

Training Curriculum Farris Engineering Services

Five comprehensive training modules are available. This standard training curriculum is designed to enable trainees to become proficient in all aspects of pressure relief safety management.

- RV 101 Introduction to Relief Devices 4 Hours
- RV 201 Mechanics of iPRSM® 12 Hours
- RV 301 Relief Contingencies 8 Hours
- RV 401 Two Phase Flow and Distillation 4 Hours
- RV 501 Discharge Evaluation Zones & Headers 4 Hours

RV 101 Introduction to Relief Devices

Part 1

Hardware, terminology, what is a valve and how does it function
RVs, Conservation vents, and rupture disks

- What is a Safety / Relief / Safety-Relief Valve?
- PRV Terminology
- Back Pressure – What is it and where does it come from?
 - What are some of the effects and issues with backpressure?
- How does a Spring Operated Pressure Relief Valve Operate?
- How does a Pilot Operated Pressure Relief Valve Operate?
 - Snap Acting / Modulating
- Tank Vent Valves (Sizing Requirements and specifications)
- Rupture Disc's (Sizing / design / specification)
 - Disc Holders and
- Codes & Standard – REVIEW
 - ASME / API
- Introduction to Sizing (API vs. ASME)

Part 2

Basic Sizing & Selection of Valves and Rupture Discs

- Introduction
 - Scope
 - Definition of Terms
- Basic RV Sizing
 - Applicable Codes/Standards
 - Required Process Data
 - Back Pressure
 - API vs. ASME Sizing
 - DIERS ω Method (2-Phase Flow)
- Installation (5 minute presentation)
- Pressure Relief Valve Selection

RV 201 Mechanics of iPRSM®

iPRSM® Function and Use

- **Module 1: Overview of iPRSM®**
 - **Lesson 1: Introduction to iPRSM®**
 - About iPRSM®
 - iPRSM® User Interface Structure
 - iPRSM® Structure Map
 - **Lesson 2: How to Use iPRSM®**
 - Product Demonstration
 - iPRSM® Requirements
 - Security
 - Page Components
 - Page Types
 - Using the Database
 - User Interface Tips
 - Common Commands and Controls
 - Multi-tasking
 - Navigation
- **Module 2: Designing a Protected System with iPRSM®**
 - **Lesson 1: Equipment**
 - About equipment types
 - Relief Equipment
 - Protected Equipment
 - Overpressure sources
 - Ancillary Equipment
 - Managing Equipment
 - **Lesson 2: Protected Systems**
 - About Protected Systems
 - Protected Systems View
 - Stream Flashes
 - Contingency Scenarios
 - Piping Losses

- **Lesson 2: Protected Systems (continued)**
 - Demonstration: Protected Systems
 - Creating a Protected System
 - Linking Pieces of Equipment to the System
 - Adding Streams and Flashes
 - Adding Contingency Scenarios
 - Calculating Piping Losses
 - Adding Distillation Columns

 - **Lesson 3: Additional Related Functions**
 - About Additional Related Functions
 - Working with Documents
 - Managing Revisions
 - Cloning

 - **Lesson 4: Checking and Signing Off**
 - About Checking Systems
 - Demonstration: Checking and Signing Off
 - Checking and Signing off the Protected System
 - Checking Equipment within the unit
 - Checking and Signing off the Unit
 - Checking and Signing off the Plant
 - Logging Out
- **Module 3: Sample Calculations**
- Lesson 1: Complete Sample Systems
 - Complete Example System Review
 - Example System Data will be loaded into iPRSM® and participants are to work through sample problems.

RV 301 Relief Contingencies

How to determine relief rates/contingencies

Stream flashes and phases defining what to use when

With samples to walk through

Contingency Analysis (Overpressure Sources)

- Understanding and identifying Relief Systems based on Piping & Instrument Drawings (P&ID's)
- Safety System components and overpressure sources
- Understanding Relief Contingency Analysis
 - Blocked Outlet
 - Abnormal heat Input
 - Exchanger Tube Rupture
 - Automatic Control Failure
 - Reflux Failure
 - Fire
 - Cooling Failure
 - Power Failure
 - Instrument Air Failure
 - Inadvertent Valve Opening
 - Mechanical equipment Failure
 - Series Fractionation
 - Thermal
 - Loss of Quench
 - Chemical Reaction
 - Steam Out

RV 401 Two Phase Flow and Distillation

Only an overview is typically provided. An additional day of training may be required for this section after the user has experience utilizing the iPRSM® software.

Distillation, oil assay, 2 Phase Flow how to determine required relief rates (complex)

With samples to walk through

- Distillation Calculations.
 - DIERS Presentation (Separate Outline)
- Oil Boiling Point Curves
 - Review D86 Test Rig
 - Show example entering data and discuss issues as you go.
 - Comparison of VMG to Hysys and PROII
- Direct Integration, plus 2-phase flow issues
 - Overview
 - Run through example
 - Discharge coefficient and backpressure correction factors.

RV 501 Discharge Evaluation Zones & Headers

Only an overview is typically provided. An additional day of training may be required for this section after the user has experience utilizing the iPRSM® software.

Using iPRSM® to manage discharge evaluation (D.E.) zones & headers

How to link relief systems and add headers

Adjusting and evaluating header scenarios

➤ **Module 1: Discharge Evaluation Zones & Headers**

○ **Lesson 1: Discharge Evaluation (D.E.) Zones**

- About D.E. Zones
 - Scenarios
 - Common D.E. Zones
- Working with D.E. zones
 - Adding D.E. zones
 - Linking system scenarios to D.E. zones

○ **Lesson 2: Headers**

- About Headers
 - Piping & fittings configuration supported by iPRSM®
 - Header feeds supported by iPRSM®
 - Output configurations supported by iPRSM®
- Working with Headers
 - Adding headers
 - Working with header scenarios
 - Header drawings