

Technical Meeting on Experience in Codes and Standards for Fusion Technology

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Recent advancements in pressure codes & standards for fusion power plants

The purpose of design codes and standards is to establish national or international standards that consist of a set of rules based on state-of-the-art knowledge, experience, and experimental feedback from facilities. The design and construction of any fusion reactor should make use of appropriate codes and standards to provide quality assurance and control for the structural integrity and safety of these plants, such as pressure vessels which cover vacuum vessels, breeder blankets, and high-pressure cooling components. The codes provide the bridge between different suppliers, participants, researchers, designers, manufacturers, and regulators. The documents can be viewed as a live document that are updated as better operational experience, knowledge, and scientific advancements become available.

The first edition of American Society of Mechanical Engineers (ASME) Boiler & Pressure Vessel (BPV) Section III Division 4 “Fusion Energy Devices” construction code and standard was released in June 2023. In 2024, Division 4 released its 5-year strategy to develop a construction code and standard for pressure vessels for fusion power plants. This marks the beginning of the activities, and one task is to write the materials qualification requirements to bring in “fusion-grade” structural materials within the Division for use in the future.

This presentation has three objectives: 1) provide update on the development of the codes and standards for fusion power plants 2) outline a proposal for the materials qualification route for Division 4 which outlines the testing requirements, standards, assessment methodologies, environmental effects such as corrosion and irradiation, and 3) update the fusion community on the work undertaken by Oxford Sigma in . The code must reflect the best practice and community needs/requests, and this talk will aim to ensure the community has a vision of how the design codes and standards that exist today, align and overlap with one another.

Technical Categories Addressed

Materials data

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