

PD386
Design of Bolted Flange Joints

CEUs: .8
PDHs: 8
Number of Days: 1

Bolted flange joints are essential components for the design and operation of pressure vessels and piping. This one-day course provides a fundamental understanding of how to design bolted flange joints and predict their resulting behaviors. Practical examples and case studies are shared with a discussion of variables that can affect flange joints along with some remediation options.

Specifically, the course reviews the different flange types and facings used in pressure vessel and piping industries, along with the advantages and disadvantages of each. Participants will be introduced to the various ASME codes and standards applicable to flange design for pressure vessels and piping.

Recommended Reading:

Gaskets and Gasketed Joints, by John H. Bickford.

By participating in this course, you will learn how to successfully:

- Develop an awareness of flange types and the ASME codes and standards applicable for bolted flange joint design
- Enhance your knowledge for designing and analyzing bolted flange joints
- Explain how the flange design interacts with bolts and gaskets to achieve a leak tight joint
- Identify the parameters that can affect flange sealing along with methods to troubleshoot and remediate flange leakage

Course Requirement

Scientific calculators are required for course exercises

Course Materials (included in purchase of course)

- Digital **course notes** via ASME's Learning Platform

Who Should Attend

Engineers involved in the design, design review and/or maintenance of pressure vessels and piping integrity utilizing flanged joints in the petroleum, refining, chemical, power, and process industries.

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Day One

- Codes Addressing Flange Design
 - Discuss how the various Code sections address the design of flange joints and the applicability of flange standards
 - Vessels: ASME Section VIII, Div 1, Div 2; Section I; Section III
 - Piping: ASME B31.3, B31.1, B31.4, B31.8
- Flange Standards
 - Discuss the ASME flange standards, their basis, applicability and how they are used within the structure of the ASME Codes and Standards
 - ASME B16.5
 - ASME B16.47 (API, MSS)
- Strength Design Methods
 - Raised face flanges: ASME design methodology and basis
 - Flanges with metal-to-metal contact outside of the bolt circle: ASME design methodology and basis
 - Flanges with full-face gaskets: published methods for design
 - Design for external loads: discuss various methods of designing for external loads
- Design for Leakage
 - PVRC method: background and basis of the PVRC research on flange design for leakage including ASME design methodology and basis
 - New proposed code rules: overview of the new ASME design rules currently under development
- Flange Joint Analysis
 - Methods of flange joint analysis, interaction between the flange, bolts, and gasket
 - Behavior of flange joints: apply principles discussed by the use of a computer program
 - Examples: troubleshooting field problems