <p>ISO 19880-7: Gaseous hydrogen Fueling stations O rings – The new IS shall be harmonized with existing ISO 3601 family Fluid Power Systems O rings. List of types and quality acceptance criteria of O rings, back up rings, which are described in ISO 3601 1, 3, 4, are considered to be referenced in the new IS. Special features of groove design and materials for high pressure hydrogen seal are to be discussed in the new IS. DIS ballot period closing.</p> <p><u>IEC 62282-8-101, Energy storage systems using fuel cell modules in reverse mode - Test procedures for the performance of solid oxide single cells and stacks, including reversible operation – New Work Item starting.</u></p>	<p>Software – reopened for corrections and clarifications.</p> <p>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 develop a Technical Specification for verification to the SAE protocol.</p> <p>CGA New publication on safe electrolyzer operation - New publication not released yet. Content is under development.</p> <p>CGA New publication on safe oxygen outtake during electrolysis process. Content under development.</p>	
<p>CGA work item 21-128, Noise from hydrogen venting and hydrogen systems operations – Work is underway to 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.</p> <p>CGA work item 22-107, Hydrogen system best practices— Developing a new standard to capture recommended best practices for handling</p>		<p>ISO TS 15916: Basic considerations for the safety of hydrogen systems - A working draft of a Technical Specification has been prepared, and the new working group is meeting.</p> <p>CGA work item 22-116, Hydrogen separation distances – New activity. CGA is developing a globally harmonized standard on the methodology for developing separation</p>	<p>GENERAL</p> <p>All WGs (all)</p>

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 task force has completed the first draft, which is now going through staff review and then membership review. The task force will meet to resolve comments from staff review.

CGA new work item – TBD – call for experts

Work has begun on a new bi-national standard, entitled “Hydrogen production intensity quantification and verification”. The purpose of this bi-national standard is to determine the emissions profile of hydrogen production accurately and consistently based on production methods. A more accurate classification system could replace or supplement the current colour classification in place (i.e., gray, blue, and green hydrogen). The bi-national quantification standard aims to include the following:
 A process to establish life cycle assessment boundaries for each hydrogen production method, from cradle to gate
 Determination of the appropriate hydrogen quality specification to ensure quantification of production is resulting in equivalent comparisons and,
 Establishment of validation and verification requirements to provide assurance of emission profiles.

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. First drafts will be issued for membership review at all the industrial gas associations.

CGA work item 22-127, Hydrogen education plan:

CGA is developing a globally harmonized standard on hydrogen emergency response and safe hydrogen handling training. The JWG has finished work on the draft document.

Deleted: CGA G-5, Hydrogen, was recently approved as an American National Standard. G-5 has now been re-published with the American National Standard designation, and is now available at <https://portal.cganet.com/publication/G-5/details>. To be removed in the next revision of this matrix.¶

<p>FC 62282-2-100 * C22.2 No. 62282-2-100, Fuel cell stacks and fuel cell modules— The committee continues to meet to adopt IEC 62282-2-100 - Fuel Cell Technologies – Part 2-100: Fuel cell modules – Safety for US and Canada.</p>	<p>IEC 62282-3-100 - Stationary fuel cell power systems – Safety: 3rd edition revision underway. August 12, 2026 is deadline to register FDIS. Convenor stepped down. Call for Convenor is being circulated. CD stage.</p> <p>IEC 62282-2-400 ED1: Fuel cell technologies— Part 2-400: Fuel cell modules— Calculation of Rated Power and Power Density of a PEM stack and PEM module – at Committee Draft stage.</p> <p>IEC 62282-3-202 ED1: Fuel cell technologies— Part 3-202: Stationary fuel cell power systems— Performance test methods for small fuel cell power systems that can be complemented with a supplementary heat generator for multiple units operation by an energy management system. FDIS approved. To be published.</p> <p>IEC 62282-3-300: Fuel cell technologies - Part 3-300: Stationary fuel cell power systems – Installation Systematic review initiated. Comments from the WG are also expected.</p> <p>ASME PTC 46, new appendix on electrolyzers, recruiting for experts. Work is expected to begin Spring 2024.</p> <p>IEC 62282-3-200 ED3: Fuel cell technologies - Part 3-200: Stationary fuel cell power systems - Performance test methods – FDIS registered.</p>	<p>ISO/DIS 19884, Gaseous hydrogen – Cylinders and tubes for stationary storage: ISO/TC 197 agreed to create a multi-part document developed by WG 15^{””}Cylinders and tubes for stationary storage^{””} with Proposed Convenor John Eihusen, in order to:</p> <ul style="list-style-type: none"> • renumber ISO 19884 to be ISO 19884-1^{””}Gaseous Hydrogen Cylinders and tubes for stationary storage – Part1: General Requirement^{””}; Project registered. • create ISO/TR 19884-2^{””}Gaseous Hydrogen Cylinders and tubes for stationary storage – Part 2: Material test data of class A materials (steels and aluminum alloys) compatible to hydrogen service^{””} for a 24-month project duration, with Project Leader Prof. Nobuhiro Yoshikawa; • create ISO/TR 19884-3^{””}Gaseous Hydrogen Cylinders and tubes for stationary storage – Pressure cycle test data to demonstrate shallow pressure cycle estimation method^{””} for a 24-month project duration, with Project Leader Prof. Nobuhiro Yoshikawa. <p>ASME PTC 50, the Fuel Cell Power System Performance Testing Code, began revision work. This effort is expected to help standardize performance reporting across the industry.</p>	<p>STATIONARY</p> <p>Power WG (all)</p> <p>Distribution WG (ISO/DIS 19884)</p>
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	<p>IEC TS 62282-7-1 ED3 - Fuel cell technologies - Part 7-1: Test methods - Single cell performance tests for polymer electrolyte fuel cells (PEFC): Circulated as Draft Technical Specification.</p>	<p>IEC 62282-9-101: Evaluation methodology for the environmental performance of fuel cell power systems based on life cycle thinking— Streamlined life-cycle considered environmental performance characterization of stationary fuel cell combined heat and power systems for residential applications – Revision to start soon.</p> <p>IEC 62932-2-2: Flow battery energy systems for stationary applications— Part 2-2: Safety Requirements – planning next edition.</p>	
	<p>IEC 62282-3-201 ED3: Fuel cell technologies - Part 3-201: Stationary fuel cell power systems - Performance test methods for small fuel cell power systems – FDIS registered.</p>		<p>PORTABLE Power WG (all)</p>

Significance to Commercialization
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 Lowest Effort

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	<p>SAE AIR 8466, Hydrogen Fueling of Aircraft, in both gaseous and liquid form: 2023 version of the H2-Aero Whitepaper from the vertical flight society to be used as a basis.</p> <p>SAE H2-Aero Whitepaper download (VFS Website-public): https://vtol.org/download.cfm?downloadfile=FDA0AB2D-B06C-15F1-5AD5823F326F5CDE&typename=dmFile&fieldname=filename.</p>	<p>IEC 63341-3 ED1. Railway applications— Rolling stock— Part 3: Fuel cell systems for propulsion— Performance requirements and test methods. Assigned to JWG 51. In FDIS editing.</p> <p>ISO/AWI 19887-2 - Gaseous Hydrogen — Fuel system components for hydrogen-fuelled vehicles — Part 2: Rail vehicles project started under ISO/TC 197 SC 1.</p>	<p>TRANSPORTATION</p> <p>Transportation WG (all)</p>
	<p>SAE J1766: Recommended Practice for Electric, Fuel Cell and Hybrid Electric Vehicle Crash Integrity Testing – revised. Action needed. Awaiting GTR 13 Phase 2</p> <p>ISO 19881: Gaseous hydrogen – Land vehicle fuel containers – FDIS has been registered.</p> <p>ISO 19882: Gaseous hydrogen – Thermally activated pressure relief devices for compressed hydrogen vehicle fuel containers – <u>Published. To be removed in the next revision of the matrix.</u></p>	<p>SAE 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 – underway.</p> <p>SAE J2990/1: Gaseous Hydrogen and Fuel Cell Vehicle First and Second Responder Recommended Practice – Revision initiated. Meeting scheduled to address comments.</p> <p>SAE J3294: Guidance for Material Selection for use in Hydrogen Systems. Soliciting comments.</p>	<p>VEHICLES</p> <p>Transportation WG (all)</p>

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	<p>IEC 62282-4-401 ED1 - Fuel cell technologies - Part 4-401: Fuel cell power systems for propulsion and auxiliary power units - Maritime sector - Safety of PEMFC-Systems: CD phase.</p>	<p>IEC 25009: Unmanned aircraft systems – General requirements and test methods for hydrogen fuel gas pipes of gaseous fuel cell powered UAV. (specifically excludes stacks) CD stage. ISO/TC 20/SC 16 is leading the effort. IEC/TC 105 decided not to participate as it is outside their scope.</p> <p>IEC 25013: Unmanned aircraft systems – General requirements and test methods for the attachable hydrogen cylinders of gaseous hydrogen fuel cell Powered UAV. CD stage. ISO/TC 20/SC 16 is leading the effort. IEC/TC 105 decided not to participate as it is outside their scope. i</p>	
<p>ISO/AWI 16110-2: Hydrogen generators using fuel processing technologies — Part 2: Test methods for performance – work has begun.</p> <p>ISO/AWI TS 19889-1: Hydrogen technologies — Interoperability — Part 1: Part 1: Interface between gaseous hydrogen trailer and hydrogen fuelling station – new project underway.</p> <p>ISO/DIS 24078: Hydrogen in energy systems — Vocabulary – DIS vote closing.</p>	<p>OSHA Requirements for Hydrogen FCHEA HCTF new activity— At the present time, 29 CFR has a long list of requirements for hydrogen systems and also provides guidance for hydrogen pressure vessels and associated equipment that is long out of date. These requirements can be seen here: http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9749</p> <p>It is recommended that these requirements be replaced by the up-to-date requirements of NFPA 2.</p>	<p>▼ ANSI/CGA H-5, Standard for bulk hydrogen supply systems The deadline to submit proposed changes for the next edition was 2/26/2024. 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/Workpace/Outline.aspx?work_id=24-010</p> <p>▼ CSA HGV 4.3 – Fueling parameter evaluation New revision starting.</p> <p>CSA HGV 4.5, Priority and sequencing equipment for hydrogen vehicle fueling -</p>	<p>INFRASTRUCTURE</p> <p>All WGs (OSHA, ISO 24078)</p> <p>Transportation WG (All CSA, NIST, ASTM, ISO)</p> <p>Production WG (All CGA, ISO 16110-2)</p> <p>Distribution WG (All CGA, ISO 19889-1)</p>

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ANSI/CGA H-3 cryogenic hydrogen storage: Published as an American National Standard. To be removed in the next revision of this matrix.¶

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CGA G-5.3, Commodity specification for hydrogen – Published. To be removed in the next revision of this matrix.¶

<p>CGA H-8 (new), Hydrogen separation distances - CGA is developing a globally harmonized standard on the methodology for developing separation distances between hydrogen systems and exposures. <u>Ongoing.</u></p>	<p>CGA H-14, HYCO plant gas leak detection and response practices: Work continues to update and post the new version.</p> <p>CGA H-15, Safe catalyst handling in HYCO plants: Deadline to submit proposed changes for next edition is 9/1/2025. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=25-59</p> <p>CGA P-28, OSHA process safety management and EPA risk management plan guidance document for bulk liquid hydrogen supply systems: Deadline to submit proposed changes for next edition is 08/01/2027 https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=25-49</p> <p>CGA PS-31, Position statement on cleanliness for proton exchange membranes hydrogen piping / components: Deadline to submit proposed changes for next edition is 6/12/2025. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=25-16</p> <p>CGA PS-33, Position statement on the use of LPG or propane tanks as compressed hydrogen storage buffers: Deadline to submit proposed changes for next edition is 12/10/2026. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=25-41</p>	<p>This project is to develop a standard to REINSTATE an updated edition of a Priority and Sequencing standard. Draft document is being prepared to publish.</p> <p>CGA H-10, Combustion safety for steam reformer operation: Deadline to submit proposed changes for next edition was 9/21/2024. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=23-038</p> <p>CGA H-11, Safe start-up and shutdown practices for steam reformers: Deadline to submit proposed changes for next edition is 8/11/2025. https://portal.cganet.com/Publication/Workspace/Outline.aspx?work_id=25-30</p> <p>CGA H-12, Mechanical integrity of syngas outlet systems: Deadline to submit proposed changes for next edition was 06/1/2024. https://portal.cganet.com/workitem/details/21-016.</p> <p>CGA P-48, Position statement on clarification of existing hydrogen setback distances and development of new hydrogen setback distances in NFPA 55: Deadline to submit proposed changes for next edition is 02/12/2030. https://portal.cganet.com/workitem/details/30-3</p>	<p>Power WG (ISO)</p>
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CGA H-17, Small scale hydrogen production and delivery: Published. To be removed in the next revision of this matrix.¶

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CGA H-13, Hydrogen pressure swing adsorber (PSA) mechanical integrity requirements: Published. To be removed in the next revision of this matrix.¶
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ISO AWI TR 22734-2 Hydrogen generators using water electrolysis – Part 2: Testing guidance for performing electricity grid service

This activity has been transferred to the newly-formed ISO/TC 197 SC 1.

CSA HGV 4.8, Compressors: This project is to revise an existing edition of HGV 4.8 compressor standard to address updates in compressor technology. CSA seeks compressor manufacturers to join the TSC. Please contact Sara Marxen (sara.marxen@csagroup.org) if interested in joining this work.

CSA 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. [Due out for public review.](#)

PEM modules Size and interfaces definition = IEC/TC 105 has received a New Work Item Proposal This activity could be broad, but is currently focused on Heavy-duty applications. See StasHH.eu. Towards a standardized fuel cell module. Mass production, reducing costs for interfaces at a system level. 6 categories of module. This effort focuses on interoperability of modules. (Plug and play). The work provides 3 options for interfaces. This NWIP has already recently been submitted to develop a Technical Specification. A call for experts is expected shortly.

ASTM D7634 Visualizing Particulate Sizes –

Standard Test Method for Visualizing Particulate Sizes and Morphology of Particles Contained in Hydrogen Fuel by Microscopy [reaffirmed in 2024. To be removed from matrix in next revision.](#)

ASTM D7675-15: Standard Test Method for the Determination of Total Hydrocarbons in Hydrogen by FID Based Total Hydrocarbon (THC) Analyzer-

This test method describes a procedure for total hydrocarbons (THC) measurement in hydrogen intended as a fuel for fuel cells on a C1 Basis. Total Hydrocarbons on a C1 basis is an analytical technique where total carbon is determined, and all of the hydrocarbons are assumed to have the same response as Methane. Sensitivity from 0.1 part per million (ppm, μmole/mole) up to 1000 parts per million (ppm, μmole/mole) concentration are achievable. Higher concentrations can be analyzed using appropriate dilution techniques. This test method can be applied to other gaseous samples requiring analysis of trace constituents provided an assessment of potential interferences has been accomplished. Proposed revision WK 70956. Interlaboratory study in progress.

ASTM D7651 Gravimetric Measurement of Particulate Concentration - Interlaboratory study required. Looking for a technical expert to lead this effort.

Deleted: CGA PS-46, Position statement on roofs over hydrogen storage systems: Published. To be removed in the next revision of this matrix.¶

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	<p>CGA (TBD) New publication on safe electrolyzer operation - Content is being developed.</p> <p>CGA (TBD) New publication on hydrogen liquefaction as part of the production process – Content is being developed.</p> <p>ASTM #AC837 Standard Development for Hydrogen Based Electrolyzers and Fuel Cells - Development of standard guides, specifications, and test methods relating to hydrogen-based electrolyzers and fuel cells. New activity.</p> <p>ASTM WK 93670 ASTM International Collaboration Area, #80676 - Water quality guidelines for makeup and recirculating waters used in electrolyzers for hydrogen production. Work is beginning.</p>	<p>ASTM D7892 Total Organic Halides, Total Non-Methane Hydrocarbons, and Formaldehyde by GC-MS – ballot approved – to be published.</p> <p>ASTM D7941/7941M-14: Standard Test Method for Hydrogen Purity Analysis Using a Continuous Wave Cavity Ring-Down Spectroscopy Analyzer - This test method describes contaminant determination in fuel cell grade hydrogen as specified in relevant ASTM and ISO standards using cavity ring-down spectroscopy (CRDS). This standard test method is for the measurement of one or multiple contaminate including, but not limited to, water, oxygen, methane, carbon dioxide, carbon monoxide, ammonia and formaldehyde.</p> <p>Awaiting results of ballot at the subcommittee level.</p> <p>ASTM D7676 Screening Method for Organic Halides in Gaseous Fuels – Standard open for review.</p> <p>ASTM Aviation Hydrogen - Work group WK85474 has been started. Looking for experts to join this group.</p> <p>ASTM Natural Gas, Hydrogen Blends for Use as a Motor Vehicle Fuel - Ballot closed and received one negative.</p>	
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		<p>ASTM Standard Test Method for Determination of Inorganic Halogenated Compounds and Formic Acid in Hydrogen by Ion Chromatography – ballot open.</p> <p>ASTM Standard Test Method for Standard Test Method for Permanent Gases in Hydrogen Fuel by Gas Chromatography and Pulse Discharge Helium Ionization Detector (GC/PDHID) – proposal submitted.</p> <p>ASTM Standard Test Method for Determination of Trace Sulfur Compounds in Hydrogen Fuel by Thermal Desorption Gas Chromatography and Sulfur Chemiluminescence Detection (TD/GC/SCD) – proposal submitted.</p> <p>ASTM D7653 - Standard Test Method for Determination of Trace Gaseous Contaminants in Hydrogen Fuel by Fourier Transform Infrared (FTIR) Spectroscopy – ballot is open.</p>	
	<p>ICAO Technical Instructions for the Safe Transport of Dangerous Goods by Air: published every two years. The 2019-2020 edition of the International Civil Aviation Organization’s (“ICAO”) Technical Instructions for the Safe Transport of Dangerous Goods by Air (Doc 9284) (“TIs”), upon which the Dangerous Goods (Consignment by Air) (Safety) Ordinance (CAP. 384) and Air Navigation (Dangerous Goods) Regulations (Schedule 16 to CAP. 448C) are based, went into</p>		<p>CARGO</p> <p>Transportation WG (all)</p>

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	<p>effect on 1 January 2019. https://www.cad.gov.hk/english/pdf/2019-2020%20ICAO%20T1%20Major%20Changes.pdf</p>		
	<p>IEEE 1547: IEEE Standard for Interconnection and Interoperability of Distributed Energy Resources with Associated Electric Power Systems Interfaces - IEEE SCC21 has started to revise IEEE 1547-2018 Interconnection Standard.</p> <p>IEEE P1547.10 Recommended Practice for DER Gateway Platforms continues work on their next revision.</p> <p>PNW 105-1068 ED1: Fuel cell technologies - multi-generation of fuel cell systems for electricity, hydrogen generation and cooling - Performance test methods. Preliminary effort in IEC/TC 105.</p> <p>PNW TS 105-1077 ED1: Fuel cell technologies- Part xx: Fuel cell modules – PEM modules Size and interfaces definition (Shape, fluidic, electrical, API interfaces). Preliminary work in IEC/TC 105.</p>	<p>IEC TR 62282-7-3 ED1: Technical report in publication stage.</p> <p>IEC 62282-9-102: Evaluation methodology for the environmental performance of fuel cell power systems based on life cycle thinking – Product category rules for environmental product declarations of stationary fuel cell power systems and alternative systems for residential applications – anticipating revision work to start.</p> <p>PNW 105-1078 ED1: Fuel cell technologies – Part 2-X: Fuel cell modules - Performance test methods for PEM module. Preliminary work in IEC/TC 105.</p>	<p>STATIONARY</p> <p>Power WG (all)</p>
	<p>JEC 62282-5-200, Portable Fuel Cell Power Systems – Performance test method - ❖ <u>Proposed new work item</u></p> <ul style="list-style-type: none"> • Emergency power • Construction sites • Outdoor activities 	<p>Drones/UAS</p> <p>Many activities in in ISO/TC 20 SC 16: SCOPE: Standardization in the field of unmanned aircraft systems (UAS) including, but not limited to, classification, design, manufacture, operation (including maintenance) and safety management of UAS operations.</p>	<p>MICRO</p> <p>Transportation WG (all)</p>

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		<p>These activities are not specific to fuel cells for drones, but will be applicable to drones using any technologies. For further information, see https://www.iso.org/committee/5336224.html.</p>	
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Please note that details of standards and activities that have been published but not currently under revision are no longer shown in the matrix. They are added back to the matrix when the activity enters revision cycle.

List of Frequently-Used Acronyms:

CD - Committee Draft

2CD - Second Committee Draft (Did not reach consensus first time)

CD2 - same as above

CDV - Committee draft for vote (term used by IEC to distinguish between a document out for comment only and one ready for vote)

DIS - Draft International Standard (achieved consensus to move from CD phase)

FDIS - Final Draft International Standard (passed DIS vote)

WG - Working Group

IEC - International Electrotechnical Commission - the international standards body for electrochemical devices, including fuel cells, which is covered by Technical Committee 105 (TC 105)

TC - Technical Committee