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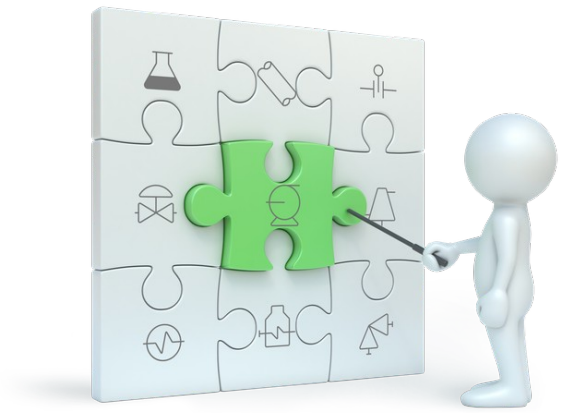

Process Design Practices

Cilliers Kruger

Intensive 5 day training course for chemical engineers with 0.5–5 years of experience. It bridges the gap between university education and practical process engineering. This course emphasizes calculation methods and techniques to troubleshoot and design process units by providing high quality handouts and numerous examples.

CONTENT

Simulation

Flash calculations; Equations of state; Mass, energy and entropy balance; Simulation of typical equipment; Phase equilibrium; Immiscible systems; Critical and retrograde phenomena

Design Conditions

Relief valve locations; Design pressure, including typical margins, pumps shut off head and, 10/13 rule; Vacuum design pressure; Test pressure; Design temperature, including typical margins; MDMT and Minimum pressurization temperature; Flanges, including type, facing and rating; Pipe specs; Pipe spec breaks.

Hydraulics

Pipe sizing techniques; Equipment nozzle sizing; Typical equipment pressure drops; Hydraulic cases; Hydraulic circuits

Piping

Pressure drop calculation; Incompressible flow; Compressible flow; Two-phase flow; Two-phase flow regime maps; Friction factors; Pipe roughness; Insulation and tracing; Hot taps and stopples; Hand valves

Flow Orifices

Types; Orifice construction, taps, straight run requirements and wiring diagram; Orifice sizing; Beta ratio limits; Orifice/nozzle equations; Choke flow; Two-phase flow; Discharge coefficients; Expansion factors; Permanent pressure drop; Flow correction

Control Valves

Components; Body types, size, trim, action, direction and characteristics; Actuator type and action; Positioners; Failure mode; Installation; Wiring diagram; Valve sizing; Equations for liquids, gases and 2-phase flow circuits

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Vessels

Types; Sizing and rating techniques and equations; Level configurations; Vessel nozzles and heads; Vertical and horizontal vessel layout; Inlet piping; Elevation and supports; Volumes

Towers

Simulation; Tray types; Efficiency; Column sizing criteria; Jet and Downcomer flooding; Derating factor; Tray spacing; Tower layout; Tray and piping layout at feeds, draw offs, transitions and reboilers; Types and layout of reboilers/condensers

Pump & Compressores

Pump/compressor components and types; suction/discharge piping; Stuffing box pressure; Typical pump/compressor curves; Spillback options; NPSHA and NPSHR; Seal systems; Horsepower; Capacity/pressure control; Surge control; Drivers

Heat Exchangers

Heat transfer basics; Typical U-values; Temperature difference; FT factor; Approach; Heat release curves; Pressure drop; TEMA types and guidelines; Tube and pass arrangements; Baffles; Typical layouts

Heaters

Heater types; Heater components; Radiant/Convection sections; Sootblowing; Decoking; Dryout and Startup/Shutdown; Burners; Fuel piping and shutdown systems; Simulation practices; Efficiency; Excess air/oxygen; Flue gas dew point and ash corrosion; Process inlet piping

Relief Valves

Set, accumulated and back pressures; Relief valve types; ASME 1 & 8 issues; Relief valve sizing; Inlet and outlet piping; Relief cases and loads; Instrumentation and double jeopardy

Metallurgy

Design life; Common refinery materials and ASTM designations; Refining corrosion mechanisms, including high temperature hydrogen, sulphur and hydrogen sulphide corrosion; HIC; PWHT; CUI; Temperature embrittlement; Flue ash corrosion; PTSCC and CISCC; Non-destructive testing

CONTACT US

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