

Multimodal Absorption And Desorption Pilot Plant For Unit Operations Training

Item Number: LPK-DMTXS



Introduction

Multimodal absorption and desorption pilot plant for higher education labs. Bridges theory and industrial practice with transparent packed columns, three operational modes (real-material, simulated, semi-physical), and SCADA control. Students explore mass transfer, column hydraulics, and process control. Customizable.

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Parameter	Description
Footprint (L x W x H)	Approx. 3930 x 2560 x 4060 mm (Adjustable to site-specific laboratory dimensions)
Frame Material	Powder-coated structural carbon steel square tubing
Platform Construction	Two-tier layout with 3mm non-slip checkered plates and 1.2m yellow safety handrails
Column Type	Transparent packed absorption and desorption columns
Operation Modes	Real-material, Simulated-material, and Semi-physical simulation modes
Control Interface	Industrial PLC with PC-based SCADA supervisory control and data acquisition
Measurement Variables	Temperature, pressure drop, liquid/gas flow rates, and liquid levels

Experimental Training Module	Key Theoretical Concepts Covered	Relevant Textbook Concepts
Volumetric Mass Transfer Coefficient Determination	Gas-liquid mass transfer rates, concentration gradients, HTU and NTU calculation	Packed Column Design & Mass Transfer (<i>Unit Operations of Chemical Engineering</i>)
Column Hydraulics Study	Pressure drop vs. gas velocity, loading point, flooding point, wetting rate	Fluid Flow through Packed Beds (<i>Transport Processes and Unit Operations</i>)
Continuous Absorption-Desorption Loop	Solvent regeneration, recycling loops, steady-state process simulation	System Material Balances & Separation Processes (<i>Chemical Engineering Design</i>)
Process Control & Automation	Sensor calibration, cascade loop control, SCADA programming, interlock logic	Process Instrumentation & Control (<i>Chemical Engineering Design</i>)