Process Design & Simulation

Training Scheme & Schedule

Aspen HYSYS · Pipenet · HTRI · Spreadsheet Methods
Alpha Tek Development Pakistan
FANCO Industrial Solutions

Elevating Process Engineering Capability

Through Rigorous, Software-Integrated Training

Programme Overview

01	Process Simulation – Amine Sweetening, Gas Dehydration & Pipeline Networking	Aspen HYSYS	3 days
02	Single & Multi-Phase Hydraulics	HYSYS / Pipenet / Fluid Flow	2 days
03	PSV Sizing (API 520 / 521)	Aspen HYSYS	2 days
04	Heat Exchanger Design & Rating	HTRI / HYSYS	3 days
05	Separator & Knockout Drum Sizing	Excel Spreadsheet	2 days

M01

Process Simulation – Amine Sweetening, Gas Dehydration & Pipeline Networking

Aspen HYSYS

Learning Objectives & Technical Concepts

Objectives

- Understand gas treatment process from well head to sales gas
- Build & converge steady-state HYSYS simulation models

Technical Concepts

- Amine Sweetening & Glycol dehydration – TEG contact tower design
- Water dew-point specification & hydrate prediction
- Pipeline pressure-drop & line sizing

Software Exercises

Software Exercises (Aspen HYSYS)

- Build amine sweetening unit from scratch
- TEG dehydration model
- Pipeline network model

M02

Single & Multi-Phase Hydraulics

HYSYS / Pipenet / Fluid Flow

Learning Objectives & Technical Concepts

Objectives

- Apply Darcy-Weisbach & Hazen-Williams for liquid lines
- Use Beggs-Brill for multiphase flow
- Size pipelines against erosional velocity & dP/100 criteria

Technical Concepts

- Reynolds number, friction factor & flow regime maps
- Two-phase flow pattern maps
- Pump performance curves on network
- Piping fittings: Equivalent length

Software Exercises & Deliverables

Software Exercises (HYSYS / Pipenet / FluidFlow)

- HYSYS: single-phase liquid & gas line sizing
- HYSYS: two-phase pipeline with terrain profile
- Pipenet / Fluid Flow: branched distribution network model
- Pipenet /Fluid Flow: pump–system curve intersection & selection

M03

Pressure Safety Valve (PSV) Sizing

Aspen HYSYS

Learning Objectives & Technical Concepts

Objectives

- Identify credible overpressure scenarios per API 521
- Calculate required orifice area.
- Select valve type – conventional / bellows / pilot (API 520)

Technical Concepts

- Overpressure scenarios: blocked outlet, fire case, CV failure
- API 520 / 521 sizing equations – gas & liquid service
- Tail-pipe & header sizing; back-pressure impact

Software Exercises & Deliverables

Software Exercises (Aspen HYSYS Relief Sizing)

- Blocked outlet scenario – gas service sizing
- Fire case sizing on a pressure vessel
- CV Failure Scenario

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M04

Heat Exchanger Sizing & Rating

HTRI / HYSYS EDR

Learning Objectives & Technical Concepts

Objectives

- Design of S&T HE
- Rate existing exchangers

Technical Concepts

- LMTD method & F-correction factor for multi-pass
- Bell- method for shell-side heat transfer
- Fouling resistance (TEMA standards) & cleanliness factor
- TEMA shell types: E, F, G, H, J, K, X

Software Exercises & Deliverables

Software Exercises (HTRI Xchanger Suite + HYSYS)

- HYSYS: size gas-gas exchanger using shortcut method & EDR
- HTRI: detailed STHE design – geometry optimization
- HTRI: rate existing exchanger

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M05

Separator & Knockout Drum Sizing

Excel Spreadsheet

Learning Objectives & Technical Concepts

Objectives

- Size 2-phase & 3-phase separators using industry methods
- Design KO drums for flare systems

Technical Concepts

- Droplet settling theory
- Residence time requirements
- Mist eliminator / demister selection
- 3-phase: oil-water interface level & boot sizing
- Vortex breaker, inlet device & nozzle sizing
- L/D ratio optimization for horizontal vs. vertical vessels

Software Exercises & Deliverables

Software Exercises (Excel Sizing Workbooks)

- 2-phase vertical separator sizing workbook
- 3-phase horizontal separator
- Flare KO drum

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