



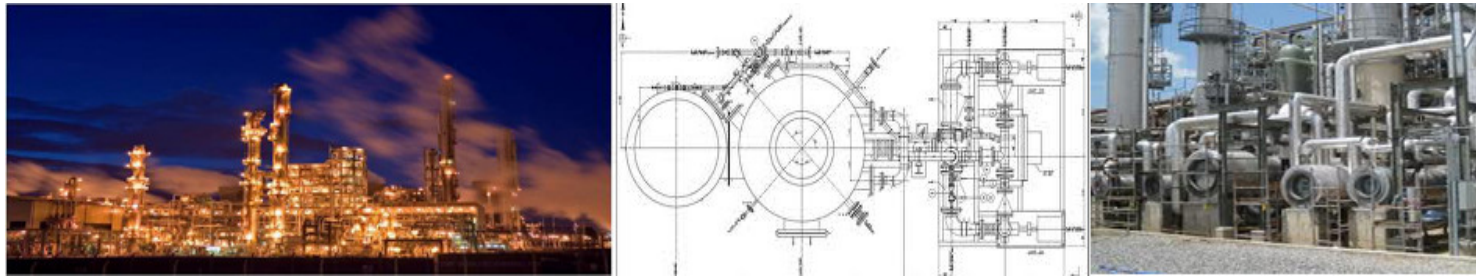
Energizing Engineering - Empowering Engineers



ISO 9001 : 2008

# Institute of Piping Engineering & Building Services

P. G. DIPLOMA CERTIFICATE - ONLINE TRAINING COURSE



## PROCESS PIPING DESIGN & CONSTRUCTION - ASME B 31.3

**Course Co-Ordinator:**

Mr. S. Tabraz  
Piping Engineering Head  
International Course Speaker

**IPEBS**

# 206, 02<sup>nd</sup> Floor, B – Block, Mayur Kushal Complex, Abids,  
Beside Chermas Showroom, Hyderabad. 500001. Telangana (INDIA).

Contact: +91- 9885946711

Email: [info@ipebs.in](mailto:info@ipebs.in)

Web: [www.ipebs.in](http://www.ipebs.in)

## **ABOUT IPEBS**

**IPEBS** was established with a vision to offer proactive training & consulting services for design, construction, Inspection, Operation & Maintenance of Process Plants & Building Services including

- a) Process Plant Engineering: Plant 3d-Modelling, Process Equipment, Piping Engineering, Pipeline Engineering, Valves, Rotating Equipments, Piping QA/QC & Inspection.
- b) Electro-Mechanical Building Services (MEP 3d Modeling, HVAC, Plumbing, Fire Protection & Electrical Systems)

## **IPEBS - CONSULTING**

**IPEBS** team comprises of engineers and designers having extensive real time experience in the design, construction, inspection, Operation & Maintenance of Process Plant Engineering and Building Services.

## **IPEBS - TRAINING**

Thousands of Engineers, Designers, Draftsman and Technicians have attended **IPEBS** training programs. On a national basis, **IPEBS** is now unquestionably the number one professional Plant Engineering, Piping Engineering & MEP course provider.

## **ABOUT TRAINING PROGRAM**

This is a comprehensive program designed to present all major topics relative to the Piping Fundamentals, Piping Drawings, Layout Engineering Pressure Design, Piping Construction & Supports.

The specialist faculty for the contact classroom training program for Process Piping Design & Construction – ASME B 31.3 has been conducting the course at **IPEBS** for last 12 years with successful completion of over 100 batches and over 5000 trained professionals from across the globe, who are today working at major oil & gas owners, EPC companies & Consultants.

The **Online Training Course** is developed by the faculty of **IPEBS**, who are International Course Speakers and have more than 20 years work & training experience individually.

## **PROGRAM FEATURES**

- ✓ In-depth course content for easy understanding.
- ✓ Blended Learning: Online contact with faculty.
- ✓ Accessibility to Course Faculty & Counseling Services.
- ✓ Job oriented training program.
- ✓ Student will be job ready, after the course.
- ✓ Student will acquire skills and knowledge similar to working professional.

## **WHO SHOULD ATTEND**

- **Graduating College Students in the following disciplines**

- ✓ Mechanical Engineers
- ✓ Chemical Engineers
- ✓ Petroleum Engineers
- ✓ Production / Industrial Engineers
- ✓ Diploma / ITI

- **Working Professionals**

- ✓ Piping Design / Layout Engineers
- ✓ Piping 3D Cad Engineers
- ✓ Pipeline Engineers
- ✓ Offshore Platform Engineers
- ✓ Piping Draftsman
- ✓ Piping Construction Engineers
- ✓ Piping Fabrication Engineers
- ✓ Piping Supervisors
- ✓ Piping Stress Engineers
- ✓ Piping QA / QC Engineers

- **Corporate / Organizations**

- ✓ EPC Companies
- ✓ Piping Equipment Manufacturing Companies
- ✓ Piping Consultants
- ✓ Piping Contractors
- ✓ Thermal Power Plants Industry
- ✓ Ship Building / Marine Industry

## **COURSE MODULES:**

- ✓ **Piping Fundamentals**
- ✓ **ASME Codes & Standards**
- ✓ **Pipe Fittings**
- ✓ **Flanges & Gaskets**
- ✓ **Valves**
- ✓ **Piping Special Elements**
- ✓ **Piping Materials**
- ✓ **Mechanical Equipments**
- ✓ **Process Flow Diagrams**
- ✓ **Instrumentation & Controls**
- ✓ **Plot Plan & Equipment Layout**
- ✓ **Piping Material Specifications**
- ✓ **Piping Study & Piping Layout**
- ✓ **Piping Isometrics**
- ✓ **Piping Spools**
- ✓ **Pipe Supports & Pipe Rack**
- ✓ **Piping Insulation**
- ✓ **Pressure Design of Piping Components**
- ✓ **Piping Fabrication & Construction**
- ✓ **Fabrication & Installation Requirement of ASME B 31.3**
- ✓ **Inspection & Testing of Piping Systems**
- ✓ **Inspection, Examination & Testing Requirements of ASME B 31.3**

## **Course Content:**

### **Piping Fundamentals**

- Introduction to Process Plants
- Difference between Code and Standards
- Scope of Piping in Projects.
- Plant Piping Systems and Transportation Pipelines.
- Definition & Application of Pipe
- Difference between pipes and tubes,
- Pipe Designators – NPS , IPS , NB, Pipe Wall Thickness & Schedule, Pipe Weights, Lengths, Grades, Ends, Joining Methods, Methods of Manufacture, Pipe Ratings, Pipe Symbols.
- ASTM Specifications of pipes.

### **ASME Codes & Standards**

- Introduction to ASME Pressure Piping Design Codes.
- ASME Standards for Common Piping Elements.
- API Codes.
- Other Codes & Standards.

### **Pipe Fittings**

- Types of Fittings – Butt Weld, Screwed & Socket Weld.
- Elbow – 90 degree (LR & SR), 45 degree, Reducing Ell, Elbow Representations on drawings, different views, drawing call outs .
- Pipe Bends – Miter Bends, Miter types, Miter angle determination, Miter stress requirements, 180 degree Return, Representations on drawings.

- Branch Connections – Weld Straight & Reducing Tee, Cross & Lateral. Representations on drawings, drawing call outs.
- Reducers – Concentric & Eccentric, Reducer Offsets Representations on drawings, Drawing call outs.
- Eccentric reducer applications, offset calculation.
- Stub Ends, Stub end types: Long, Short, Class A, Class B Representations on drawings, Application of Stub Ends.
- Fabricated Branch Connections – Stub in & Stub On, Representations on drawings, Welding Minimums for Stub In.
- Branch Reinforcements – Reinforcing Pad, Welding Saddle, Representations on drawings, Drawing call outs.
- O let Fittings – Weldolets, Sockolet, Thredolets, Latrolet, Elbolet & Sweepolet, Nipolet, Flangolet Representations on drawings.
- Types of Couplings: Full coupling, Reducing coupling, Half coupling, Representations on drawings, Drawing call outs.
- Weld Cap, Plug, Representations on drawings, Drawing call outs.
- Fitting Makeup – Dimensioning, Placement of Dimensions.
- Minimum Pipe length requirements.
- Screwed & Socket Weld Fittings – Union, Plug, Coupling, Types of couplings, coupling applications. Types of Swages, Swage end configurations. Swage applications.
- Classes of Screwed & Socket Weld Fittings
- Dimensioning Exercises

## **Flanges & Gaskets**

- Definition of Flange.
- Types of Flanges and Application, P-T. Ratings. – Forged Steel and Cast Iron Flanges.
- Flange Facings – Flat Face, Raised Face, RTJ, & Male - Female, Tongue & Groove. Flange Face Finish types, application.
- Weld Neck, Slip On, Threaded, Socket Weld, Lap-Joint, Reducing, Blind & Orifice Flanges.
- Flange considerations by a Piping Engineer and by Code. Bolt hole requirements. Bolts & Nuts types.
- Gaskets – Types, Thickness, selection requirements
- Flange selection exercise.
- Dimensioning Exercises.

## **Valves**

- Definition.
- Valve Functions, P-T Ratings, Difference in Valve and flange Ratings, Valve Tag numbers, Locations & End Connections.
- Valve Types – Gate, Globe, Ball, Check, Butterfly, Angle, PRV/PSV, Plug, Control Valve, Diaphragm, Needle, Piston, Flush bottom, 3-Way, 4-Way etc.
- Control Valve Manifold: Types, Function, Layout types, Representation & Requirements on Flow Diagrams and Layouts.
- Valve Operators.
- Valve Data Sheet preparation and understanding.
- Valve Trim.
- Valve Selection.
- Valve Layout Considerations.
- Dimensioning Exercises.

## **Piping Special Elements**

- Strainers
- Bellows/Expansion Joints.
- Rupture Disc.
- Spectacle Blind.
- Blanks.
- Spacers.
- Steam Traps.
- Flame Arrestor.
- Vortex Breaker.

## **Piping Material Specification (PMS)**

- PMS and its requirements,
- Piping Specifications / Material Selection / P-T ratings / Valve Data / Branch table / Abbreviation details.
- PMS Application/Use by various departments

## **Mechanical Equipments**

- Static – Horizontal Vessels, Distillation columns, Storage Tanks, Heat Exchanger & Re boiler, Fired Heaters, Reactors, Cooling Towers
- Rotary – Pumps, Compressor, Fans
- Vessel trim

## **Process Flow Diagrams**

- Block flow Diagrams-BFD
- Process Flow Diagram – PFD
- Utility Flow Diagram- UFD
- Piping & Instrumentation Diagram – P & ID
- Line Numbering

- Line Number requirements
- Piping Tracing (Jacket Piping, Steam/Electric tracing)
- P& ID Requirements,
- Line Designation table/ Line list creation from P & ID
- Print Reading Exercise
- Flow Diagram Exercises
- Symbols & Abbreviations
- Equipment vendor data/PDS
- Instrument Types & Symbols – Flow, Temp, Pressure & Level
- Instrument Hook-up Drawing

### **Instrumentation & Controls**

#### **Plot Plan & Equipment Layout**

- Plot Plan Development & Requirements
- Layout Terminology & call outs
- Control Point & Plant north, Battery Limits
- Equipment Layout: Types, Guidelines for preparation based on type
- Guidelines for Building layout types
- Piping GA Drawing Requirements and Layout Procedure
- Piping Study Drawings
- Pipe routing requirements
- Pump GA Drawing and Layout Consideration
- Tank & Vessel Layout Consideration
- GA - Print Reading Exercise
- Inputs (Drawings/Documents) for piping G A drawings

### **Piping Study & Piping Layout**

#### **Piping Isometrics**

- Isometric requirements
- Drawing Piping Isometrics
- Isometric Dimensions, Notes & Callouts
- Isometric Offsets
- Print Reading Exercises
- Exercises on Creation of Isometrics form Piping Plans and Sections
- Inputs (Drawings/Documents) for piping Isometric drawings

#### **Piping Spools**

- Definition
- Types of Spool Drawings.
- Guidelines to Prepare Spool Drawings.
- Print Reading Exercises.
- Exercises on Creation of Piping Spool from Piping Isometrics.
- MTO (Material Take Off): Types, and applications.

#### **Pipe Supports & Pipe Rack**

- Classification of Supports.
- Primary supports
- Secondary supports
- Rest supports
- Anchor supports
- Standard supports
- Standard support details required
- Non Standard supports/Special pipe supports(SPS)
- SPS requirements.

- Anchors.
- Pipe Guides.
- Limit Stops.
- Pipe Shoe.
- Shoe Guides / Hold down guides,
- Dummy Leg / Trunion.
- Field Support / Base Support.
- Rigid Hangers – Rod & Clevis, Trapeze.
- Pick up supports,
- Flexible/Spring supports – Variable & Constant.
- Control valve manifold supports.
- Piping support Engineer work procedure.
- Pipe Rack Design – Types, Height & Width Calculations, Pipe Arrangements.
- Control Station & Utility Station on Pipe Racks.

### **Piping Insulation**

#### **Pressure Design of Piping Components**

- Scope of ASME B 31.3, B31.4 & B 31.8
- ASME B 31.3 Fluid Service Categories.
- Design Pressure & Design Temperature for Piping Systems.
- P-T Rating Determination of Flanges, Threaded & Socket Weld Fittings.
- Pressure Design of Straight Pipe under Internal Pressure. – Wall thickness Calculations.
- MDP – Maximum Design Pressure for Piping Systems
- Branch Reinforcements – Reinforcement Pad Calculations.
- Pressure Design of Miter Bends – Single & Multiple Miters.
- Pressure Design of Blanks.

- Pipeline Wall thickness Calculations – B 31.4 / B 31.8.
- MAOP – Maximum Allowable Operating Pressure for Pipelines.
- Piping Material Selection per ASME Code.

### **Piping Fabrication & Construction**

- Fabrication Requirements
  - Material Limitations (Pipe, Nipples, Flanges , Fittings)
  - Drawings
  - Fit- Up Tolerances (Mitered Joints, Ends for Field Welding)
  - Pipe Bending (Hot & Cold)
- Welding & Heat Treatment
  - Butt Welds
  - Fillet Welds
  - Welding Steps
- Inspection & Testing Of Pipe Spools
- Product Marking
  - Identification
  - Cleaning
  - Painting
  - Protection
- Metallic Plant Piping Installation Requirements
  - Pipe Fitup & Tolerances
  - Pipe Alignment to Load Sensitive Equipment
  - Flange Joint Assembly
- Buried Installation

## **Fabrication & Installation Requirement of ASME B 31.3**

- Welder/Brazer Qualification
- Welding Processes (SMAW, GMAW, FCAW, GTAW)
- Weld Preparation
- Typical Welds
- Preheating and Heat Treatment
- Bending and Forming
- Typical Owner Added Requirements
- Installation

## **Inspection & Testing of Piping Systems**

- Typical Weld Imperfections
- Types of Weld Inspection ( Visual, Radiography, Magnetic Particle, Liquid Penetrant, Ultrasonic )
- Examination Requirements
- Types of Pressure tests ( Strength, Tightness, Leak, System, Service)
- Plant Piping – Hydrostatic Leak Test
- Pneumatic Test – Plant Piping
- Cross Country Pipeline – Hydrostatic Test

## **Inspection, Examination & Testing Requirements of ASME B 31.3**

- Inspection
- Examination (Methods, Requirements & Acceptance Criteria)
- Leak Testing (Methods & Requirements)



**IPEBS Corporate Training Clients:**

<b>Company Name</b>	<b>Location</b>	<b>Company Name</b>	<b>Location</b>
Intergraph Consultants	India	SPPC	Sudan
Port of Sohar	Oman	CFPE Technology Solutions	Malaysia
Uhambiso Consultant	South Africa	Qatar Petroleum Technical Center	Qatar
Newtech Consulting Group	Sudan	Petro Vietnam Marine Shipyard	Vietnam
Yashada Consultant	India	Locus Technologies	India
Telstar Life Science Pvt Ltd	India	RasGas	Qatar
BHEL	India	ICB Technimont	India & Italy
IDC Training House SDN BHD	Malaysia	LG-Digitech	Sudan
Sakhlain Energy	Russia	Infotech Enterprises	India
Aveon Offshore	Nigeria	Petroleum Operating Company	Sudan
BPCL	Bhutan	Dr. Reddy's Labs	India
Saitech Engineers	India	Vasavi Power Services	India
Riyan Architects	Maldives	Siddhi Consulting	India
Oryx GTL	Qatar	Qatar Petroleum	Qatar
WNPOC	Sudan	Centroid Technical Services	Sudan
GNPOC	Sudan	MG – Vowgas Group	Nigeria
Fleming gulf	UAE	DAL Group	Sudan

**Course Fee Details:**

Course Title	Fee for Indian Participants	Fee for International Participants
<b>Process Piping Design &amp; Construction - ASME B 31.3 – Online Training Course</b>	<b>INR 30,000/- (Spl Offer: INR 26000/-)</b>	<b>USD 800/- (Spl Offer: USD 600/-)</b>

For making e – payment for the course fee please find **IPEBS** Bank account details below.

<b>Account Name</b>	<b>IPEBS</b>
<b>Account Number</b>	<b>03182020005287</b>
<b>Bank Name</b>	<b>HDFC</b>
<b>Branch</b>	<b>ABIDS</b>
<b>RTGS / NEFT / IFSC Code</b>	<b>HDFC0004125</b>
<b>SWIFT Code</b>	<b>HDFCINBB</b>

### **Terms & conditions:**

**CANCELLATIONS: IPEBS** does not provide refunds for Cancellations done after registration & fee payment. However, credit maybe granted to a later program. This credit will be available for up to one year from the date of issuance.

**COURSE MATERIAL AGREEMENT:** It is the intention of **IPEBS** that the course text and materials supplied to participants at **IPEBS** courses are prepared and issued for the participants' sole use. Codes and standards constantly change and interpretations are issued by the publishing societies. Information contained in **IPEBS** course materials is based on the best available data obtained by **IPEBS** at the time of publication. **IPEBS** is in no way responsible for subsequent use regardless of intention.

**PROGRAM CHANGE POLICY:** Please note that instructors and topics were confirmed at the time of publishing this document; however, circumstances beyond the control of the training organizers may necessitate substitutions, alterations or cancellations

of the instructors and/or topics. As such, **IPEBS** reserves the right to alter or modify the instructors and/or topics if necessary. Any substitutions or alterations will be updated on our web site.

**COURSE CANCELLATION BY IPEBS: IPEBS** reserves the right to cancel any course due to circumstances beyond our control. All tuition fees will be refunded in the event of cancellation. **IPEBS** liability is limited to only those tuition fees paid in advance.

**FORCE MAJEURE:** Except for the obligations to make money payments as outlined hereunder, neither party shall be responsible to the other for delay or failure to perform any of the terms and conditions, or other activities, of this agreement if such delay or failure is caused by strike, war, act of God, or force majeure.

## **Frequently Asked Questions – FAQ's**

### **Duration of the course?**

**Ans:** Course Duration is 01 month.

### **Daily Class Duration?**

**Ans:** Daily class will be for 02 to 03 Hours.

### **Requirement for the course?**

**Ans:** Computer / Laptop with good internet connection, Camera and Mic.

### **Support from IPEBS?**

**Ans:** Faculty assigned to all registered participant of the course. Faculty not only helps to clear the participant's queries while doing the course but also monitors the progress of the participant to help in successful completion of the course.

### **Mode of Payment?**

**Ans:** You can make the payment through electronic transfer or at IPEBS office.

### **Issue of Certificate?**

E - Certificate would be issued by **IPEBS** only on successful completion of the course & will be sent via email to the participant.

## **Training Methodology?**

**Ans:** Online streaming of lectures, contact with faculty by email or chat groups.

## **Training Material?**

**Ans:** Printed Material – Course / Class handouts will be provided in printed format and shipped (within India) to the participants.

Soft Copy Material - Data tables, charts, nomographs, drawings, concept theory, design calculations and practice exercise's will be provided in soft copy.

Demonstration software's and excel spread sheets will be provided.

**\*\*** International Shipping charges of printed material - course / class handouts to be borne by participants.