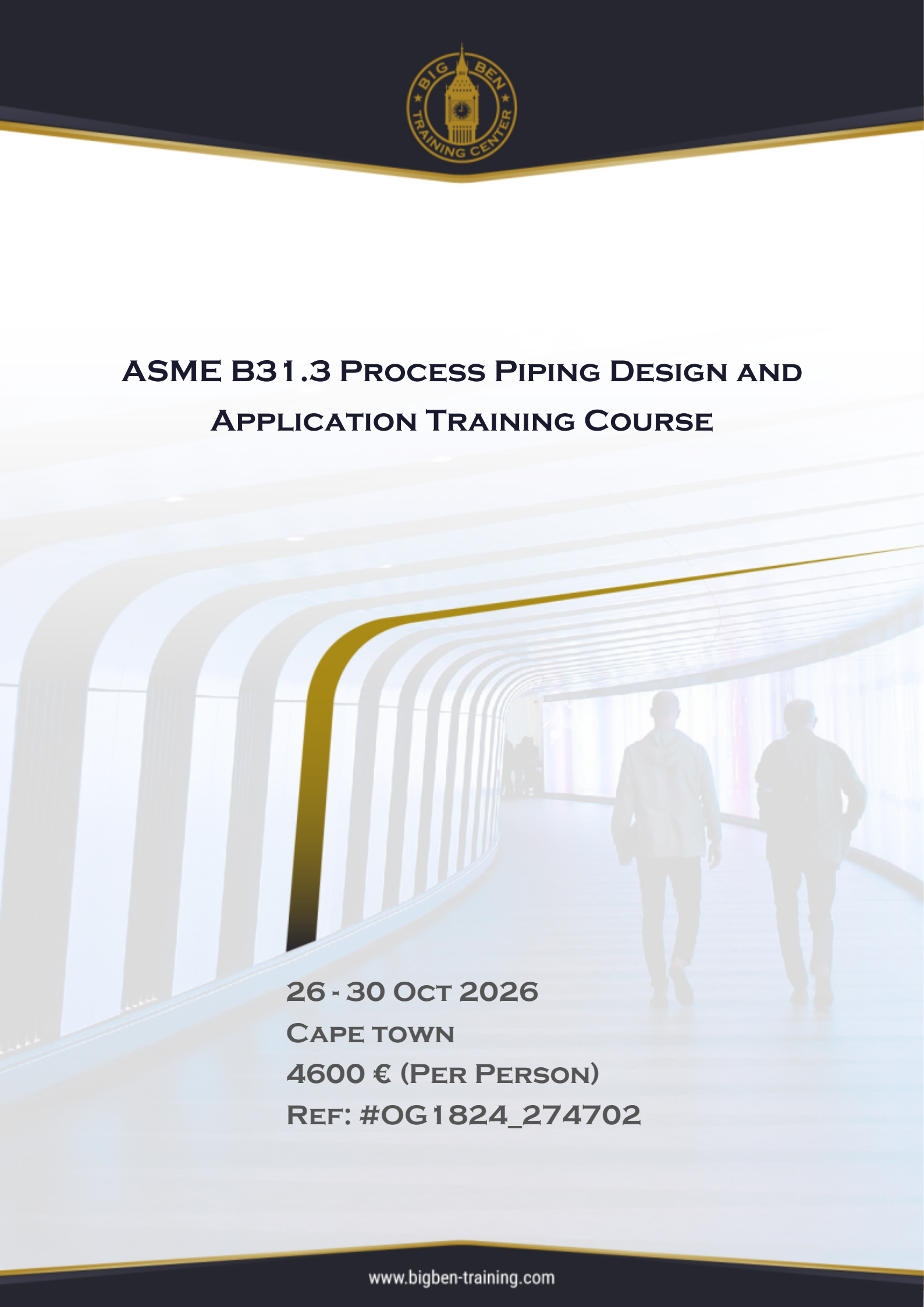
ASME B31.3 Process Piping Design and Application Training Course



26 - 30 Oct 2026

Cape town

4600 € (Per Person)

Ref: #OG1824_274702

Course Introduction / Overview:

This comprehensive training course provides an in-depth exploration of the ASME B31.3 Process Piping Code, the definitive standard for piping systems typically found in petroleum refineries, chemical plants, pharmaceutical facilities, and related processing plants. The course is meticulously designed to guide participants from fundamental principles to advanced applications, ensuring a thorough understanding of code requirements for design, materials, fabrication, examination, testing, and inspection. As highlighted by industry expert Charles Becht IV in his seminal work, "Process Piping: The Complete Guide to ASME B31.3," a deep and practical knowledge of this code is paramount for ensuring the safety, reliability, and integrity of process facilities. This program offered by BIG BEN Training Center moves beyond simple code recitation, focusing on the practical interpretation and application of the rules. Participants will engage with real-world scenarios, learning to navigate the complexities of pressure design, material selection, flexibility analysis, and compliance documentation. The curriculum is structured to empower engineers and technical professionals to make informed, code-compliant decisions that enhance operational safety and prevent costly failures, making it an essential investment for any organization committed to engineering excellence and risk management in their piping infrastructure.

Target Audience / This training course is suitable for:

- Piping Engineers and Designers.
- Mechanical and Project Engineers.
- Piping Stress Analysis Engineers.
- QA/QC Inspectors and Engineers.
- Plant and Facility Operations Professionals.
- Maintenance and Integrity Engineers.
- Engineering Managers and Supervisors.
- Regulatory Compliance Officers.

Target Sectors and Industries:

- Oil and Gas Production and Refining.
- Petrochemical and Chemical Processing.
- Power Generation and Utilities.
- Pharmaceutical and Biotechnology.
- Pulp and Paper Manufacturing.
- Water and Wastewater Treatment Facilities.
- Governmental bodies and regulatory agencies.
- Engineering, Procurement, and Construction (EPC) companies.

Target Organizations Departments:

- Engineering and Design.
- Project Management.
- Maintenance and Operations.
- Quality Assurance and Quality Control (QA/QC).
- Inspection and Non-Destructive Testing (NDT).
- Health, Safety, and Environment (HSE).
- Procurement and Supply Chain.
- Asset Integrity Management.

Course Offerings:

By the end of this course, the participants will have able to:

- Interpret the scope, definitions, and fundamental requirements of the ASME B31.3 code.
- Perform accurate pressure design calculations for pipes, flanges, and fittings.
- Select appropriate materials for various fluid services based on code criteria.
- Understand the requirements for fabrication, welding, and heat treatment.
- Apply principles of piping flexibility and stress analysis to prevent system failure.
- Develop and implement effective examination, inspection, and testing plans.
- Ensure proper documentation and record-keeping for code compliance.
- Navigate the specific requirements for different fluid service categories.

Course Methodology:

The training methodology at BIG BEN Training Center is designed to be highly interactive, practical, and engaging, ensuring that participants not only learn the ASME B31.3 code but also understand how to apply it effectively in their daily work. We believe in a blended learning approach that combines expert-led instruction with hands-on application. The course incorporates detailed presentations, interactive discussions, and problem-solving sessions where participants work through real-world design calculations and compliance scenarios. A significant portion of the training is dedicated to case study analysis, examining both successful piping designs and notable failures to extract critical lessons. Group workshops and collaborative exercises encourage peer-to-peer learning and allow participants to tackle complex problems, such as developing a testing plan or performing a basic flexibility analysis. Our experienced instructors facilitate these sessions, providing continuous feedback and guidance. This immersive learning environment ensures that theoretical knowledge is immediately reinforced with practical skills, empowering participants to return to their organizations with the confidence and competence to apply the ASME B31.3 code correctly and efficiently, thereby enhancing safety and reliability.

Course Agenda (Course Units):

Unit One Introduction to ASME B31.3 and Design Conditions

- Scope and applicability of the ASME B31.3 Process Piping Code.
- Understanding the code's structure, sections, and appendices.
- Defining design pressure and design temperature.
- Determining minimum design metal temperature (MDMT) and impact testing requirements.
- Introduction to fluid service categories and their implications.
- Overview of roles and responsibilities in piping design and construction.
- Key definitions and terminology used throughout the code.

Unit Two Pressure Design of Piping Components

- Calculating required pipe wall thickness for internal and external pressure.
- Design principles for standard and non-standard piping components.
- Reinforcement requirements for branch connections.
- Pressure design of flanges, blanks, and bolted connections.
- Analysis of closures, heads, and other pressure-containing parts.
- Understanding listed and unlisted components and materials.
- Practical workshops on performing pressure design calculations.

Unit Three Materials, Fabrication, and Examination

- Material selection criteria based on fluid service, temperature, and pressure.
- Understanding material specifications (ASTM, API) referenced in the code.
- Requirements for welding, preheating, and post-weld heat treatment (PWHT).
- Rules for bending, forming, and other fabrication processes.
- Methods and extent of required non-destructive examination (NDE).
- Acceptance criteria for welds and other fabricated components.
- Personnel qualification requirements for welding and NDE.

Unit Four Flexibility, Supports, and System Design

- Fundamentals of piping flexibility and thermal expansion.
- Formal flexibility analysis requirements and methodologies.
- Designing and selecting pipe supports, hangers, and restraints.
- Layout considerations for piping systems to manage stress.
- Analysis of sustained, occasional, and displacement loads.
- Simplified methods and computer-based stress analysis.
- Case studies on failures due to inadequate flexibility and support.

Unit Five Testing, Inspection, and Code Compliance

- Requirements for hydrostatic, pneumatic, and alternative leak testing.
- Procedures and safety precautions for pressure testing.
- Visual examination and in-process inspection requirements.
- Documentation, certification, and record-keeping for compliance.
- Overview of requirements for non-metallic and lined piping systems.
- Addressing Category M, High Pressure, and High Purity fluid services.
- Final course review and comprehensive Q&A session.

FAQ:

Qualifications required for registering to this course?

There are no requirements.

How long is each daily session, and what is the total number of training hours for the course?

This training course spans five days, with daily sessions ranging between 4 to 5 hours, including breaks and interactive activities, bringing the total duration to 20 - 25 training hours.

Something to think about:

Considering the increasing use of novel materials and higher operating pressures, how might the ASME B31.3 code evolve to address future challenges in process piping safety and integrity?

What unique qualities does this course offer compared to other courses?

This course distinguishes itself by moving beyond a theoretical recitation of code clauses to a deep, practical application-focused experience. While many courses explain *what* the ASME B31.3 code states, our curriculum emphasizes the *why* behind the rules, providing the engineering context and rationale that are crucial for sound decision-making. We achieve this through an extensive use of real-world case studies, analyzing both design triumphs and catastrophic failures to provide tangible lessons on the consequences of code interpretation. The program is built around interactive problem-solving workshops where participants don't just listen; they actively engage in design calculations, material selection exercises, and the development of inspection plans. This hands-on approach solidifies understanding and builds practical skills. Furthermore, our instructors are seasoned industry professionals who bring decades of field experience, offering insights and practical tips that cannot be found in textbooks. The focus is on developing a robust engineering judgment that allows participants to apply the code intelligently to complex, real-world scenarios, rather than simply learning to look up rules, ensuring a more profound and lasting mastery of the subject.