

# American Society of Mechanical Engineers (ASME) Hydrogen Standardization

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# ASME

- 700+ technical committees
- 72,000+ Members, from over 130 countries
- 6,400+ Volunteers
- 550+ Codes and Standards published and maintained
- ASME Codes and Standards accepted in over 100 countries
- 12 Conformity Assessment Programs
- Founded as a technical professional society in 1880
- Engineers convened to foster engineering innovation, education, and research
- First standard issued in 1884: “Code for the Conduct of Trials of Steam Boilers” (boiler efficiency testing).
- Headquarters in New York City with additional offices in Houston, Little Falls, NJ, Beijing, Mumbai, and Singapore



# ASME Hydrogen for Green Economy Steering Committee

ASME established a Hydrogen for Green Economy Steering Committee to address the needs of industry to be a central point for engaging with industry including industrial gas companies, National Labs working on clean energy research, Government agencies such as DOE, EPA, NIST, as well as volunteers from various ASME technical committees, ASME Public Affairs and Outreach.

This committee has assisted ASME in coordinating its green hydrogen products and services, such as standards development, conferences, webinars, publications, and research efforts.

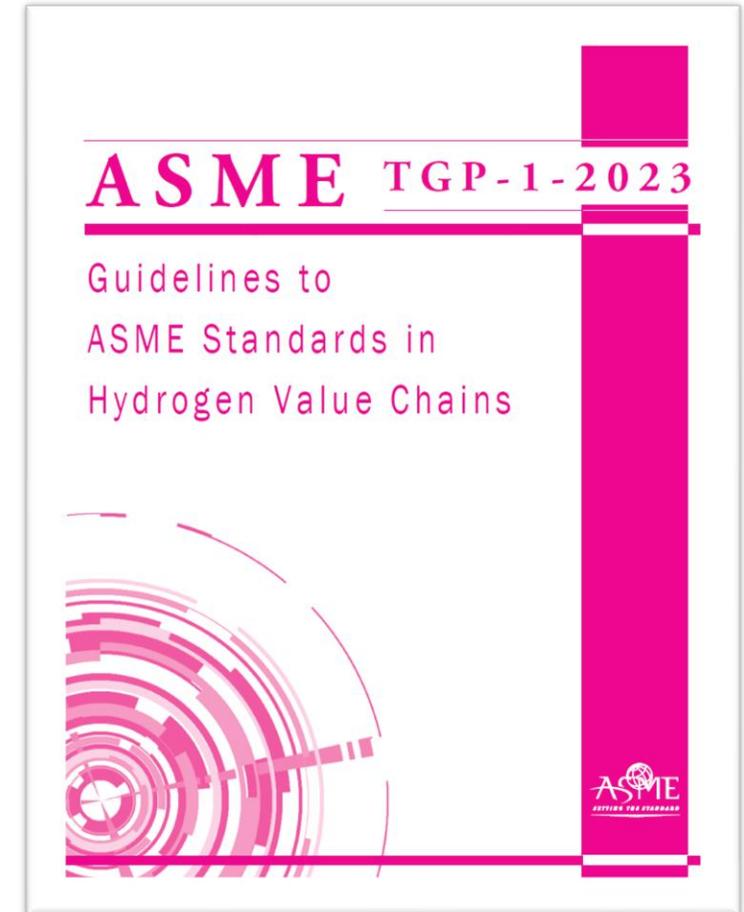


# TGP-1 Guidelines to ASME Standards in Hydrogen Value Chains

- This free document was published in June 2023 by ASME STLLC and is available to download through the following link:

<https://www.asme.org/codes-standards/find-codes-standards/tgp-1-guidelines-asme-standards-hydrogen-value-chains/2023/pdf>

- The intent of this guidance document is to:
  - summarize the existing standards in hydrogen value chains
  - identify relevant standards for specific hydrogen applications



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# ASME B31.12 Hydrogen Piping and Pipelines

- First published in 2008, ASME B31.12 covers piping in gaseous and liquid hydrogen service and pipelines in gaseous hydrogen service
- Typical applications are power generation, process plants, refining, transportation, distribution, and automotive filling stations.
- These requirements are transitioning to:
  - ASME B31.1 Power Piping
  - ASME B31.3 Process Piping
  - ASME B31.8 Gas Transmission and Distribution Piping Systems
  - Full transition and sunset of B31.12 is expected by 2030



# B31.8 and B31.8S

- Development of a new “by exception” chapter for H2 and H2 blends in B31.8
- These chapters are targeted to be included in the next editions of the standards with a target release in late 2026
  - Sour service will be used as a template for the update and mirror the approach for CO2
  - Other gases (e.g. N2, O2, etc.) may need similar chapters
  - Sections of B31.8 are already incorporated in 49 CFR 192 (ASME B31.12 not referenced in regulation)
- This effort was supported by the Pipeline Research Council International’s (PRCI) Emerging Fuel Institute (EFI) group who published a Consensus Engineering Requirement report for pipelines in Hydrogen and Hydrogen blend service



# Section VIII- Electrochemical Cell Stacks

- ASME has issued code case 3078-1 to address requirements for electrochemical cell stacks which apply to electrolyzers for use in hydrogen production.
- These requirements are intended to be included permanently in the next edition of ASME BPV Section VIII.



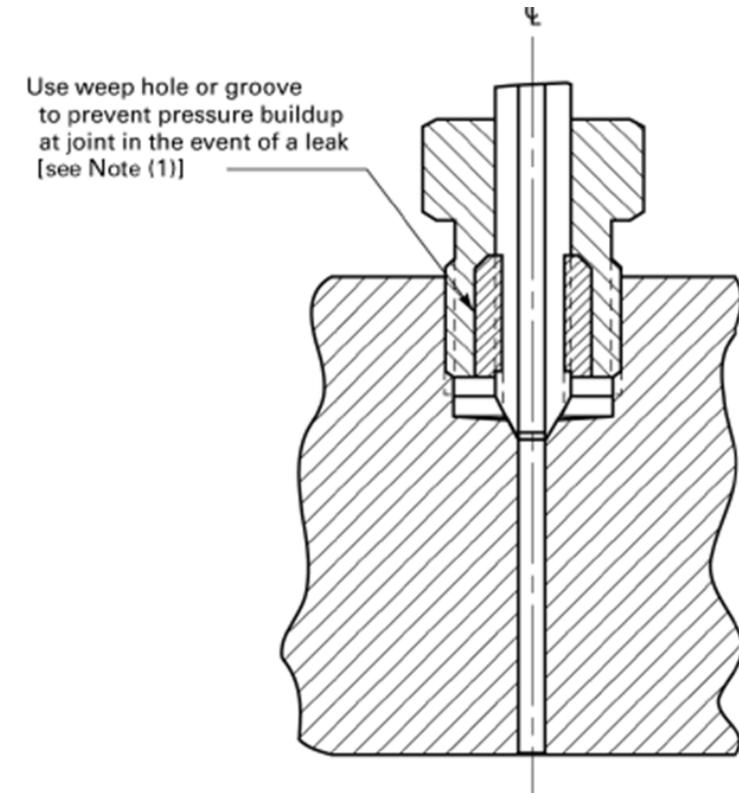
# ASME PTC 50- Fuel Cell Power Systems Performance

- First published in 2002, this performance test code provides performance requirements for fuel cells for electricity and thermal energy generation.
- This Code provides test procedures, methods, and definitions for the performance characterization of fuel cell power systems. Fuel cell power systems include all components required in the conversion of input fuel and oxidizer into output electrical and thermal energy. Performance characterization of fuel systems includes evaluating system energy inputs and electrical and thermal outputs to determine fuel-to-electrical energy conversion efficiency and where applicable, the overall thermal effectiveness. These efficiencies will be determined to an absolute uncertainty of less than  $\pm 2\%$  at a 95% confidence level.



# B16 High Pressure Connections

- Working on standard for high pressure tubing connections
- Commonly used for piping/tubing in hydrogen applications
- First patented in 1952
- No current industry standard
- Projected issuance in 2027



# ASME PTC 46- Overall Plant Performance

- New Appendix in development that will provide performance test procedures for hydrogen production of an electrolyzer
- Possible Performance Parameters:
  - System Efficiency (can be a function of % of full stack current)
  - Stack Efficiency
  - System Efficiency
  - Stack Energy
  - Power Consumption
  - Hydrogen (Pressure, Flow, Purity)
  - Water (Temperature, Flow and Quality) – water may end up being a performance parameter and a correction



# BPTCS Task Group on Hydrogen Degradation

- The Board on Pressure Technology Codes and Standards established this task group in 2025 to develop recommendations for a consistent approach to address hydrogen degradation concerns in design and post construction assessment of pressure equipment and piping.
- Currently reviewing the aforementioned documents and will develop recommendations to be delivered to the applicable stakeholders



# Standards Technologies Publications

STP-PT-003 Hydrogen Standardization Interim Report for Tanks, Piping, and Pipelines

STP-PT-005 Design Factor Guidelines for High-Pressure Composite Hydrogen Tanks

STP-PT-006 Design Guidelines for Hydrogen Piping and Pipelines

STP-PT-014 Data Supporting Composite Tank Standards Development for Hydrogen Infrastructure Applications

STP-PT-017 Properties for Composite Materials in Hydrogen Science

STP-PT-021 Nondestructive Testing and Evaluation Methods for Composite Hydrogen Tanks

STP-PT-023 Guidelines for In-Service Inspection of Composite Pressure Vessels

STP-PT-043 Flawed Cylinder Testing

STP-PT-064 Evaluation of Fracture Properties Test Methods for Hydrogen Service



# ASME Events

- Pressure Vessels & Piping Conference (PVP)
  - <https://event.asme.org/PVP>
  - July 19-24, 2026 in Anaheim, CA
- International Pipeline Conference & Expo (IPCE)
  - [International Pipeline Conference & Expo \(IPCE\)](#)
  - September 21-25, 2026 in Calgary, AB
  - [IPCE 2026 Volunteer Interest Form](#)
- Catalyze
  - <https://catalyze.asme.org/>
  - June 17-18, 2026 in Detroit, MI



# Questions?

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