PS2000: Basic Process Operations Simulator

The PS-2000 is a simulation software package with rigorous and detailed dynamic simulation models of industrial process equipment — Heat Exchanger, Pump, Compressor, Distillation column, Reactor, Furnace, Boiler, etc. The trainee can learn the equipment configuration, control system, perform normal operations, emergency handling and troubleshooting procedures, startup and shutdown operations on each of the module.

For Academic

- Industrial Exposure for Students
- In-depth Process Understanding
- Carry out In-house projects
- Sound Fundamental Concepts of Process Control and safety with DCS Operations
- Understanding the Intricacy & Complexity of process dynamics
- Employability

For Industries

- Improved Plant Safety
- Smooth Startup & Shutdown
- Evaluation of Operator Proficiency
- Faster Recovery from External/Internal Process Disturbances
- Increased familiarity of Controls & Interlock Systems

The package consists of simulation models for various equipment that are used in process and power plants. Each model simulates an equipment with its control, instrumentation and safety systems and field devices. The Instructor can invoke malfunctions, disturbances and instrument failures and evaluate the trainee performance. Trainee can perform normal and emergency operations as well as startup/shutdown operations on these models.

SIM INFOSYSTEMS PVT LTD, 11,1st Cross Street, Nehru Nagar, Kottivakkam, Chennai 600 041, INDIA
Phone: +91-44-24542617, Email: sales@siminfosystems.com. www.siminfosystems.com

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PS-2001 Distillation:
The Distillation module simulates a De-Propanizer column with steam boiler, overhead air-fan cooler and reflux drum. The simulation model also displays the top and bottom product purity.

PS2003 Centrifugal pump:
This module teaches the trainee the operating fundamentals of the Centrifugal pump. The dynamic simulation of pump provides a virtual environment for the trainee to understand various functional aspects of the equipment, normal operating conditions and effect of changes in the input parameters and their corresponding responses on suction head, NPSH available and required, power and discharge flow.

PS-2002 Superheated Steam Boiler:
The Boiler simulation model simulates a typical industrial boiler which includes feed drum, deaerator, steam drum, combustion system and desuperheater. All the controls and trip system are included in the simulation.

PS-2004 Flash drum:
The flash drum model simulates a multi component vapor-liquid flashing. The drum pressure and level controller are provided. Trainee can change the inlet feed temperature and composition and observe the vapor and liquid flows and composition.

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PS-2005 Heat Exchanger:
Single phase heat exchanger that simulates all the design parameters and variation of them as well as inlet stream flow and properties.

PS-2006 Heater with APH:
Crude heater consisting of two coils, fuel system and Air preheater. The Oxygen content of flue gas is displayed

PS-2007 CSTR:
This module is to teach trainees the operating fundamentals of a CSTR using dynamic simulation. The trainee can change the flow rates of the two reactants, reactor temperature, rate of reaction and simulate the product composition.

PS-2008 CSTR in series:
This module simulates two CSTR operating in series. The product from 1st reactor is fed to 2nd reactor for further reaction. The temperature of the reactors can be controlled by respective temperature controllers.

PS-2009 Fixed Bed Reactor:
This module simulates a hydrocracking reactor where the heavy feed is cracked into lighter product in the presence of catalyst. Hydrogen is introduced between the beds to quench the heat of reaction.

PS-2010 Plug Flow Reactor:
Reactor flow rates, inlet temperature and order of reaction can be changed to study the outlet product composition.

PS-2011 Cyclone Separator:
Collection Efficiency is calculated as a function of Viscosity of gas, Density of particles, Density of the gas, Inlet Velocity of gas, Inlet Width of the cyclone, Number of Effective Turns provided by cyclone and Particle Diameter.

PS-2012 Crystallizer:
The feed is heated in a heat exchanger through steam and evaporated in a flash evaporator. Heat exchanger outlet temperature and flash pressure can be varied to study the water crystallization rate.

PS-2013 Centrifugal Compressor:
The feed supply pressure, feed gas molecular weight, feed temperature and compressor RPM can be changed to simulate the compressor discharge pressure and flow. Anti-surge controller is simulated.

PS-2014 Centrifugal with utilities:
This module simulates a centrifugal compressor along with the lube and seal oil system.

PS-2015 Reciprocating Compressor:
Simulates a two stage reciprocating compressor.

PS-2016 Evaporator:
Controllers are provided for Evaporator temperature and pressure. User can change feed flow rate, feed temperature, ID, OD, tube pitch, number of tubes, number of tube passes, tube length and study the evaporation performance.

PS-2017 Blending:
This module is to simulate fuel oil viscosity blending operation using diesel as the cutter stock.

PS-2018 Gas Turbine:
Gas Turbine section, in which compressed air and fuel oil or fuel gas are ignited, drives the turbine, which in turn drives the electric generator. Air system, combustion section, turbine and generator are simulated.

PS-2019 Ball Mill:
Ball mill along with feed bin, cyclone, classifier, bag filter and product bin are simulated. Feed particle size, ball mill speed and classifier can be changed to study the product particle size.

PS-2020 pH neutralization:
Simulates acid neutralization using NAOH. Effect of change in acid and NAOH concentration can be studied in this model.

PS-2021 Batch Reactor:
Simulates a batch reactor. Effect of reactor temperature and reaction time on product quality can be studied.

PS-2022 Cement plant:
This is a simulation of Cement kiln operation. Besides feed, fuel and air controller, the user can also simulate effect of various disturbances and malfunctions.

PS2023: Refrigeration System
This model simulates a typical vapor compression Refrigeration system or modified Carnot cycle. This will have one theoretical model with commonly used refrigerant and two industrial use cases, one with ammonia and another with propane as a refrigerant.

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PS2101: Flow Through Pipes
Simulates a Virtual lab. This exercise is to determine the frictional losses encountered in a hydraulically smooth pipe under laminar and turbulent flow situations and to determine the effect of Reynolds number on fanning friction factor.

PS2102: Flow Through Packed Bed
Simulates a Virtual lab. This exercise is to experiment flow of water through a packed bed and variation of pressure drop and friction factor with Reynold's Number in a packed bed.

PS2103: Flow Through Fluidization Bed
Simulates a Virtual lab. This exercise is to experiment on the flow of air through fluidized bed and to obtain the effect of superficial velocity on bed porosity and pressure drop. Determine the minimum fluidization velocity from the experimental data.

PS2104: Heat Loss Through Pipes
Simulates a Virtual lab. This exercise is to determine the heat loss through pipes for different types material of construction.

PS2105: Double Pipe Heat Exchanger
Simulates a Virtual lab. This exercise is to determine the overall heat transfer coefficient making use of logarithmic mean temperature difference. From the overall heat transfer coefficient, determine the individual heat transfer coefficient for laminar and turbulent flow heat transfer. To compare overall heat transfer coefficient for parallel and counter flow heat exchange processes in a Double Pipe Heat Exchanger.

PS2106: Rotary Dryer
Simulates a Virtual lab. This exercise is to determine the drying characteristic for rotary dryer.

PS2200: Advanced CRE Module
This module consists of advanced chemical engineering reaction models namely preparation of catalyst, steady state non-isothermal reactor, non-isothermal continuous flow reactor, fluidized bed reactor, slurry bed reactor and trickle bed reactor.

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