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Guidelines to ASME Standards in Hydrogen Value Chains



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GUIDELINES TO STANDARDS IN HYDROGEN VALUE CHAINS

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FOREWORD

Development of hydrogen infrastructure, either newly built or retrofitting existing infrastructure has been one of the major challenges the industry is facing toward reaching the zero carbon goals. The need for assessment and alignment of industry standards in hydrogen value chains (production, transportation, storage, and end use) is well recognized. This guidance document has been developed to summarize the existing hydrogen-related standards (ASME and non-ASME).

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ABSTRACT

The repurposing of the existing infrastructure requires intensive evaluation. There are numerous programs worldwide that have been completed or are ongoing that address issues with such a transition. Although there is considerable data and information on the effects of hydrogen introduction into a natural gas network, it is recognized that the industry knowledge related to the assessment of materials, components, and equipment compatibility with hydrogen service, under various conditions is still continuously developing as knowledge is gained through ongoing laboratory research and testing programs, pilot studies, and early hydrogen deployment efforts.

Revisions to existing standards and guidelines, or an overall unified guideline is beneficial to support various practitioners in understanding the aspects required to ensure the safety of such networks and components. It is recognized that much of the existing hydrogen guidance was developed for new design, focused in many cases on pure hydrogen service. However, these standards and existing guidance may not address all considerations necessary for the conversion of existing infrastructure, for example considering blending of hydrogen in existing natural gas systems in lower concentrations.

The primary objective of this report is to provide a guidance document to be used by practitioners to better understand the standards and publications issued by ASME relevant to hydrogen service.

The scope of work summarized in this report includes identifying a list of documents ASME provides in relation to its Hydrogen Portfolio. For each product identified, the report provides a review to assess and characterize:

- Where the document lies on the hydrogen landscape.
- The audience the document is addressing, e.g., manufacturers, designers.
- Usability of the documents within the hydrogen industry landscape (high-level).
- Areas of confusion (if any) concerning the use of the documents.

1 PURPOSE AND USE

The intent of this guidance document is to:

- summarize the existing standards in hydrogen value chains
- identify relevant standards for specific hydrogen applications

The intent is to enable users to quickly identify the relevant Codes and Standards for their various applications. This guidance document is intended to provide high-level insights on the existing standards to various practitioners in hydrogen value chains such as engineers, managers, owners, system operators, manufacturers, the public, inspection parties, regulators, and other stakeholders. Standards published by other organizations such as API, ISO, AMPP (Formally NACE), and CGA are also discussed and included where relevant.