

## MC104

### Bases and Application of Heat Exchanger Mechanical Design Rules in ASME BPV Code, Section VIII

#### Day 1

- High-Level Overview of Part UH
  - Technical History of Part UHX
  - Scope and Limitations of Part UHX
- Basis of Tubesheet Design Procedure
  - Basis of Tubesheet Design Procedure / Free body diagrams
  - Significance of Calculated Stresses
  - Designing to Division 1 and Division 2, Part 4, Class 1 Vessels
- Parameters Affecting Heat Exchanger Design
  - Tube Expansion
  - Tube-to-Tubesheet Joints
  - Flange Loads
  - Thicker Shell Near Tubesheet
  - Simply Supported Tubesheet
  - Simplified Elastic/Plastic Analysis
  
- Detailed Review of Design Procedure for U-tube Tubesheets

#### Day 2

- Detailed Review of Design Procedure for Fixed Tubesheet Design
  - Effect of operating conditions on axial and radial thermal expansion
  - Effect of expansion joints on tubesheet thickness
    - Thick-walled (TEMA type)
    - Thin-walled (bellows)
  - Fixed tubesheet kettles
- Detailed Review of Design Procedure for Floating Head Tubesheet
  - Significance of tube buckling
- Review of Form U-5, Fixed Tubesheet Exchangers – Operating Conditions
- Worked Examples for Heat Exchanger Design
  - U-Tube Tubesheets
  - Fixed Tubesheets/Tube Stress
  - Fixed Tubesheet Kettles
  - Floating Head Tubesheets
- Example problems
- Summary and Wrap-up