ASME VIII | Design of Pressure Vessels 120 hs

Online Course: Design of Pressure Vessels according to ASME VIII for industrial applications.

Enrolment can be to the full course or to each part individually (three).

Who Should Attend?
This course is intended for graduates (or soon to be), designers, freelancers, technicians and engineers involved in: calculation, design, selection, manufacturing, safety, quality and maintenance of systems and equipment in industrial processes.

Previous knowledge of this subject is not required to attend to the course.

Training Objectives
The main objective of this course is to transfer to participants the theoretical and practical skills required in projects, obtained from experience and sound engineering practices.

What to Expect?
Get familiar with the terminology and acquire vocabulary and fundamentals.
Understand the code organization, scope and most important sections.
Learn to design and calculate all the main components of Pressure Vessels.
Benefit from Lessons Learned and Best Practices from different international projects.

Course Duration
Full Course: 120 hs; to be completed in 90 days. The Virtual Campus will be open for 150 days (flexibility).
Parts (three): 40 hs, to be completed in 30 days. The Virtual Campus will be open for 60 days (flexibility).

Methodology
Self-guided, Hands-On Course
Available 24/7, Self-paced course
“Learn by doing” concept
Non-scheduled sessions
Instructor available during the entire course

Included in the course
Study Notes
Summary Videos
Conceptual Questions
Case Studies based in real designs
Design & calculation sheets
Part I: 40 hs

Lesson 1: Introduction & ASME VIII Code

Configuration and design codes
Pressure vessel parts, Geometry definition

ASME BPVC – Boiler and pressure vessel code
Historical review, BPVC Sections

ASME BPVC Section VIII, Div.1
Scope, Code organization
ASME stamp
Code revisions

Proposed Case Studies
- Vocabulary and terminology
- Key Concepts in Design Codes: Quiz
- ASME VIII Code organization, scope
- Key Concepts in ASME VIII: Quiz

Lesson 2: Internal & External Elements

Internal attachments
Tray supports, Beds’ support
Internal piping / distributors
Vortex breakers, Demisters

External attachments
Clips, Davits, Lifting devices
Insulation, Fireproofing
Platforms, Ladders

Proposed Case Studies
- Vocabulary and terminology
- Identification of internal attachments: Quiz
- Identification of external attachments: Quiz
- Attachments weight estimation

Lesson 3: Design Conditions

Design Conditions
Temperature, Pressure
Corrosion Allowance

Loadings
Permanent | Temporary
Cyclic | Local

Vessel Weights
Shell | Heads | Nozzles | Skirts

Proposed Case Studies
- Key Concepts in Design Conditions Quiz
- Key Concepts in Loadings Quiz
- Vertical PV Weight Estimation: Case Study
- Horizontal PV Weight Estimation: Case Study

Lesson 4: Material Selection

Material selection
Corrosion types
Corrosion Allowance
Essential properties of materials

Material designation
Most used materials
ASME Tables
General requirements

Proposed Case Studies
- Vocabulary and terminology
- Materials designation
- Allowable Stress selection
- MDMT Verification
Part II: 40 hs

Lesson 5: Joint Efficiency

Joint Efficiency
Welded joints, Joint types
Service requirement
Welded joint evaluation
Joint efficiency value
Selection charts
The full or spot dilemma

Proposed Case Studies
- Vocabulary and terminology
- Key Concepts in Joint Efficiency Quiz
- Vertical PV Joint Efficiency Selection: Case Study
- Horizontal PV Joint Efficiency Selection: Case Study

Lesson 6: Internal Pressure Design

Design of parts under Internal Pressure
Stresses in cylindrical shells
Cylindrical | Spherical shells
Fabrication of shells
Types of Heads: Hemispherical, Elliptical heads
Toruspherical heads, Flat heads
Fabrication of heads
Conical transitions | Toriconical transitions

Proposed Case Studies
- Calc's of Cylindrical & Spherical Shells: Case Study
- Calc's of the different types of Heads: Case Study
- Calc's of Conical, Toriconical transitions: Case Study
- Calc's of Flat Covers: Case Study

Lesson 7: External Pressure Design

Design of parts under external pressure
Support lines, Cylindrical shells
Shell under external pressure
Stiffening rings under external pressure
Spherical shells
Heads and conical transitions
Conical heads & transitions

Proposed Case Studies
- Key concepts in External Pressure: Quiz
- Calc's of PV against external pressure: Case Study
- Design of Stiffening Rings: Case Study
- Shell + Rings Verification: Case Study

Lesson 8: Nozzle Design

Nozzles
Nozzle Configurations
Standard flanges, Gaskets
Nozzle necks, Calculation
Reinforcement
Reinforcement requirement
Calculation methods
Self-reinforced and integral nozzles

Proposed Case Studies
- Key concepts in Nozzle Design: Quiz
- Nozzle Neck Calculation: Case Study
- Reinforcement Pad Calculation: Case Study
- Self-reinforced nozzles Calculation: Case Study
Part III: 40 hs

Lesson 9: Non-Standard Flange Design

Non-standard flanges
Design criteria, Load definition
Flange types
Bolts & Gaskets
Gaskets
Design of Non-standard flanges
Flange design steps
Sound engineering practices

Proposed Case Studies
• Key Concepts in Non-Std Flange design: Quiz
• Types of Non-Standard Flanges: Case Study
• Calculation of Integral Flanges: Case Study
• Calculation of Loose Flanges: Case Study

Lesson 10: Wind & Seismic Loads

External loads
Wind pressure
Seismic loads
Period of Vibration (POV)
Vertical vessels: skirt, legs
Horizontal vessels: saddles
Allowable stress & loads combination

Proposed Case Studies
• Key Concepts in External Loading: Quiz
• Wind Pressure & Seismic Profile: Case Study
• Definition of loads action on the vessel: Case Study
• Base shear & overturning moment calc: Case Study

Lesson 11: Supports for Vertical Vessels

Skirt design
Types of shell-to-skirt joint
Skirt thickness calculation
Skirt saddle design
Tall towers, Lugs

Legs design
Profile cross section, Legs standard
Verification of legs

Proposed Case Studies
• Key Concepts in Skirt & Legs design: Quiz
• Design and Calculation of Skirts: Case Study
• Design and Calculation of Legs: Case Study
• Design and Calculation of Anchor Bolts: Case Study

Lesson 12: Supports for Horizontal Vessels

Saddles design
Location of saddles
Components
Saddles standard
Verification of saddles
Anchor bolts
Thermal expansion

Proposed Case Studies
• Key Concepts in Saddles design: Quiz
• Design and Calculation of Saddles: Case Study
• Shell Verification against over stress: Case Study
• Design and Calculation of Anchor Bolts: Case Study
Instructor

Senior Mechanical Engineer and Master in Business Administration (MBA). More than 20 years of experience in design, calculation and fabrication of pressure vessels, heat exchangers, storage tanks, piping systems and structures in general.

Duties of the above-mentioned positions cover the entire cycle of an equipment, from the very conception, drawings, design and calculation, technical specifications, technical requisitions, vendor drawings, to the manufacturing phase and installation assistance. Among the developed projects, clients such as SHELL, EXXON, REPSOL, CHEVRON, GALP, CEPSA, TUPRAS and SAUDI ARAMCO can be found.

Vast experience providing specific training sessions in both classroom and online approaches. More than 75 training courses carried out in different institutions and in-company, courses oriented to graduates, designers, engineers and experienced professionals.

Arveng Training

Arveng Training has developed effective and practical courses for the needs of today’s industrial challenges by delivering specific and high-quality engineering training courses utilizing all three approaches: classroom, on-line and tailored training. We are proud to have imparted more than 100 classroom courses, 200 online courses and over 15 in-company sessions. Our training activities has benefited over 1,500 professionals. Our greatest pride is in the letters of recommendation we receive from so many of our customers in this area.

We consider the time of our students as the most valuable. For this reason, all our courses have been designed with the main objective of quickly the professional skills of the participants, through our expert instructors in different disciplines. We stimulate creativity, innovation and initiative to make the participants inquisitive to bring good engineering practices and lessons learned to the field that benefits their employers in the long term.

Tailored Training

The most effective training is one that satisfies the needs of each company’s business focus and deliverables. We adapt our training programs to each specific requirement, offering bespoke solutions for each need. The result, 100% tailored programs, developed to maximize the time investment and deliver tangible and intangible returns to the work teams.

After an assessment phase, a tailored training plan is designed jointly with the client. This plan is specifically tailored to meet the client’s needs, focusing on effectively enhancing the capabilities of the work team. We provide practical, dynamic and hands-on training, making available the best instructors in each subject.

Our Company

Arveng Training & Engineering SL is a leading company providing Training and Engineering services based in Madrid, Spain. Our mission and vision are to be a leading training and engineering services company. We are a team of highly motivated, talented high qualified professionals with more than 20 years of experience. Our main goal is to provide our clients, the best training and engineering services and to exceed their expectations in all their spheres of industrial activity, through our renowned services which are based on efficient, innovative, cost-effective and transparent principles.

Established in July 2010, mainly oriented to the industrial sector, from the very beginning Arveng has always worked with closeness, responsibility and commitment in the different areas of activity.