

## **GASKET PRINCIPLES I**

### **Course Introduction:**

Gaskets, how are they applied? Gaskets are a crucial part of every day life in process plants, but what do we really know about them? What are Gaskets made of? Where are they used? What variables effect Gaskets and their ability to seal properly. This course takes you through a thorough discussion of the Gasket and all of the variables that surround its reliability.

### **Course Objective:**

Upon completion of this course you will be able to identify Flanges types, describe the purpose of a Gasket, identify various Bolted Flange Joints, explain Heat Exchanger Operation, describe the Whole Joint: Flange, Gasket and Bolts, describe proper Gasket Installation procedures and general troubleshooting remedies for typical faults and causes.

**Course Curriculum Length:** 40 hours

### ***Course Modules & Syllabus***

- **Introduction to Pipes & Flanges**
  - Pipe
    - Pipe Differentiation
      - Pipe
      - Piping Systems
      - Pipe Sizes and Schedules
    - Materials
      - Steel
      - Iron
      - Lined Pipes
      - FRP (Fiberglass Reinforced Pipe)
      - Non-ferrous Materials
      - Plastics
    - Jointing Methods
      - Welding
      - Threading
      - Brazing and Soldering
      - Adhesives
      - Mechanical joints
  - Flanges
    - Flanges
      - Flange Standards
      - Flange Dimensions
    - Connecting the Pipe to the Flange
      - Integral Flanges
      - Welded Flanges

- Socket Weld Flanges
  - Slip-on Flanges
  - Weld Neck Flanges
  - Lapped Flanges
  - Flange Facings
    - Plain Faced or Flat Faced Flange
    - Male and female / Tongue and Groove Faced Flanges
    - Raised Faced Flanges
    - Ring Joints
  - Surface Finish
    - Surface Grooves
    - Surface Inspection
    - Surface Scale and Residual Gasket Material
  - Flange Parallelism
    - Bolting Assembly
  - Flange Rotation
  - Hydrostatic End Thrust
- **Gasketing**
  - Gaskets
    - Gasketing
      - Sheet Gaskets
  - Compressed Fiber Sheets
    - Compressed Fiber Sheets
      - Non-asbestos Fibers
      - Elastomer Binders
      - Manufacturing Compressed Fiber Sheets
  - PTFE Sheet Gaskets
    - PTFE Sheet Gaskets
  - Flexible Graphite Sheet Gaskets
    - Flexible Graphite Sheet Gaskets
      - Oxidation of Graphite
  - Metallic Gaskets
    - Spiral Wound Gaskets
    - Steel Trap Gaskets
  - Gasket Test Standards
    - Gasket Test Standards
      - Compressibility and Recovery
      - Creep Relaxation
      - Sealability
      - Alternative Gasket Tests
  - Selecting the Proper Gasket
    - Selecting the Proper Gasket
      - Chemical Compatibility
      - Temperature
      - Pressure

- Thickness
  - Plant Specifications
- **Bolted Flange Joints**
  - Bolts and Threads
    - Bolts and Threads
      - Thread Design
      - How Bolts Work
      - Strength of Materials
  - Tightening Methods
    - Tightening Methods
  - Friction
    - Friction
  - Nut Factor and Coefficient of Friction
    - Nut Factor and Coefficient of Friction
  - Relaxation of Material
    - Relaxation of Material
      - Elastic Interactions
  - Tolerances, Component Fit and Condition
    - Tolerances, Component Fit and Condition
      - Thread Engagement
  - Thermal Expansion and Contraction
    - Thermal Expansion and Contraction
      - Other Factors
- **Heat Exchangers**
  - Heat Exchangers
    - Heat Exchangers
    - Live-loading Heat Exchangers
      - Thermal Cycling
      - Vibration
  - Heat Exchanger Types
    - Heat Exchanger Types
      - Fixed Tubesheet Heat Exchanger
      - U-tube Heat Exchanger
      - Split Backing Ring, Floating Head Heat Exchanger
      - Pull-through Floating Head Heat Exchanger
  - Heat Exchanger Classes
    - Heat Exchanger Classes
  - Heat Exchanger Gaskets
    - Heat Exchanger Gaskets
- **The Whole Joint: Flange, Gasket & Bolts**
  - Overview
    - Overview
  - ASME Boiler and Pressure Vessel Code
    - ASME Boiler and Pressure Code
  - Gasket Installation Procedures
    - Installation Procedures

- Disassembly
  - Assembly
- Gasket Troubleshooting Guide
  - Gasket Troubleshooting Guide