Constant Pressure Filtration Educational Unit Operations Pilot Plant

Item Number: LPK-BFLP

Introduction

Hands-on educational pilot plant for constant pressure filtration. Classic plate and frame filter press allows students to study kinetics, determine specific cake resistance, perform cake washing and evaluate washing rates. Ideal for chemical engineering curriculum. Mobile, customizable, safety-compliant design.

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Parameter	Specifications & Components
Physical Dimensions	≤ 2200 mm × 580 mm × 1400 mm (Length × Width × Height)
Frame Material	High-strength anodized aluminum alloy profile with heavy-duty casters
Filter Equipment	Industrial-type dismountable plate and frame filter press, washable blind-flow design
Feed System	Pressurized feed vessel with integrated pneumatic agitation disc and pressure-regulating valve
Material Vessels	Stainless steel slurry preparation tank, pressurized feed tank, and filtrate receiver
Safety Features	Overpressure relief valve, pressure gauges, and secure pipe routing
Slurry Aggregation	Bottom-entry compressed air pneumatic dosing and suspension system

Textbook	Core Unit Operation / Concept	Corresponding Lab Exercise with Pilot Plant
Unit Operations of Chemical Engineering	Cake filtration theory, constant pressure filtration equations, specific cake resistance, filter medium resistance.	Determination of filtration constants (K and s) and calculation of specific cake resistance under varying pressures.
Transport Processes and Unit Operations	Fluid-particle mechanics, porous media flow, cake washing dynamics, washing rate estimations.	Operation of the cake washing cycle to measure solute displacement rates and analyze washing kinetics.
Chemical Engineering Design	Equipment selection, scale-up of filtration systems, process safety in pressurized systems.	Evaluating pilot-scale experimental data to estimate the filtration area required for industrial-scale batch operations.