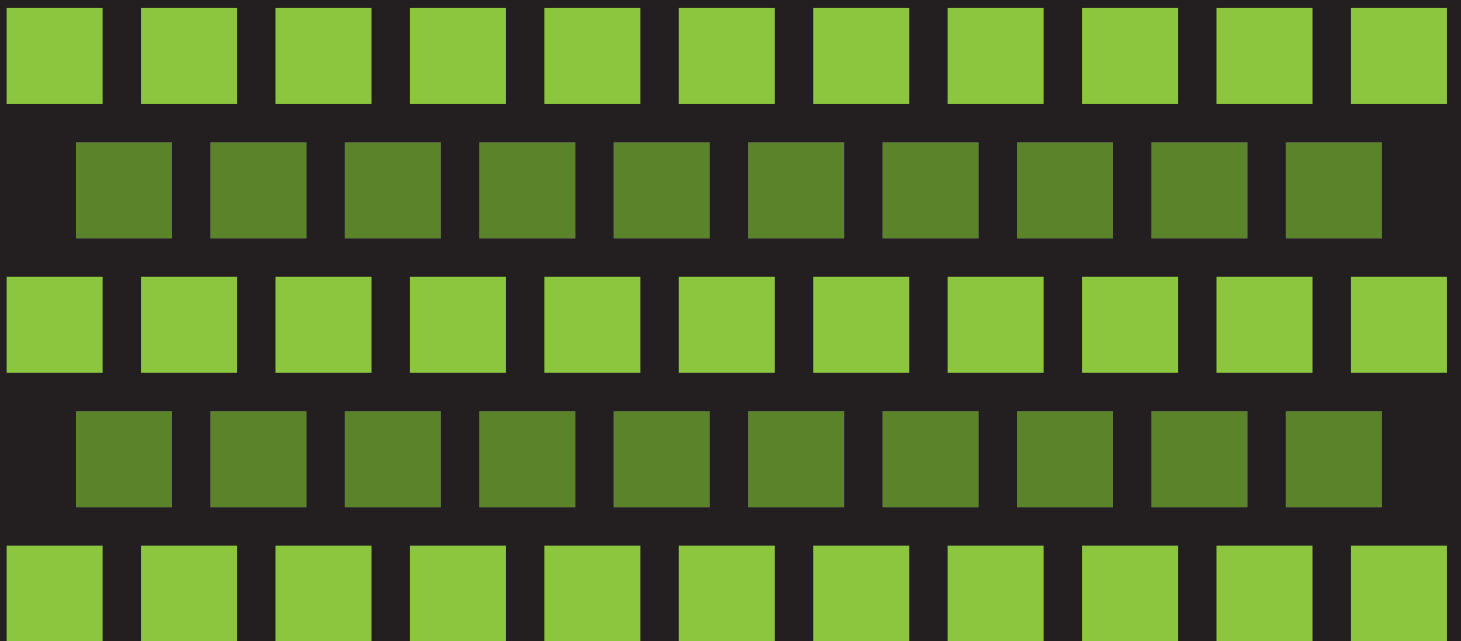


STP-PT-023

# GUIDELINES FOR IN-SERVICE INSPECTION OF COMPOSITE PRESSURE VESSELS



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## FOREWORD

Commercialization of hydrogen fuel cells, in particular fuel cell vehicles, will require development of an extensive hydrogen infrastructure comparable to that which exists today for petroleum. This infrastructure must include the means to safely and efficiently generate, transport, distribute, store and use hydrogen as a fuel. Standardization of pressure retaining components, such as tanks, piping and pipelines, will enable hydrogen infrastructure development by establishing confidence in the technical integrity of products.

Since 1884, the American Society of Mechanical Engineers (ASME) has been developing codes and standards (C&S) that protect public health and safety. The traditional approach to standards development involved writing prescriptive standards only after technology has been established and commercialized. With the push toward a hydrogen economy, ASME has adopted a more anticipatory approach to standardization for hydrogen infrastructure which involves writing standards with more performance based requirements in parallel with technology development and before commercialization has begun.

The ASME B&PVC Standards Committee appointed a project team to develop new Code rules for hydrogen storage and transport tanks to be used in the storage and transport of liquid and gaseous hydrogen and metal hydrides. Rules for gaseous storage tanks with maximum allowable working pressures (MAWPs) up to 15,000 psig (103 MPa) will be needed. Research activities are being coordinated to develop data and technical reports concurrent with standards development and have been prioritized per Project Team needs. This technical report has been developed in response to Project Team needs and is intended to establish data and other information supporting separate initiatives to develop ASME standards for the hydrogen infrastructure.

Established in 1880, the American Society of Mechanical Engineers (ASME) is a professional not-for-profit organization with more than 127,000 members promoting the art, science and practice of mechanical and multidisciplinary engineering and allied sciences. ASME develops codes and standards that enhance public safety, and provides lifelong learning and technical exchange opportunities benefiting the engineering and technology community. Visit [www.asme.org](http://www.asme.org) for more information.

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## **ABSTRACT**

This report describes the procedures and recommendations for in-service inspection of high pressure composite tanks made to ASME code requirements and used for the shipping or storage of hydrogen. For the in-service inspection of high pressure composite tanks, only external visual inspection is recommended. Internal visual inspection is optional and may be performed when it is not certain that only pure dry hydrogen has been shipped or stored in the tanks. For certain applications, safety rules or regulations may also require a hydrostatic pressure test of the tanks.

Guidelines are given for acceptable methods of visual inspection of high pressure composite tanks and for acceptance criteria for any indications that are found by the visual inspection. This report does not specify or provide guidelines for the frequency of performing the in-service inspection. The frequency of the in-service inspection is determined by the operational requirements or specified by other safety rules and regulations.