

# ASME B31 Piping, Construction, Inspection, Maintenance, Repair & Integrity Assessment & Re-Rating (ASME B31.3 & API 570)



## TRAINING METHODOLOGY

This interactive training course includes the following training methodologies as a percentage of the total tuition hours:-

- 70% Lectures
- 10% Workshops & Work Presentations
- 10% Practical Exercises
- 10% Software & General Discussions

The course instructor may modify the above training methodology before or during the course for technical reasons with no prior notice to participants

## TO REGISTER CALL NOW!

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### VISIT:

[www.worldwidetank.com.au](http://www.worldwidetank.com.au)

### EMIAL:

[admin@worldwidetank.com.au](mailto:admin@worldwidetank.com.au)

## WHO SHOULD ATTEND

This course is primarily aimed at persons aspiring to sit the American Petroleum Institute – ICP Examination for API 570, however this course provides an overview of all practical aspects and considerations of piping systems for those who are involved in the design, analysis, fabrication, installation, inspection, repair, pigging, rehabilitation, integrity assessment, maintenance or ownership of piping & pipeline systems. Engineers, Draftsmen, maintenance, inspection, quality assurance, and manufacturing personnel who work in the chemical, petrochemical, petroleum, utility, plastic processing, pulp and paper, and manufacturing fields will find it a time-saving means to broaden and update their knowledge of piping & pipeline systems. Those who must comply with Code requirements will benefit from the practical approach presented in this course in obtaining satisfactory and economical piping systems.



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## COURSE DESCRIPTION

This course provides a comprehensive coverage of the examination requirements Body of Knowledge along with ASME B31.3 Code requirements. It includes descriptions of important new requirements of ASME B31.3, including the philosophy behind the changes. Further, the course has been enriched with the latest requirements of the API 570. General topics in the course include: Code organization and intent, pressure design, design for sustained loads including support design, flexibility analysis, equipment loads, expansion joints, supports and restraints, materials, fabrication, examination, testing, and, for existing piping inspection, maintenance, repair, rehabilitation, and mechanical integrity. Applications of these concepts, including simple hand analysis methods and computer-based analysis methods using CAE-SAR II, will be demonstrated. Examples of the required analysis and sources of further information will be provided.

The course covers design, fabrication, examination and testing requirements of API 570/ASME B31.3. It covers Code requirements from design, as well as standards for inspection, integrity and repair of piping systems that have been in service, as provided in API 570. The course covers the practical aspects of piping integrity, maintenance and repair. Participants will be introduced to the technical basis of the ASME and API integrity rules, and their application and exercises. The participants will be able to recognize causes of degradation in-service, whether mechanically induced (pressure, vibration, fatigue, pressure transients, external damage) or due to corrosion (wall thinning, pitting, cracking), and apply integrity analysis techniques to make run-or-repair decisions.

The course provides a working knowledge of the Code, how it is organized, its intent, the basis for requirements, including both design and construction (fabrication, erection and testing) aspects. It provides a foundation of knowledge necessary for those responsible for assuring the mechanical integrity of existing systems, as well as those responsible for designing and constructing new systems. The participants will become knowledgeable in the technical basis and application of ASME B31.3, API 570.

Each session will be conducted in a lecture/discussion format designed to provide intensive instruction and guidance on understanding Code requirements, and also on developing an awareness of other considerations in the design, analysis, fabrication, installation, inspection, maintenance, repair and integrity assessment of piping and pipeline systems which is not covered by the Codes. There will also be a demonstration of computer software that can be used to assist in piping analysis.

Participants should bring calculators and Lap Top computers for working sample problems. Participants may wish to bring copies of the codes if they have copies available, but the course is designed such that it is not necessary for the participants to have copies of the Codes for reference.



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## COURSE OBJECTIVES

Upon the successful completion of this course, participants will be able to:-

- Apply an up-to-date knowledge and skills of the latest technology in piping & pipeline design, construction, inspection, maintenance, repair and integrity assessment in accordance with the latest ASME and API codes
- Design, analyze, fabricate and install new piping and pipeline systems according to the latest revision of ASME B31 Code and have a working knowledge of the Code, how it is organized, its intent, the basis for requirements and the philosophy behind the new changes
- Inspect, maintain, repair and assess the integrity of existing (in-service) piping and pipeline systems according to API 570 Code and recognise the causes of degradation, whether mechanically induced (pressure, vibration, fatigue, pressure transients, external damage) or due to corrosion (wall thinning, pitting, cracking)
- Implement the physical phenomena which affect the design of piping and pipeline systems including the ASME formulas and other methods by which these phenomena can be analyzed to determine resulting stresses, evaluation of those stresses relative to ASME code limitations, and the methods by which piping and pipeline systems are fabricated, inspected and tested
- Identify the technical basis of the ASME and API integrity rules and apply integrity analysis techniques to make run-or-repair decisions
- Make the right decisions for the development of new piping/pipeline pigging systems, the operation of existing systems and the selection of cleaning pigs and ILI tools

## DAY 1

0730 – 0800 Registration & Coffee

0800 – 0815 Welcome

0815 – 0900 Introduction

0900 – 1000

Course overview & Study Plans

1000 – 1015 Break

1015 – 1045

Code Tab Settings

WTS will issue you with 'TABS' to facilitate ease of finding code references in ALL referenced Codes required for the examination.

1045 – 1230

Review of API 570 Body of Knowledge

1230 – 1330 Lunch

1330 – 1445

ASME B31.3 Process Piping Overview

1445 – 1500 Break

1500 – 1620

Codes & Standards – ASME - API

1620 – 1720 Examination Questions

1720 – 1730 Distribute Homework

1730 End of Day One



# ASME B31 Piping, Construction, Inspection, Maintenance, Repair & Integrity Assessment & Re-Rating

## DAY 2

0730 – 0800 Coffee – Homework Review  
0800- 1000

Metallic Pipe & Fitting Selection, Piping System Failure, Bases for Selection, Listed versus Un-listed Piping Components, Fluid Service Requirements, Pipe, Fittings, Branch Connections, Flanges, Gaskets, Bolting, Flanged Joints

1000 – 1015 Break

1015 – 1230

Materials – B31.3 Chapter II Design, Chapter III Materials, Appendix A - Allowable Stresses & Quality Factors – Metals Appendix F - Precautionary Considerations

1230 – 1330 Lunch

1330 – 1445 Pressure Design  
Design Pressure & Temperature  
Quality Factors  
Weld Joint Strength Factor  
Pressure Design of Components  
Four Methods  
Straight Pipe

1445 – 1500 Break

1500 – 1620

Pressure Design  
Fittings  
Fabricated Branch Connections  
Flanges and Blanks  
Other Components  
Piping Material Specifications

1620 – 1720 Examination Questions

1720 – 1730 Distribute Homework

1730 End of Day 2

## DAY 3

0730 – 0800 Coffee

0800 – 0815 Homework Review

0815 – 1045

Valves - Code Requirements  
Selection by Valve Type

- Gate
- Globe
- Check
- Butterfly
- Ball
- Plug
- Pinch
- Diaphragm

1045 – 1230 Flexibility Analysis

1230 – 1330 Lunch

1330 – 1445

Sustained loads  
Cause primary stresses  
Failure modes  
Design criteria

1445 – 1500 Break

1500 – 1620

Displacement Loads  
Cause secondary stresses  
Failure modes  
Design criteria  
Reaction design criteria  
Flexibility Analysis Example

1720 – 1730 Distribute Homework

1730 End of Day 3



# ASME B31 Piping, Construction, Inspection, Maintenance, Repair & Integrity Assessment & Re-Rating

## DAY 4

0730 – 0800 Coffee

0800 – 0815 Homework Review

0815 – 0900 Layout & Support

0900 – 1000

Flexibility - Reactions General Considerations, Friction, Stress Intensification, Elbow Flexibility, Thermal Expansion, Spring Hangers, The Displacement Load Analysis, Elastic follow-up, Fixing Problems, Cautions

1000 – 1015 Break

1015 – 1045

Designing with Expansion Joints Types of Expansion Joints, Pressure Thrust, Installation of Expansion Joints, Metal Bellows Expansion Joints, Other considerations

1045 – 1230 Fabrication & Installation

1230 – 1330 Lunch

1330 – 1445

Inspection, Examination & Testing Inspection Examination, Methods, Requirements, Acceptance Criteria  
Leak Testing, Methods, Requirements

1445 – 1500 Break

1500 – 1620

Piping Systems - Instrument Piping, Pressure Relieving Systems

1620 – 1720 Non-Metallic Piping

1720 – 1730 Distribute Homework

1730 End of Day 4

## DAY 5

0730 – 0800 Coffee

0800 – 0815 Homework Review

0815 – 0900 Category M Piping

0900 – 1000 High Pressure Piping

1000 – 1015 Break

1015 – 1045 In-Service Piping

1045 – 1230 Code Interpretations

1230 – 1330 Lunch

1330 – 1445 Exam Questions

1445 – 1500 Break

1500 – 1720 Exam Questions

1720 – 1730 Certificate Presentation

1730 End of Day 5

### Dress Code:

Smart casual wear is suggested along with a sweater or jacket in case the conference room is cool.

### Payment Terms:

Payment must be made prior to the event or admittance will not be permitted. A tax invoice and confirmation letter will be emailed to the attendee upon completion of a valid registration. Payment may be made by EFT, cheque or credit card.