Multi-Modal Distillation Unit Operations Training Pilot Plant

Item Number: LPK-DMTJL

Introduction

Multi-modal distillation pilot plant for practical unit operations training in chemical engineering education. Features real, analog, and semi-physical simulation modes, industrial construction, customizable for university labs. Hands-on fractionation columns, SCADA control, safety systems. Includes sight glasses, sampling ports, closed-loop recycling.

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Feature / Specification	Technical Details / Capability	Aligned Textbook & Core Unit Operations
Column Configuration	Sieve tray design, single-pass downcomer with visual sight glasses, and multi-point sampling ports.	*Unit Operations of Chemical Engineering* - Plate column hydraulics, tray efficiency calculations, vapor-liquid contact mechanisms, weeping, and flooding phenomena.
Variable Reflux Control	Manual reflux ratio control system with real-time feedback and calculation capabilities.	*Transport Processes and Unit Operations* - McCabe-Thiele method, determination of minimum and operating reflux ratios, and column mass balances.
Feed Thermal Control	Integrated pre-heater with adjustable temperature settings for the raw feed liquid.	*Unit Operations of Chemical Engineering* - Influence of feed thermal state (q-value) on operating lines and energy requirements.
Multi-Modal Simulation	SCADA configuration software with Real Material, Analog, and Dry Simulation algorithms.	*Chemical Engineering Design* - Process control systems, piping and instrumentation diagrams (P&ID), plant start-up/shut-down procedures, and process safety management.
Physical Platform	Overall dimensions: 3930 × 2560 × 3900 mm (customizable). Two-tier steel frame with safety handrails and textured floor plates.	*Chemical Engineering Design* - Industrial plant layout, equipment spacing, structural accessibility, and plant safety regulations.