

Packed Bed Absorption Educational Unit Operations Pilot Plant

Item Number: LPK-TLXS



Introduction

Study gas-liquid absorption, pressure drop, flooding, and mass transfer coefficients with this pilot plant. Transparent packed column, industrial touchscreen, real-time sensor data, automated analysis. Investigate two-phase flow, loading points, column efficiency. Comprehensive data logging and assessment software included.

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Educational Module	Technical Specifications & Capabilities	Textbook & Curriculum Alignment
Fluid Dynamics & Hydraulics	- Transparent packed column with industrial-grade packing. - Variable-speed gas blower and liquid pump. - Differential pressure transmitters for bed pressure-drop measurement.	Two-Phase Flow in Packed Beds: Loading and flooding point determination. Pressure Drop Correlation: Dry vs. irrigated packing pressure drop curves. - Directly corresponds to column hydraulics concepts in <i>Unit Operations of Chemical Engineering</i> and <i>Transport Processes and Unit Operations</i>.
Mass Transfer Determination	- Liquid distribution system with adjustable spray density. - Liquid and gas sampling ports. - High-accuracy flow meters for liquid and gas streams.	Absorption of Dilute Gases: Determination of volumetric mass transfer coefficients ($K_Y a$). Column Efficiency: Calculation of Height of a Transfer Unit (HTU) and Number of Transfer Units (NTU). - Aligns with mass transfer theories in <i>Unit Operations of Chemical Engineering</i>.
Process Control & Automation	- Industrial all-in-one touch screen interface. - Digital sensors for flow, pressure, and temperature. - Automated data logging and parameter calibration.	Plant Instrumentation & Control: Introduction to sensor calibration, signal transmission, and data analysis. System Design & Integration: Practical evaluation of control loops as discussed in <i>Chemical Engineering Design</i>.