

# **ASME BPVC SECTION 1 - RULE FOR CONSTRUCTION OF POWER BOILERS**

**COURSE DURATION: 5 DAYS**

## DESCRIPTION

This Section provides requirements for all methods of construction of power, electric, and miniature boilers; high temperature water boilers, heat recovery steam generators, and certain fired pressure vessels to be used in stationary service; and power boilers used in locomotive, portable, and traction service.

Rules pertaining to use of the V, A, M, PP, S and E ASME Product Certification Marks are also included. The rules are applicable to boilers in which steam or other vapor is generated at a pressures exceeding 15 psig, and high temperature water boilers intended for operation at pressures exceeding 160 psig and/or temperatures exceeding 250 degree F. Superheaters, economizers, and other pressure parts connected directly to the boiler without intervening valves are also considered as part of this ASME Section 1.

## COURSE OUTLINE

### Day 1

#### Section one - Boiler basics:

Steam generation principle; Types of water circulation in boilers; Boiling phenomenon; Boiling curve; Operating pressures; Operating temperatures; Power boilers; Boiler types: Watertube Boilers; Fire-tube Boilers; Feedwater heaters; Electric heaters; Miniature boilers; Organic fluid vaporizers; Superheater(SH); Reheater (RH); Heat recovery steam generators (HRSG)

#### Section two - Boiler components & parts:

Steam drum; Water drum; Tubes, Shells, Headers, Dished heads; Openings; Flanged-in openings; Nozzles; Inspection openings; Stayed surfaces; Pressure relief valves; Drain valves; Fitting; Weld joints; Brazed joints; Rivets; Tube connections; Stay tubes; Feedwater supply; Staybolts; Ligaments; Supports; Attachment lugs; External piping; Feed piping; Blowoff piping; Water level indicators; Water gages; Combustion chamber; Refractories; Firing doors; Box headers; Burners; Stack; Economizer; Boiler specifications

#### Section three - Overview of ASME BPVC Section 1:

Background of ASME BPVC Code; Objectives; Scope; Key elements; Part PG (general requirements for all methods of construction); Part PW (for boilers fabricated by welding); PART PR/PB (Requirements for boilers fabricated by riveting/brazing); Part PWR (Requirements for watertube boilers); Part PFT (Requirements for firetube boilers); Part PFH (Requirements for feed-water heater); Part PMB (Requirements for miniature boilers); Part PEB (Requirements for electric boilers); Part PVG (Requirements for organic fluid vaporizers); Part PHRSG (Requirements for heat recovery steam generators); ASME JURISDICTION



### COURSE DURATION

- 5 Days Training

### WHO SHOULD ATTEND?

- Petroleum downstream companies
- Power plants companies
- Pressel vessel / boiler manufactures
- Frontline third party inspection / certification companies
- Inspection companies



## Day 2

### Section four - Part PG & Part PW

Scope; Service limitations

### Section five - Rules for Materials:

Rules; ASME Section 2; Plate; Forgings; Castings; Pipes, Tubes, and Pressure-Containing Parts; Material Identifiable; Miscellaneous Pressure Parts; Water Level Indicators and Connector Material; Stays; Rivets

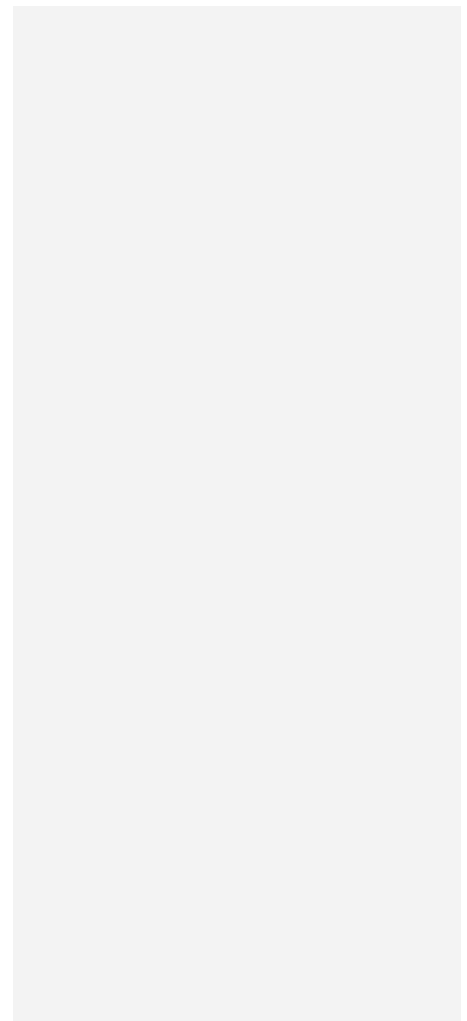
### Section six – Rules for Design

Part PG: General; Fabrication by a Combination of Methods; Design Validation by Proof Test; Cold Forming of Austenitic Materials; Cold Forming of Creep Strength Enhanced Ferritic Steels; Maximum Allowable Working Pressure; Loadings; Stress Values for Calculation Formulas; Quality Factors for Steel Castings; Weld Joint Strength Reduction Factor; Cylindrical Components Under Internal Pressure; Welded Access or Inspection Openings Under External Pressure;

## Day 3

**Part PW:** Design of Welded Joints; Heat Treatment; Volumetric Examination of Welded Butt Joints; Head-to-Flange Requirements; Openings in or Adjacent to Welds; Welded Connections; Minimum Requirements for Attachment Welds; Welded-In Stays.

**Section seven - Rules for Openings and Compensation:** Openings in Shells, Headers, and Dished Heads; Compensation Required for Openings in Shells and Dished Heads; Flanged-In Openings in Formed Heads; Compensation Required for Openings in Flat Unstayed Heads and Flat Stayed Plates; Limits of Metal Available for Compensation; Strength of Compensation; Compensation for Multiple Openings; Methods of Attachment of Pipe and Nozzle Necks to Vessel Walls; General Requirements for Fittings, Flanges, and Valves; Nozzle Neck Thickness; Inspection Openings; Stayed Surfaces; Staybolts; Location of Staybolts; Dimensions of Staybolts; Ligaments; Supports and Attachment Lugs



## Day 4

### Section eight- Rules for Boiler External Piping and Boiler Proper Connections:

Outlets and External Piping; Application Requirements for the Boiler Proper; Design and Application; Requirements for Miscellaneous Pipe, Valves, and Fittings; Feedwater Supply; Overpressure Protection Requirements; Superheater and Reheater; Mounting of Pressure Relief Valves; Operation of Pressure Relief Valves; Minimum Requirements for Pressure Relief Valves

### Section nine - Rules for Fabrication:

**Part PG:** Cutting plates; Plate identification; Holes for stays; Repairs of Defects in Materials; Tube Holes and Ends; Permissible Out-of-Roundness of Cylindrical Shells; Tolerance for Formed Heads; Holes for Stays

**Part PW:** Welding Processes; Welding Qualification and Weld Records; Base Metal Preparation; Assembly; Alignment Tolerance, Shells and Vessels (Including Pipe or Tube Used as a Shell); Alignment, Tube and Pipe; Finished Longitudinal and Circumferential Joints; Miscellaneous Welding Requirements; Preheating; Requirements for Postweld Heat Treatment; Repair of Defects; Circumferential Joints in Pipes, Tubes, and Headers; Joints in Valves and Other Boiler Appurtenances; Loading on Structural Attachments; Fabrication Rules for Bimetallic Tubes When the Clad Strength Is Included.

## Day 5

### Section ten - Rules for Inspection and Tests:

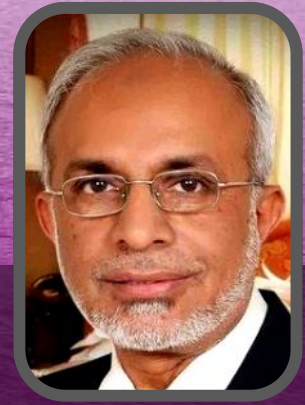
**Part PG:** Qualification of Inspectors; Inspection and Repair of Flat Plate in Comer Joints; Hydrostatic Test

**Part PW:** Check of Welding Procedure; Check of Welder and Welding Operator Performance Qualifications; Check of Heat Treatment Practice; Qualification of Nondestructive Examination Personnel; Radiographic Examination; Ultrasonic Examination; Test Plates; Hydrostatic Test

### Section eleven - Rules for Certification by Stamping and Data Reports:

Heating Surface Computation; Code Symbol Stamps; Stamping of Boilers; Field Assembly; Stamping for Field-Assembled Boilers; Stamping of Pressure Piping; Stamping of Boiler Pressure Relief Valves; Location of Stampings





## TRAINER'S PROFILE

# YOUSUF MEMON

**Mr. Yousuf Memon, Senior Mechanical Integrity Professional specializing in the Plant & Equipment Integrity has been working for international oil & gas exploration, petroleum refineries, petrochemical plants, chemical plants, fertilizer plants, power plants and desalination plants for several years.**

Different areas of Plant & Equipment Mechanical Integrity remained his areas of expertise that cover Material Selection, Corrosion Monitoring, Corrosion Inhibitor Injection, Protective Coatings, Cathodic Protection System, Metallurgy, Plant Inspection, Non Destructive Testing, Risk-Based Inspection, Failure Analysis and Fitness-For-Services.

His former employers include ARAMCO – Jeddah Oil Refinery Company (Saudi Arabia), TOTAL Exploration & Production (UAE) and PARCO Mid Country Refinery (Pakistan). He has also been leading companies that provide mechanical integrity services; namely Reliance Swift Veritas and Petrosult & Unimart.

## TRAINING COURSES DELIVERED

- ✓ Cathodic Protection Operation & Maintenance
- ✓ Corrosion & Cathodic Protection
- ✓ Corrosion Control
- ✓ Corrosion in Fertilizer Industry
- ✓ Corrosion Resistant Coating & Painting
- ✓ Corrosion, Metallurgy & Failure Prevention
- ✓ Metallurgy & Corrosion Prevention
- ✓ Metallurgy for Non-Metallurgists
- ✓ Metallurgy of LNG Industry
- ✓ Oil & Gas Field Corrosion Monitoring

## EDUCATION QUALIFICATION

- ✓ Bachelor's degree in Chemical Engineering from Dawood University of Engineering & Technology, Karachi, 1975.

## PROFESSIONAL MEMBERSHIPS

He has been intermittently associated with different professional bodies, namely

- ✓ National Association of Corrosion Engineers (NACE, USA)
- ✓ American Society of Mechanical Engineers (ASME, USA)
- ✓ American Society of Quality (ASQ, USA)
- ✓ American Institute of Chemical Engineers (AIChE, USA)
- ✓ Pakistan Engineering Council (PEC, Pakistan)

## PARTIAL CLIENTELE

- ✓ Ras Gas, Qatar
- ✓ Zakum Development Company (ZADCO), Abu Dhabi
- ✓ Abu Dhabi Off-shore Company (ADCO), Abu Dhabi
- ✓ Oman India Fertilizer Company (OMIFCO)
- ✓ Engro Chemical Limited, Dharki
- ✓ Engro Polymers Limited, Karachi
- ✓ GASCO/ADNOC, Al Ruwais
- ✓ TUV Nord

