

Process Design Engineering Masterclass

Full Course Syllabus

Course details and preview lessons: booststrand.com/process-design-ultimate-course/

Booststrand - practical process engineering training: booststrand.com

Video	44 hr 6 min on demand
Lessons	473 lessons - 27 sections
Downloads	8 (calculation sheets, design basis file, example files)
Free previews	52 lessons marked inside this document
Included	8 full courses: P&ID;, Pipe Sizing, Pump Hydraulics, Control Valves, Compressors, Separator & Vessel Sizing, PSV & Relief Systems, Shell & Tube Exchanger Thermal Design (HTRI)
Software used	Aspen HYSYS, HTRI, Aspen Flare System Analyzer
Access	Lifetime access - Certificate of completion
Guarantee	30-day money-back
Instructor	Mohamad - chemical engineer, 14+ years in process design (oil, gas & petrochemicals)

Lessons marked [Free preview] can be watched before enrolling. Items without a duration are quizzes, files or text lessons.

Section 1: Introduction (9 lessons · 40 min)

- Introduction [Free preview] — 2:42
- What is Process Design [Free preview] — 7:17
- Importance of Process Design [Free preview] — 2:33
- Optimizing process requirements — 12:13
- Optimize Equipment Sizing [Free preview] — 4:10
- Minimize Energy and Utility Consumption [Free preview] — 3:01
- Ensure Safe and Environment Friendly Process — 6:04
- Effect of Process Design on Maintainability — 2:21
- Quiz 1 [Free preview]

Section 2: Process Engineering Inputs and Outputs in a Project (7 lessons · 39 min)

- How a Project Starts [Free preview] — 8:35
- Project Inputs - Feed & Product Specifications — 10:42
- Project Inputs -Existing Utility and Effluent Systems — 7:44
- Project Inputs - Codes, Standards and Design Criteria — 5:06
- Project Outputs: Documents & Activities to be provided by a Process Engineer — 7:48
- Process Design Stages From Conceptual Design To Startup [Free preview]
- Quiz 2

Section 3: Process Design Basis (9 lessons · 52 min)

- Design Basis [Free preview] — 6:01
- Design Basis Walkthrough - Introduction [Free preview] — 7:03
- Process Description, Scope and Battery Limits — 10:50
- Feed Specs and Product Requirements — 11:41
- Available Utility \ Effluent Systems and Site Conditions — 6:08
- Process Design Criteria — 7:58
- Equipment, Piping and Instrument Tagging Philosophy — 2:36
- Design Basis File
- Quiz 3

Section 4: Process Simulation (5 lessons · 35 min)

- Process Simulation [Free preview] — 5:14

- Things to Consider Example 1 - Optimizing Compressor Stages — 14:48
- Things to Consider Example 2 - Choose Proper Fluid Package [\[Free preview\]](#) — 3:59
- Things to Consider Example 3 - Tower Optimization — 11:56
- Quiz 4

Section 5: Process Flow Diagram (PFD) and Process Control (3 lessons · 12 min)

- Process Flow Diagram (PFD) — 2:40
- Example of a PFD with a Heat and Mass Balance Table — 9:50
- Tips to choose the Proper Control Scheme [\[Free preview\]](#)

Section 6: Tower Sizing (7 lessons · 35 min)

- Main Sizing Activities [\[Free preview\]](#) — 0:49
- Tower Sizing & Hydraulics — 4:54
- Tower Sizing Parameters and effect on Process [\[Free preview\]](#)
- Tower Sizing Example - Adding Tower Internals on HYSYS — 9:03
- Effect of tower operation on Process at maximum capacity and turndown [\[Free preview\]](#) — 7:52
- Example of Tower Datasheet & Sketch — 12:49
- Quiz 5

Section 7: Exchanger Sizing (6 lessons · 46 min)

- Heat Exchanger Thermal Design — 6:40
- Discover Aspects for design of Shell and Tube Heat Exchangers
- How to choose the Optimum Exchanger TEMA type? [\[Free preview\]](#)
- Example 1 - Shell and tube heat exchanger Sizing using HTRI — 23:19
- Example 2 - Shell and tube heat exchanger Sizing using HTRI — 16:52
- Exchangers Quiz 1

Section 8: Separator Vessel Sizing (5 lessons · 58 min)

- Separator / Vessel Sizing — 3:39
- Separator type selection, internals and design criteria
- Vessel Sizing Example using Aspen Hysys — 35:39
- Readjusting Simulation to optimize the size of the vessel — 10:03
- Example of Vessel Datasheet — 8:52

Section 9: Sizing Activities (6 lessons · 28 min)

- Pipe Sizing — 3:36
- Pipe Sizing Criteria and Workflow — 6:08
- Pump Hydraulic Calculations — 4:30
- Impact of pump hydraulics — 3:31
- Calculation of Design Pressure and Temperature — 10:15
- Centrifugal Pump Procurement & Overpressure Challenge – Case Study [\[Free preview\]](#)

Section 10: Evaluating Required Utilities (7 lessons · 1 hr 9 min)

- Understanding Role of Utilities in a Plant [\[Free preview\]](#) — 21:18
- Plant Effluents and effect of their quantity and frequency — 9:01
- Analyzing Cooling Water Consumption in a Distillation Unit — 26:14
- Add Steam Consumption to the Utility Summary — 6:39
- What shall we do with other utilities? — 1:41
- Adding Effluent Summary — 4:16
- Let's Recap

Section 11: P&IDs Course - Introduction (32 lessons · 1 hr 27 min)

- Introduction — 4:34
- Details shown on a P&ID VS a PFD — 4:56
- Anatomy of a P&ID Drawing — 3:19
- Equipment Arrangement: Series VS Parallel VS Spare — 1:46
- Equipment Design Data & Specifications — 3:50
- Examples for Equipment Data Tables on a P&ID — 2:24
- Scope and Battery Limits — 2:12
- Analyzing Pipe Details on a Line Number — 3:39

- Showing Fittings on a P&ID: Reducers, enlargers, Class Breaks & Insulation Kits — 7:15
- Manual Valves — 2:35
- Check Valves — 0:57
- Data Not Shown on a P&ID — 1:28
- Let's Recap
- Components of Control and Shutdown Loops — 1:32
- Main Instrument Abbreviations on a P&ID — 1:49
- Details of Measuring Devices — 2:23
- Flow Measurement — 3:44
- Level Measurement — 4:24
- Temperature and Pressure Measurement — 0:33
- Control System — 2:47
- Shutdown System — 2:37
- Types of Final Elements — 1:50
- Control Valves — 1:12
- Shutdown Valves — 1:42
- On Off Valves Control in Batch Systems — 1:37
- Valve Actuators and Accessories — 4:47
- Adding Data For Instruments **[Free preview]** — 2:25
- Motor Details — 1:20
- Showing Pressure Safety Valves (PSV) — 5:21
- Tank Protection Using Pressure Vacuum Safety Valves (PVSF) — 1:37
- Let's Recap
- Examples of instrument datasheets — 6:40

Section 12: PSV and Relief System Requirements (24 lessons · 2 hr 6 min)

- Pressure Safety Valves: An Essential Protection Against Overpressure **[Free preview]**
- Pressure Safety Valves (PSV) Role in Workflow — 4:01
- 4 Key Factors Affecting PSV Sizing & Operation **[Free preview]**
- Importance of Proper PSV Positioning in P&ID Design **[Free preview]**
- Example of PSV sizing using Aspen Hysys — 24:54
- PSV Datasheet Example **[Free preview]** — 5:34
- Purpose of Automatic Depressurization **[Free preview]** — 2:03
- Configuration of Blowdown System **[Free preview]** — 4:35
- Depressurization Timing Criteria **[Free preview]** — 1:21
- Dividing Plant into Sections — 3:33
- Objectives and Methodology of Blowdown Calculation — 9:16
- Adding input data for fire depressurization scenario **[Free preview]** — 11:43
- Adjusting Required Orifice Diameter and Manipulating different factors — 11:45
- Calculating MDMT based on Orifice Data — 7:04
- Quiz - Depressurization and Blowdown
- What is a Flare System? — 1:42
- Considerations for Inlet Pipe to PSVs — 2:56
- Outlet PSV line Considerations — 3:38
- Calculating Relief Load of Flare Header — 2:17
- Purpose and Criteria of flare / Relief System analysis **[Free preview]** — 10:03
- Adding Inputs to Aspen FlareNet Software — 9:31
- Running the Model and analyzing results & impact on relief system — 10:17
- Quiz- Flare System Analysis
- Files used in flare Analysis

Section 13: Project Workflow Effect on P&ID details (6 lessons · 17 min)

- Main P&ID Issuance Purposes — 2:34
- Conceptual and Basic Engineering — 4:09
- Issuing P&IDs for Design — 3:41
- HAZOP Session and Its Effect on a P&ID — 2:52
- Construction and As-Built P&IDs — 2:17
- Effect of Changes in a P&ID on a Project Workflow — 1:32

Section 14: Types of P&IDs (7 lessons · 14 min)

- Legend P&IDs — 3:58
- Typical Details P&IDs — 1:30

- Distribution P&IDs — 2:21
- Tie-in P&IDs — 1:53
- Main Process Considerations when selecting Tie-in Location — 3:20
- Packaged P&IDs — 1:39
- Let's Recap

Section 15: P&ID Maintenance and Operational Requirements (20 lessons · 57 min)

- How to Provide the Operator with Plant Performance Indicators — 1:05
- Measuring reading from Field using Field Instruments — 2:34
- Show Instrument Reading to Operator in Control Room — 6:11
- Warn the Operator from Upset Conditions Using Alarms — 3:04
- Sampling Connections from the Plant to the Laboratory — 1:46
- Let's Recap
- Importance of Plant / System Isolation — 2:15
- Types of Isolation — 3:16
- Factors to choose Isolation Technique — 5:08
- Isolation of pumps — 2:37
- Isolation of Vessels and Shell & Tube Exchangers — 3:27
- Isolation of Control Valves — 2:40
- Isolation of Pressure Safety Valves (PSVs) — 6:53
- Let's Recap
- Preparation for Static Equipment Maintenance **[Free preview]** — 3:44
- Steaming out a Vessel **[Free preview]** — 2:24
- Choose the Drainage Location **[Free preview]** — 2:07
- Closed Drain System **[Free preview]** — 5:34
- Open Drain System **[Free preview]** — 2:20
- Let's Recap

Section 16: P&ID Protection and Safety Requirements (25 lessons · 1 hr 17 min)

- Potential Hazards in a Process Plant — 2:53
- Warn the Operator - Layers of Protection — 3:21
- Proper Design Conditions - Eliminate the Risk — 1:05
- Fail Safe Position - Eliminate the Risk — 1:03
- Prevent Hazard by Shutting down the System - Layers of Protection — 1:41
- Mitigate Hazard by PSV - Layers of Protection — 0:51
- Design Pressure of Centrifugal Pump Discharge System — 4:53
- Design Temperature for the system downstream a Cooler — 0:49
- Applying 10 13 Rule on a shell & Tube Exchanger to handle Tube Rupture Scenario — 2:42
- Compressor Settling Out Pressure — 3:21
- Design Temperature of Compressor Suction — 1:37
- Control Valve Fail Action a in High to Low Pressure Interface — 2:18
- Valve Fail Action in Reactor Cooling System — 0:41
- Control Valve Failing in Location — 1:58
- Let's Recap
- External Equipment Protection from Process Upsets — 3:38
- Avoid Common Cause Failure by Segregation between Control and Shutdown Systems — 2:40
- Cause and Effect **[Free preview]** — 1:18
- Gas Blowby Example — 3:29
- Overview of a cause and effect template and how it looks like — 13:37
- Example for applying Interlocks on Cause & Effect — 12:32
- Reciprocating pump discharge, Pipe Thermal Expansion & Exchanger Tube Rupture — 4:16
- Blockage, External Fire, Control Valve Failure, and Coolant Failure — 4:49
- How to Properly choose the PSV Sizing Cases? — 2:18
- Let's Recap

Section 17: Applying Safety Studies on a P&ID (17 lessons · 58 min)

- Role of Safety Studies — 4:01
- Main HAZOP Rules — 1:46
- Node Classifications — 1:41
- Example of HAZOP Worksheet — 1:22
- Example 1: No Flow Deviation at Vessel Inlet — 9:38
- Example 2: More Liquid Flow to Vessel — 6:43

- Analysis and Recommendations for Example 2 — 5:02
- Example 3: More Gas Flow to Vessel — 1:58
- Example 4: Less Liquid Level in the Vessel — 2:18
- Let's Recap
- What is SIL Assessment? — 2:24
- How to Assess Frequency of a Hazard Consequence? — 7:43
- Analyse the severity of a Consequence — 1:59
- Applying Risk Reduction Matrix — 2:45
- Example 1: HIPPS system to protect Vessel Inlet — 2:29
- Example 2: Protection against Gas Blowby — 7:08
- Let's Recap

Section 18: Pipe Sizing (24 lessons · 1 hr 16 min)

- Main Sizing Criteria — 1:03
- Effect of Velocity on a pipe and its calculation — 2:00
- Velocity criteria for gases and two phase flow — 2:28
- Pipe Sizing Velocity Criteria for Liquids — 2:00
- Pressure Drop sizing approaches — 2:51
- Calculate friction factor — 2:51
- Calculating pressure drop for two phase flow — 1:15
- Pressure drop criteria — 3:11
- Hydraulic Loops — 6:08
- Two phase flow regimes — 2:53
- How to avoid or reduce slug flow? — 4:14
- Determine pipe internal diameter against pipe schedule — 1:27
- Consider fittings and calculate pipe equivalent length — 1:52
- Let's Recap
- Tools to calculate pipe sizing — 1:53
- Pipe sizing examples introduction — 5:08
- Pipe Sizing Calculation Sheet
- Example 1- Condensate at pump discharge — 2:30
- Example 2- LPG at pump suction — 3:56
- Example 3- Gas at compressor suction — 2:03
- Example 4- Two phase flow example — 3:20
- Example 5 - Condenser Hydraulics — 9:40
- Example 6- Reboiler Hydraulics — 13:20
- Let's Recap

Section 19: Pump Hydraulics Course (37 lessons · 1 hr 59 min)

- Introduction — 1:23
- Why do we Need a Pump? — 5:45
- Main pump types and how they work — 4:45
- Factors affecting pump selection — 2:52
- Main pump Calculations — 0:52
- Available Pump Net Positive Suction Head — 2:22
- How do we calculate pump NPSH? — 1:48
- Pump Strainers — 1:29
- Vertical can pumps — 1:06
- Solutions to adjust pump NPSH — 3:12
- NPSHA example 1 — 3:11
- Solution to NPSH example 1 — 12:45
- NPSH example 2 — 1:46
- Solution to NPSH example 2 — 5:49
- What is pump differential head? — 2:22
- How can we calculate pump differential head? — 2:17
- Differential head Example 1 — 0:51
- Solution to diff. head example 1 — 10:09
- Differential head example 2 — 0:27
- Solution to Example 2 — 1:55
- Pump Power and how to calculate it — 3:36
- Solution to pump power example — 3:33
- Pump Calculation sheets

- Performance curve, system curve and operating point — 3:09
- A closer look into the pump curve — 4:03
- Let's Recap
- Performance curve of a positive displacement pump — 2:26
- Pump main control methods — 2:48
- Controlling discharge resistance using a control valve **[Free preview]** — 9:43
- Changing pump speed using Variable Frequency Drive motor **[Free preview]** — 3:50
- VFD power savings **[Free preview]** — 2:21
- Pump series and parallel configuration — 1:02
- Parallel configuration overview — 4:41
- Parallel pumps performance curve — 3:55
- Pumps in series overview — 4:42
- Pumps in series performance curve — 2:18
- Let's Recap

Section 20: Control Valve Hydraulics Course (25 lessons · 1 hr 48 min)

- Introduction — 1:46
- Main functions of a control valve — 5:54
- How a control valve works? — 1:47
- Valve cavitation — 3:22
- Flashing — 3:18
- What is a valve CV? — 2:37
- Equations calculating valve Cv — 2:23
- Choked Flow — 2:59
- Control Valve Inherent Characteristics — 4:07
- Control Valve authority — 1:49
- Actual Control Valve Pressure Drop — 1:36
- Valve Installed Characteristics — 3:53
- Inherent vs Installed Characteristics — 3:14
- Valve Plug Geometry — 1:00
- Butterfly Valves — 3:04
- Butterfly inherent vs installed characteristics — 1:38
- Let's Recap
- Valve sizing Procedure — 1:48
- Calculating Control valve pressure drop — 3:23
- Determine the controlling cases — 3:51
- Example 1: Calculate pressure drop and controlling case pump discharge valve — 32:47
- Example 2: On tower overhead — 15:18
- Valve sizing procedure by valve supplier — 1:45
- Oversized vs undersized Valves — 5:07
- Let's Recap

Section 21: Compressor Operation Course (40 lessons · 2 hr 47 min)

- Introduction — 1:11
- Pumping liquids vs compressing gases — 1:41
- Compressor types — 2:18
- When to use a dynamic or a positive displacement compressor — 4:52
- Dynamic compressor types — 1:23
- Positive Displacement compressor types — 1:55
- Using compressor in with more than one stage — 5:52
- Compressor performance head — 2:32
- Adiabatic vs Polytropic behavior — 2:15
- How to calculate compressor head — 1:58
- Let's Recap
- Effect of changes in inlet gas conditions on the compressor — 3:46
- Importance of polytropic efficiency for a centrifugal compressor — 5:22
- Explaining Compressor efficiency - Adiabatic Efficiency — 6:58
- Surge and Stonewall — 2:04
- How system resistance affects the compressor performance — 1:00
- Surge scenario — 2:48
- How to protect the compressor from surge — 2:09
- Anti-surge Caveats — 3:59

- Anti surge take off point — 4:34
- Let's Recap
- Dynamic compressor control methods — 1:41
- Discharge Throttling [\[Free preview\]](#) — 2:22
- Suction Throttling — 2:24
- Inlet guide vane angle adjustment — 0:49
- Controlling speed using variable speed drivers [\[Free preview\]](#) — 1:45
- Main reciprocating compressor control methods — 2:11
- Spill-back or recycle control — 2:42
- Compressor Cylinder Types — 5:06
- Step control of a reciprocating compressor — 4:13
- Variable Speed Control of a reciprocating compressor — 2:04
- Let's Recap
- Adding a Compressor on HYSYS and Analyzing Main Parameters — 10:56
- Plotting the compressor curve and changing operating points — 6:15
- Effect of Changes in Gas Molecular Weight on Compressor Performance — 6:02
- Manipulating Inlet Pressure, Flow and Speed — 11:35
- Effect of changes in inlet Compressor Temperature — 8:39
- Compressor Surge Analysis Tool — 23:30
- Checking Surge with Cooler on Suction — 5:54
- Simulating Compressor's Operation - Practical Insights — 10:43

Section 22: P&ID Review Example - Separator, Pump and Exchanger (11 lessons · 2 hr 11 min)

- Walking through P&ID - Part 1 — 19:14
- Walking through P&ID - Part 2 — 17:58
- Review Title block, tagging, line numbers, notes and holds [\[Free preview\]](#) — 18:53
- Checklist scope fail actions winterization fail actions and others — 21:27
- Check piping details - Spec breaks, reducers and enlargers check with sizing — 11:16
- Checking Maintenance, isolation valve locking and drainage requirements — 9:24
- Performance indication, bypass, tie in and future connections — 5:25
- Insulation and full bore requirements — 1:48
- Upset scenarios safeguards & exchanger mismatch with PFD — 14:44
- Checking fire scenario and heat exchanger configuration — 11:12
- Download Walkthrough Data

Section 23: Specifying Design Conditions of Equipment (8 lessons · 1 hr 6 min)

- Basic design pressure, maximum and minimum design temperature criteria [\[Free preview\]](#) — 9:01
- Steaming out conditions — 4:49
- Design Pressure in case of Pump or Compressor Discharge blockage — 17:15
- Design temperature at exchanger maloperation or blow down MDMT — 5:39
- Atmospheric tank and tower sections design pressures — 2:27
- Example of calculating design pressure & temperature - Oil facility inlet, gas and water outlets — 8:25
- Analyzing design conditions for oil separator outlet, pump suction discharge and minimum flow — 8:30
- Design conditions for oil exchangers, desalter and air cooler up to cooler — 10:22

Section 24: Line Designation Table (Line List) (2 lessons · 32 min)

- Line Designation Table Template and data to be added — 19:24
- Adding data to line designation table — 12:40

Section 25: Separator & Vessel Sizing Course (36 lessons · 4 hr 48 min)

- Effect of Required Droplet Size and K Factor [\[Free preview\]](#) — 12:31
- Specifying K factor for vertical vessels [\[Free preview\]](#) — 4:23
- Calculating Droplet Size for Horizontal Vessels using Ballistic model [\[Free preview\]](#) — 9:49
- Understanding Vessels function as a surge drum [\[Free preview\]](#) — 5:16
- Residence Time Criteria — 13:07
- Minimum span Criteria — 5:38
- Effect of normal liquid level on separation efficiency — 3:54
- Effect of foaming and inlet slugs — 6:56
- Effect of Fouling on Vessel Internals — 2:08
- Degassing Criterion — 2:13
- Vessels Quiz 1

- Main Vessel Sections — 6:26
- Choosing Vertical vs Horizontal vessels — 6:15
- Types of Inlet Devices — 15:35
- Plate Packs and Coalescers — 4:36
- Vessel Outlet Devices — 7:10
- Vessels Quiz 2
- Factors affecting maximum particle size — 6:28
- Sizing Procedure for vertical separators — 6:31
- Horizontal Separator Sizing Procedure — 9:36
- Vessels Quiz 3
- Example 1 - Vertical Vessel with only deflector No outlet Device — 20:10
- Example 1 - Effect of Adding IVD (Schoepentoeter), Mesh Pad, or Vane Pack — 15:48
- Example 1 - Adding oversize factor for vertical and horizontal vessels Sizing — 4:42
- Example 2 - Sizing the separator as a horizontal vessel — 18:03
- Example 2 - Adding devices to the horizontal separator — 10:38
- Example 3 - Compressor Suction Scrubber **[Free preview]** — 17:01
- Example 4 - Debutanizer Overhead Accumulator and effect of residence time — 16:04
- Example 4 - Accommodating slug and foaming — 4:57
- Vessels Quiz 4
- Example 5 - Liquid Collecting vessel with boot configuration — 11:21
- Example 6 - Sizing 3 phase separator with weir configuration — 25:18
- Vessels Quiz 5
- Explaining main concepts introducing plate packs — 4:38
- Piping, instrument and other nozzle considerations — 10:52
- Access files for all examples

Section 26: PSV Sizing Course (42 lessons · 5 hr 2 min)

- Main codes and standards used — 3:56
- PSV Quiz 1
- Spring Loaded Pressure Safety Valves — 3:35
- PSV operation from opening to reseating **[Free preview]** — 14:08
- Pressure Relief Valve Mechanism liquid service **[Free preview]** — 6:38
- Pressure Terminologies in a Pressure Safety Valve **[Free preview]** — 9:22
- An Expert Pressure Relief Valve Overview
- Main PSV types — 6:09
- Effect of PSV testing and CDTP — 8:29
- Operational Issues: Chatter and Leakage — 6:55
- Pilot Operated Valves — 3:30
- Effect of flare backpressure — 7:19
- PSV Quiz 2
- Main Steps in Sizing a PSV — 9:21
- Equations Calculating Orifice Area for a gas service — 14:49
- Example Calculating Orifice Area for a Critical and Subcritical Flow — 7:30
- Alternate method for subcritical calculation of orifice area — 2:58
- Calculate Orifice Area for Steam Service — 3:34
- Get orifice area of a PRV handling Liquid Service with example — 7:14
- PSV Quiz 3
- Basis on which Relief Load is Determined — 9:07
- Fire Scenario — 18:00
- Example calculating fire with traditional method — 24:03
- Solving fire case using HYSYS — 13:16
- Sizing PSV for gas fire (Supercritical fluid service) — 11:10
- Thermal Expansion — 8:07
- Blockage — 9:09
- Control Valve Failure — 13:35
- Loss of Cooling — 10:04
- Absorbent Failure — 1:31
- Check Valve Failure — 2:54
- Reflux Failure — 13:57
- PSV Quiz 4
- Analyzing Fire and Blockage cases for LTS — 17:33
- Pressure Vacuum Safety Valves for Tank Protection — 7:24
- Causes of overpressure in tank — 4:06

- Calculation of inbreathing and outbreathing rates — 10:09
- Using Emergency Hatches Protecting tank from Fire — 1:21
- Rupture Disc — 4:19
- Surge Relief Valves to protect against water hammer — 7:17
- PSV Quiz 5
- All Calculation Resources

Section 27: Shell and Tube Exchanger Thermal Design (53 lessons · 8 hr 16 min)

- Standards and Criteria to be followed — 6:43
- HTRI Interface - Adding Basic Data — 16:05
- HTRI Interface - Input Process Data — 9:00
- HTRI Interface - Input Geometry — 3:19
- HTRI Interface - Output Reports — 8:58
- Exchangers Quiz 2
- How duty is affected by fluid properties — 4:34
- How Mean Temperature Difference Affects Exchanger Performance with example — 15:39
- Main Equation for Heat Transfer Coefficient — 1:25
- Equation Calculating fluid Film Coefficients for shell and tube sides — 13:08
- Examples for Effect of Viscosity on Heat Transfer Coefficient — 8:12
- Example effect on exchanger geometry on heat transfer coefficient — 5:38
- Exchangers Quiz 3
- Effect of Shell Diameter, Number of Tubes and Tube Length — 17:14
- Effect of Tube Passes — 4:14
- Effect of Baffles — 8:29
- Effect of Nozzles — 8:59
- Flow Streams — 15:19
- Tube to tubesheet Joints — 2:37
- Exchangers Quiz 4
- Introduction to reboiler types — 7:55
- Kettle Type Reboiler or Exchanger Design Aspects — 16:47
- Thermosiphon reboiler Design Considerations — 11:02
- Analyzing Exchanger Parts and TEMA types- Part 1 — 15:17
- Analyzing Exchanger Parts and TEMA types- Part 2 — 12:04
- Exchangers Quiz 5
- Tube Layout — 8:17
- Installing a Tube Bundle Animation — starts at 01:30
- Pulling Exchanger Bundle using Bundle Extractor
- Exchangers Quiz 6
- Factors Affecting vibration — 10:49
- Types, forms and solutions of vibration — 11:06
- Acoustic Vibration — 5:26
- Exchangers Quiz 7
- Main Sizing Procedure — 25:50
- Workflow of an Exchanger in a Project from Design to Delivery — 14:18
- Analyzing the data that is added in an exchanger datasheet **[Free preview]** — 21:49
- Exchangers Quiz 8
- Crude Kerosene Exchanger — 14:00
- Crude Naphtha Exchanger **[Free preview]** — 15:42
- Crude Naphtha Exchanger - Part 2 — 19:59
- Gas Liquid Exchanger — 11:54
- Gas Gas Exchanger — 14:17
- Solving Acoustic Vibration in Gas Gas exchanger — 9:27
- Propane Cooler — 16:08
- Introducing kerosene side stripper reboiler — 11:32
- Solving as Thermosiphon Reboiler — 16:21
- Solving as Kettle Reboiler — 11:32
- Rough Hydraulic Calculation — 14:45
- Firm Reboiler Hydraulic Calculation — 7:13
- Sizing Condenser Example — 17:52
- Analyzing Duty Mismatch and considering J type — 5:43
- Access files for all examples

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