

Aspirin Api Synthesis Unit Operations Training Pilot Plant

Item Number: LPK-ISPM



Introduction

An integrated pilot plant for aspirin API synthesis training, featuring batch reaction, recrystallization, and packed distillation modules. Offers dual-control operation, transparent vessels, and public utility simulation for safe, hands-on chemical engineering unit operations education. Ideal for university labs.

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Process Module	Core Functional Components	Key Technical Capabilities	Physical Footprint (L x W x H)
Public Utility Module	Softened water reservoir, cooling water circulation, air compressor interface, and vacuum pump.	- Supplies stable utilities to all modules - Centralized touch-screen control - Designed for continuous, unattended operation	\$\le\$ 2200 mm x 1120 mm x 2050 mm
Reaction Unit	Jacketed reaction kettle, neutralization kettle, charging pumps, and condensation reflux system.	- Quantitative reactant feeding - Acylation and neutralization operations - Vacuum liquid transfer and filtration separation - Fully transparent reaction vessels	\$\le\$ 2200 mm x 1120 mm x 2800 mm
Recrystallization Unit	Dissolution/crystallization vessel, temperature-controlled jacket, filtration system, and receiver.	- High-purity product recrystallization - Controlled cooling rate crystallization - Condensation reflux and vacuum transfer	\$\le\$ 2200 mm x 1120 mm x 2200 mm
Packed Distillation Unit	Packed distillation column, reboiler, reflux splitter, condenser, and distillate receivers.	- Batch and continuous distillation modes - Adjustable reflux ratio control - Constant power or self-regulating pressure heating - Enclosed tail-gas exhaust system	\$\le\$ 2200 mm x 1120 mm x 2285 mm

Core Curriculum	Associated Textbook Reference	Applied Unit Operations & Teaching Concepts
Chemical Reaction Engineering	<i>Unit Operations of Chemical Engineering</i>	- Batch reactor kinetics during acylation - Heat transfer in jacketed agitation vessels - Liquid-phase mass transfer and mixing behavior
Mass Transfer Operations	<i>Transport Processes and Unit Operations</i>	- Distillation in packed columns (HETP and HTU calculations) - Reflux ratio optimization and its impact on distillate purity - Solid-liquid extraction, washing, and vacuum filtration
Chemical Engineering Design	<i>Chemical Engineering Design</i>	- Process flow diagram (PFD) and piping layout analysis - Public utility load calculation and balancing - Process control loops (temperature, pressure, and flow rates)
Pharmaceutical Technology	Relevant Pharmaceutical Process Engineering Literature	- Synthesis, purification, and crystallization of APIs - GMP-aligned operational principles and contamination control