Carbon Dioxide Absorption And Desorption Educational Pilot Plant For Carbon Capture Studies

Item Number: LPK-TBJJX

Introduction

Explore carbon dioxide absorption and desorption with this educational pilot plant. Transparent columns visualize mass transfer; electric heating simulates industrial solvent regeneration; touchscreen interface enables data monitoring. Ideal for chemical engineering, bridging theory and practice.

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Parameter / Component	Specification Details
System Dimensions	≤ 2200 mm × 580 mm × 2500 mm (Length × Width × Height)
Structure Frame	High-strength aluminum alloy with lockable, adjustable casters
Absorption Column	Transparent borosilicate glass, packed column configuration
Desorption Column	Transparent borosilicate glass, packed column with integrated reboiler
Desorption Heating	High-temperature electric heating jacket, operational up to 400°C
Control Interface	15.6-inch industrial touchscreen terminal
Data Transmission	Supports wireless data export and real-time remote monitoring
Instrumentation	Integrated gas mass flow meters, peristaltic liquid pumps, and temperature sensors

Experimental Module	Core Unit Operation & Knowledge Points	Associated Textbook & Concepts
Packed Tower Hydrodynamics	Pressure drop determination, loading point, flooding velocity, and gas-liquid flow regimes.	*Unit Operations of Chemical Engineering* - Flow of fluids through packed beds - Packed column design and flooding correlations
Carbon Dioxide Absorption	Gas-liquid mass transfer, solvent selection, two-film theory, and calculation of the height of a transfer unit (HTU).	*Transport Processes and Unit Operations* - Absorption of dilute gases in packed towers - Mass transfer theories and coefficients
Solvent Desorption & Regeneration	Thermal stripping, energy balance, solvent recovery, and reboiler duty calculation.	*Chemical Engineering Design* - Stripping column design - Energy integration and heat exchange in separation systems
System Efficiency Analysis	Overall mass transfer coefficient calculation ($K_G a$), influence of gas/liquid flow rates on absorption efficiency.	*Unit Operations of Chemical Engineering / Transport Processes and Unit Operations* - Gas-liquid equilibrium - Rate-based mass transfer in columns