



# ASME B31.3 PROCESS PIPING

**COURSE DURATION: 6 DAYS**

## COURSE DESCRIPTION

This 6-day specialist course provides complete comprehensive coverage of ASME B 31.3 – Process Piping Code requirements for the **design, construction and integrity of process piping systems**. The course includes the new requirements of the **new edition** of ASME B 31.3 – 2016. The course is designed to engineer the participants into becoming a complete ASME Code professional and apply the code in the **design, analysis, fabrication, erection and testing** of process piping systems.

## KEY AREAS/TOPICS TO BE COVERED

- Deep coverage on the scope of process piping systems, organization and intent of the code, fluid service categories, selection of piping components, pressure design of pipe and fittings, valve selection, selection of flanges & gaskets, branch connections, selection of piping materials as per the code requirements, piping flexibility requirements, flexibility methods and calculations, material considerations and requirements, fabrication, Examination and testing requirements for metallic piping systems.
- Detailed insight is provided into code requirements for the design of non-metallic piping systems, category M fluids, high pressure piping systems & high purity piping systems.
- Piping flexibility analysis concepts will be explained in great detail using software CAESAR – II, and a complete analysis will be demonstrated detailing the effects of Thermal expansion loads, use of supports & restraints, consideration of SIF factors for piping joints, introducing expansion loops for flexibility, & discussion of sustained load considerations.
- Cover selection of flanges and requirements of ASME B 16.5 as well as standards for inspection and repair of piping systems that have been in service, as provided in API 570, Piping Inspection Code.
- A foundation of knowledge necessary for those responsible for assuring the mechanical integrity of existing piping systems, as well as those responsible for designing and constructing new piping systems.

The participants will use the ASME Code equations and Data tables at the end of each session and work on sample problems including identifying fluid service categories, design pressure and temperatures, component selection, pipe wall thickness calculation, flexibility calculations, material selection, pressure testing calculations, support span calculations, calculation of stresses, introducing flexibility in piping systems, expansion loop sizing, valve selection, P-T ratings, remaining life calculations & MAWP of piping systems.



## WHO SHOULD ATTEND?

- Piping engineers, Piping designers, Pipe stress engineers, Senior Draftsmen working for EPC companies & Design Offices.
- Maintenance, QA/QC personnel, Piping Inspectors working for Process plants including Oil & Gas, Chemical, Petrochemical, Steel, Paper & Pulp, Semi-conductor, Cryogenic, Water & Food Processing, Pharmaceutical, Cement, Utility & Textile plants.
- Managers, Engineers, Supervisors and Plant Operation Personnel working for Process Plants.



## COURSE OBJECTIVES

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

- ✓ Have a very good background on the scope & definition of ASME B31.3, process piping design, construction & mechanical integrity
- ✓ Understand metallic pipe and fitting selection including its system failure, bases for selection and method requirements
- ✓ Identify the strengths of materials including its requirements and be able to identify the bases for design stresses
- ✓ Determine the components of pressure design and be able to know the concepts of weld joint strength factor and design pressure & temperature
- ✓ Know the process of valve selection and be able to list the requirements needed for the selection process
- ✓ Become familiar with the design of flanged joints and be able to describe its features & functions
- ✓ Introduce flexibility & flexibility analysis and able to explain the general considerations for the layout and support of pipes, Learn the various types and designs of expansion joints and be able to describe their components and use
- ✓ Understand the fabrication and installation methods of piping system and be able to list the requirements and guidelines needed in the inspection, examination and testing of pipes
- ✓ Know the design, fabrication, installation, inspection, examination and testing methods for nonmetallic piping systems, category M Fluid service, high pressure piping & high purity piping systems
- ✓ Review the concept of API 570 including its inspection, repair, alteration and rerating of in-service piping

## COURSE OUTLINE

The following program is planned for this course. However, the course instructor(s) may modify this program before or during the course for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met.

### DAY 1 & 2 (TRAINER: LUTZ SEIBT)

#### Welcome & Introduction

##### Introduction

- General Definitions, Piping Design Method, Piping System Standards, B31 Committee Organization, B31.3 Scope, Organization of the Code, Fluid Service Definitions

#### Metallic Pipe and Fitting Selection

- Piping System Failure, Bases for Selection, Listed versus Unlisted Piping Components, Fluid Service Requirements, Pipe, Joining Method, Fittings, Branch Connections, Flanges, Gaskets, Bolting



### COURSE DURATION

- 6 Days Training

### DAILY SCHEDULE

- 8:30am - 5:30pm

### ITEMS TO BRING

- ASME B31.3 (2016 Edition)
- ASME B16.5 (2017 Edition)
- API 574 (Recommended)  
(Codebooks in Hardcopy Recommended)
- Scientific Calculator
- Lots of Questions
- A "CAN-DO" Attitude

**Stationeries such as pen and highlighter will be provided.**



## Overview of ASME B 16.5 Flange Requirements

- Scope, P-T Ratings, Material Selection, Dimensions, Material Specifications, and Temperature Considerations

## Materials

- Strength of Materials, Bases for Design Stresses, B31.3 Material Requirements

## Pressure Design

- Design Pressure and Temperature, Quality Factors, Weld Joint Strength Factor, Pressure Design of Components

## DAY 3 & 4 (TRAINER: MD. KAMAL)

### Valves Selection

- Code Requirements, Selection by Valve Type

### Introduction to Flexibility Analysis

- What are we trying to achieve?, Sustained loads, Displacement Loads, Reaction Design Criteria, Flexibility Analysis Example

### Layout & Support

- General Considerations, Support Spacing, Support Locations, Support Elements, Fixing Problems

### Flexibility

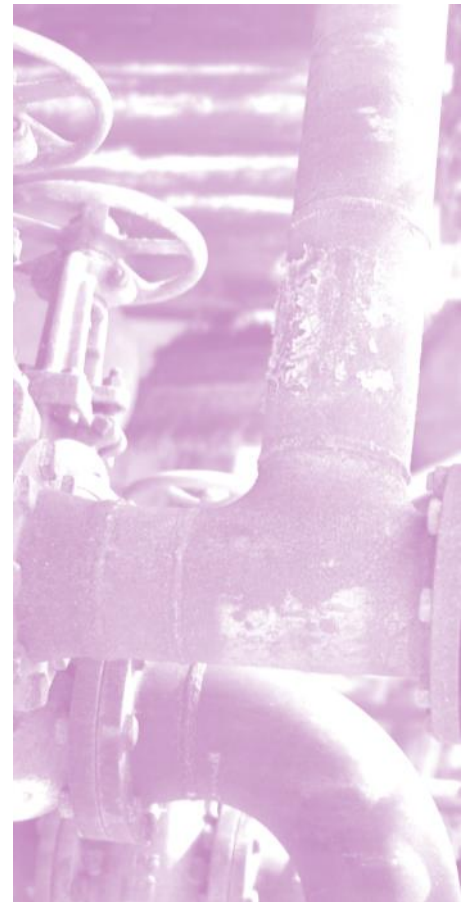
- General Considerations, Friction, Stress Intensification, Elbow Flexibility, Thermal Expansion, Spring Hangers, The Displacement Load Analysis, Elastic Follow-Up, Fixing Problems, Cautions

### Reactions

- General Considerations, Fabricated Equipment, Rotating Equipment, Supports, Flanged Joints, Cold Spring

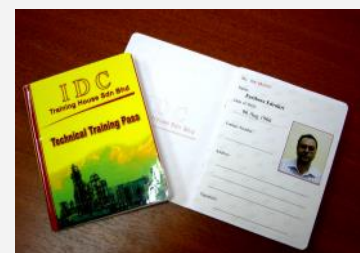
### Flexibility Analysis

- When to Perform a Detailed Analysis, Computer Program Attributes, Considerations, Solving Problems, Typical Errors, Sample Computer Flexibility Analysis – CAESAR II



**BONUS !!!**

**Technical Training Passes will be provided**



### Designing with Expansion Joints

- Types of Expansion Joints, Pressure Thrust, Installation of Expansion Joints, Metal Bellows Expansion Joints, Other Considerations

## DAY 5 (HALF-DAY MORNING, TRAINER: MD. KAMAL)

### Category M Fluid Service

- Design, Fabrication and Installation, Inspection, Exam and Testing

### High Pressure Piping

- Design, Fabrication and Installation, Inspection, Exam and Testing

### High Purity piping

- Basics of High Purity Piping & Non Metallic Piping System

## DAY 5 (HALF-DAY AFTERNOON, TRAINER: LUTZ SEIBT)

### Fabrication & Installation

- Welder/Brazer Qualification, Welding Processes, Weld Preparation, Typical Welds, Preheating and Heat Treatment, Bending and Forming, Typical Owner Added Requirements, Installation
- Inspection, Examination, Testing
- Responsibilities
- Inspection Acceptance Criteria
- Progressive Sampling Concept
- Extent of Required Examination
- Leak Testing

### Summary, Open Forum, Closure

## DAY 6 (TRAINER: LUTZ SEIBT)

### Practical Example + Examination



### TRAINING METHODOLOGY

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

- 60% Lectures
- 30% Courses, Group Work & Practical Exercises
- 10% Videos & Software



## TRAINER'S PROFILE

# LUTZ SEIBT

**Lutz Seibt has more than 20 years hands-on experience as an Authorized Inspector and Auditor acc. to German Pressure Vessel (AD Merkblaetter), Boiler (TRD) and Storage Tanks Codes, Pressure Equipment Directive (PED), Transportable Pressure Equipment Directive (TPED) and European Construction Material Directive; 9 years out of it within TUV's International Business Unit in Asia Pacific.**

He has conducted numerous training sessions related to Pressure Equipments (based on American and European standards) in Malaysia, Singapore, Korea, China, Thailand and Vietnam.

## TECHNICAL QUALIFICATIONS

- ✓ Certified International Welding Engineers (International Institute of Welding - IIW, Germany)
- ✓ Certified API 510 Pressure Vessel Inspector
- ✓ Certified API 570 Piping Inspector
- ✓ Certified API 577 Advanced Welding Inspection & Metallurgy Professional
- ✓ Certified Pedestal Crane Inspector acc. to API RP 2D (Cranetech Training & Inspection, Inc., USA)
- ✓ Certified Safety Engineer (Fachhochschule Frankfurt, Germany)
- ✓ Environmental Auditor (Technical Academy Esslingen, Germany)
- ✓ Bachelor Degree – Motor Vehicle Engineering

## SPECIAL SKILLS

- ✓ Inspector for periodical inspection & certification of
  - \* Pressure vessels, Steam boilers, Piping Systems
  - \* Cranes, Hoisting equipment, Hoisting equipment of lifeboats
- ✓ Inspector for third party & welding inspection and QA/QC in manufacturing / construction of
  - \* Pressure vessels, Steam boilers, Piping Systems

## COURSES CONDUCTED

- API 510 Pressure Vessel Inspector
- API 570 Piping Inspector
- API 577 Advanced Welding Inspection & Metallurgy Professional cum IDC Welding Inspector
- ASME IX "Welding Qualification"
- ASME VIII Division 1 "Pressure Vessel"
- European Pressure Equipment Directive (PED) 97/23/EC Simplified
- IDC Piping Specialist - Part 1: ASME B31.3 Process Piping
- Leak or Pressure Testing of Pressure Equipment
- Material Certificates (EN10204 / EN10168 / ISO10474)
- Welding & NDT Symbols (AWS / ISO Code)





## TRAINER'S PROFILE

# MD. KAMAL

**Md. Kamal Uddin Ahmed, B.E.( Mechanical Engineering ) is a Senior Piping & Pipeline Engineer with 15-20 years of progressive & extensive international experience. He is an expert in Process, Power Piping & Liquid & Gas Transmission Pipelines as per ASME & API standards including ASME B1.1, B31.3, B31.4, B31.8, & API 570.**

He is a dynamic speaker & master trainer providing knowledge transfer effectively with interactive style that connects with the audience.

Md. Kamal has designed & presented piping design seminars to piping engineers & designers across India, Qatar & Saudi Arabia. He has trained more than 1500 mechanical, chemical, & petroleum engineers in Piping Engineering, Pipeline Design, HVAC & Plumbing Systems from different countries including India, Qatar, Saudi Arabia, Jordan, Turkey, Sudan, Ghana, Nigeria, Maldives, United Kingdom, & Thailand.

## CLIENTS SERVED

Md. Kamal has offered professional training services to many corporate including:

- ORYX GTL Qatar
- ICB Tecnimont, Qatar Petroleum
- RASGAS
- Intergraph Consulting
- Infotech Enterprises
- Petrodar Oil & Gas Operating Co.

## EXPERTISE IN

- ✓ Piping Systems Detailed Engineering
- ✓ Pipe Stress Analysis
- ✓ Pipe Hydraulics
- ✓ Process Plant Layout
- ✓ Pipeline Design & Construction
- ✓ Pipe Supports
- ✓ Piping Systems Erection & Testing
- ✓ HVAC Plant Design
- ✓ Plumbing & Fire Water Piping Systems

Throughout his career, Md. Kamal has been providing these expertise for both new and operating process / power plants & facility construction industry using codes / standards, software analysis and field experience in arriving at safe, economical piping designs and solutions to piping problems.

Besides, Md. Kamal has also offered his services such as:

- ✓ Project Management
- ✓ Design / Analysis
- ✓ Construction / Testing / Inspection

in **India & Kingdom Of Saudi Arabia** involving many onshore & offshore projects.