



شركة ميرك العربية السعودية
MEIRC Saudi Arabia

Safety Valves

Introduction

This course is designed as a comprehensive guide to safety and relief valves. This course explains how safety and relief valves function and how to size and select the correct valve for given duties and specifications. The course employs lectures, demonstrations and problem solving sessions

Who Should Attend

This training course is designed for engineers who use/select and for Technicians who install/service these safety devices. Managers with responsibility for plant and equipment would find an appreciation of the subject and the issues involved useful

Course Objectives

This training class objectives include the following:

- Learn the main types and operating characteristics of safety and relief valves
- Be able to select and specify the correct safety valve for a given application
- Understand the need to match actuator with valve
- Receive a full course manual as a permanent record

Course Outlines:

1. Definition & Terminology:

Pressure Relief Valves Types

- Modulating pressure relief valve
- Full left pressure relief valve
- Ordinary pressure relief valve
- Direct - acting pressure relief valve
- Safety relief valve
- conventional safety relief valve
- piloted pressure relief valve piloted pressure valve with restricted loading
- piloted pressure relief valve with combined Safety & Control Function

Terms related to the Actuation of Piloted Pressure Relief Valves

- Energize-to-trip principle
- Deenergize-to-trip principle
- Energize-to-open principle



Pressure Terms Relating to Pressure Systems

- Operating Pressure
- Max. Allowable working pressure
- Accumulation
- Maximum allowable accumulation

Pressure Terms Relating to safety Valves

- Start-to-open pressure
- Set pressure
- Cold differential test pressure
- Seating pressure difference
- Operating pressure
- Operating pressure difference
- Over pressure
- Relieving Pressure
- Reseating pressure
- Operating pressure difference
- Blowdown
- Back pressure
- Built-up back pressure

Direct Acting Safety Valves

- Valves Loading
- Safety Valves
- Safety Relief Valves
- Devices for blowdown adjustment

Operation of Direct Acting Pressure Relief Valves

- Seating pressure difference
- Blowdown
- Opening pressure difference
- Performance Diagram

Prime Causes of Misbehavior of Safety Valves Case Studies In

- Working Installation
- Working Valve Selection
- Oversizing
- Non-Observance of Systems Conditions



Piloted Pressure Relief Valves

- Operating Media
- Operating Principles of Main Valves
- Operating Principles of Pilot Mechanic
- Main Valves for Operating by System Fluid

2. **Full Description of Valve**

3. **Preparing the Valve for Service (Initial Installation)**

Storage

Installation

- Inlet Piping
- Outlet Piping

Welding of Body

Hydrostatic Testing

- Flanged and Welded Inlet Safety Valves
- Hydrostatic Test Procedure

Initial Valve Assembly

- Cleaning and Lubrication
- Lubrication Points
- Initial Field Assembly Procedures
- Assembly of Valve (Spring Compression Retained)

4. **Description of Operation**

5. **Set Pressure Testing and Adjustment**

Set Pressure Testing on system

- Air Set Pressure Device
- System Pressure
- Nozzle Ring and Guide Ring Adjustment

6. **Safety valve components & design:**

Definition / function



Safety valve / relief valve / safety – relief valve Types

- Huddling chamber type
- Nozzle reaction type

Components

- Compression screw, release nut, locking nut
- Lever pin, drop lever, spring, feather guide retaining ring, locking screw, spindle, feather & feather guide, ring pin, huddling chamber, seat bushing base

Safety base valve adjustments

- Nozzle reaction safety valve adjustments
- Popping point adjustment
- Compression adjustment
- Lower nozzle ring adjustment

7. Valve Maintenance & Repair:

- On line valve inspections
- Workshop valve inspection & testing
- Valve calibration
- Causes of valve leakage
- Causes of valve corrosion & failures
- Dismantling & assembly of valves
- Replacement of valve components
- Corrective action & valve maintenance planning schedule

8. Valve failures:

Symptoms, trouble, problem

Causes

- Design errors
- Material defect
- Material wrong selection
- Manufacturing deficiencies
- Assembly error
- Off design or untended service condition
- Maintenance deficiencies
- Neglect
- Wrong procedures



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- Improper operation
- Improper calibration