

Workshop: A Comparison of ISO 14692 and ASME NM.2 for FRP Piping

In this 2-hour workshop, Lukas Bajarunas from industry expert Dynaflow Research Group compares the design philosophies and calculation methods of ISO 14692 and ASME NM.2 for GRP/FRP piping systems. You will learn how performance-based design, regression testing (ASTM D2992) and stress analysis approaches differ between the codes, and how these differences affect allowable stresses, SIFs and piping flexibility results in practice.

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WHAT YOU'LL LEARN

Fibreglass Reinforced Plastic (GRP/FRP) piping systems are governed by different international standards, most notably ISO 14692 (first issued in 2002) and ASME NM.2 (first issued in 2018). While both adopt performance-based elements, their design philosophies and calculation procedures differ significantly.

In this workshop, Lukas Bajarunas, engineer at Dynaflow Research Group (Dynaflow being a founding member of the ISO 14692 certification committee), provides a structured comparison of the two codes. The session begins with general remarks on GRP code philosophy, highlighting the distinction between base performance requirements and fully performance-based design as applied in ISO 14692.

The four design routes in ASME NM.2 are explained namely: design by rules using allowables from ASME NM.3.3, long-term regression testing in accordance with ASTM D2992, short-term testing methods, and stress analysis supported by FEA. These are compared with ISO 14692 requirements, including differences in regression methodology, SIF treatment and load type factors.

A detailed case study compares design envelopes obtained using each method, followed by a piping flexibility example in CAESAR II demonstrating differences in SIF application and governing equations. The emphasis is on understanding how code selection directly influences calculated stresses and compliance margins. Participants will be taken through the qualification procedure for FRP piping conform ISO 14692-2 and can ask detailed questions to the instructor to ensure they leave with knowledge they apply in their future work.

SKILLS YOU'LL GAIN

- ✓ understand the underlying design philosophies of ISO 14692 (performance-based) and ASME NM.2 (performance-based and minimum performance system design);
- ✓ are familiar with the four design methods in ASME NM.2, including design by rules (ASME NM.3.3 allowables), long-term regression testing (ASTM D2992), short-term testing, and FEA-based stress analysis;
- ✓ understand why regression analysis is permissible in ISO 14692 and how this contrasts with ASME NM.2 approaches;
- ✓ can identify differences in stress intensification factors (SIFs), load type factors and allowable stress formulations between the two codes;
- ✓ are able to compare design envelopes generated using ISO 14692 and ASME NM.2 methods;
- ✓ understand how SIFs and code equations influence results in a piping flexibility study, including implementation in CAESAR II.

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ABOUT THE INSTRUCTOR

Lukas Bajarunas, MSc

Subject Matter Expert Fiberglass Piping

WHO THIS COURSE IS FOR

- ✓ Those involved in the design of an FRP piping system.
- ✓ Those involved in the stress analysis of an FRP piping system.

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COURSE CONTENT