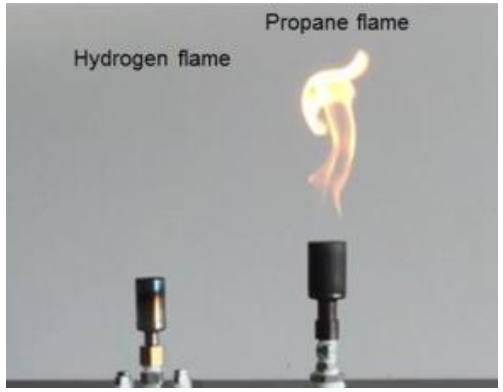
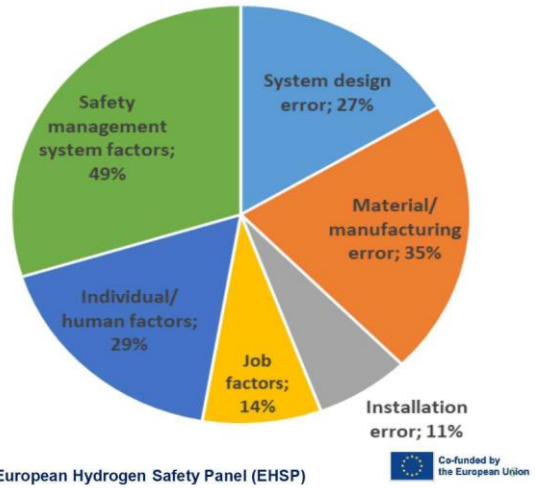
Current state of Standards in the Hydrogen Industry:
An ASME Perspective

October 2024

Hydrogen has unique challenges

- Hydrogen is a very flammable gas with unique chemical properties that pose critical challenges for safety standards
- In 2023, an EU study estimated that the majority of reported hydrogen release incidents in the US were caused by sudden equipment failures due to engineering faults
- Owing to ultra-low density, hydrogen storage vessels need to operate at up to 700 bar

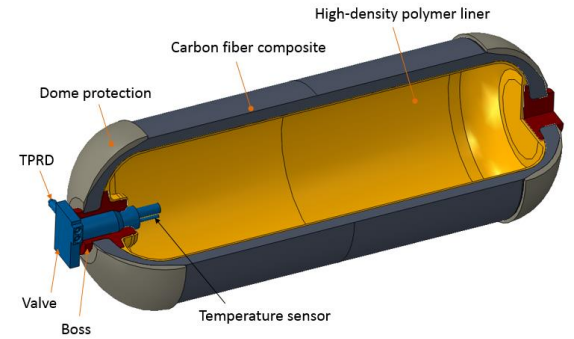




Causes (multiple entries per incident possible)

European Hydrogen Safety Panel (EHSP)

Co-funded by the European Union

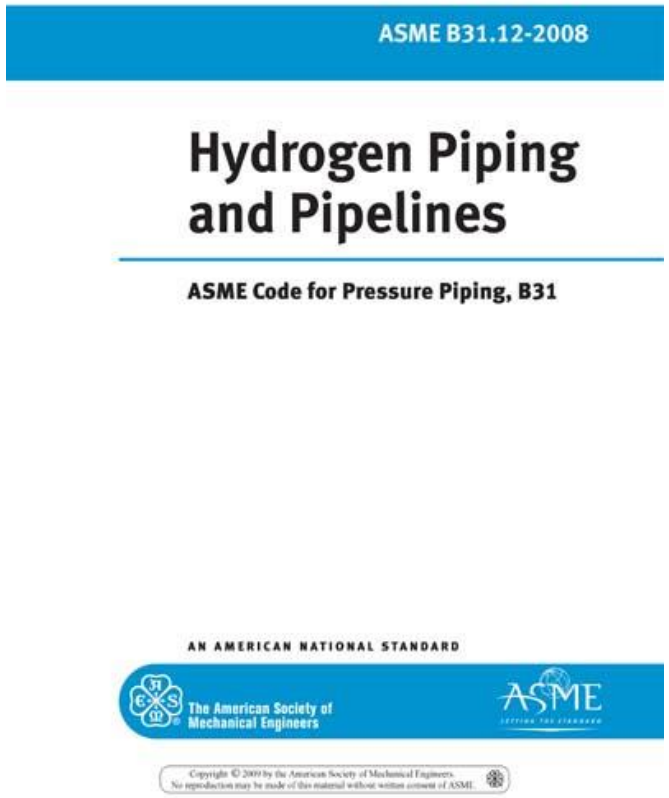


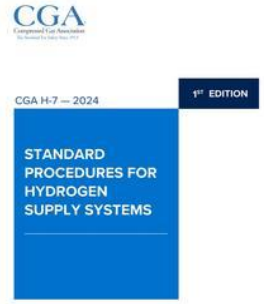
TPRD = Thermally Activated Pressure Relief Device

Credit: Process Modeling Group, Nuclear Engineering Division. Argonne National Laboratory (ANL)

What has been done so far?

- In 2008, ASME first released standard B31.12 for hydrogen piping and valves
- ASME is actively working to extend B31.12 to other components, such as expansion joints, as well as issuing updates for other standards to be explicitly for hydrogen use
- Other SDOs have issued safety, handling, and usage standards as well
- Working with govs in US and elsewhere to incorporate H2-specific standards into relevant codes





What is next to come?

- Implementation guidance: industry has asked for documentation on best practices for implementing hydrogen systems (particularly electrolyzers)
- Manufacturing & repair guidance: welding, inspection, etc. for Hydrogen equipment
- Interlocking standards: having a body of standards to draw on and inter-reference for more robust coverage
- Implementation of new materials: expansion of the BPVC to cover new materials and processes