

Hollow Fiber Ultrafiltration Membrane Separation Educational Pilot Plant

Item Number: LPK-SUF



Introduction

Explore our hollow fiber ultrafiltration membrane separation educational pilot plant for hands-on learning of industrial ultrafiltration processes, flux analysis, fouling mitigation, and process control. Compact, customizable, and built for engineering labs.

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Parameter / Component	Specification
Membrane Module	Hollow fiber ultrafiltration (UF) membrane module
Feed System	Polyvinyl Alcohol (PVA) test solution capabilities
Analytical Equipment	Spectrophotometer integration for concentration determination
Piping & Valves	High-transparency piping for flow visualization; chemical-resistant valves
Support Structure	Anodized aluminum alloy frame with heavy-duty lockable casters
Overall Dimensions	≤ 2200 mm × 580 mm × 1740 mm (L × W × H)
Customization Scope	Adaptable hardware components and software data logging integration

Experimental Module	Key Educational Objectives	Relevant Disciplines	Associated Textbook Concepts & Terminology
Ultrafiltration Flow Mechanics	Understanding co-current/cross-flow filtration, transmembrane pressure (TMP), and hydrodynamic resistance.	Chemical Engineering, Environmental Engineering, Water Treatment	Unit Operations of Chemical Engineering: Membrane separations, ultrafiltration, microfiltration, gel polarization, and mass transfer.
Separation Efficiency & Rejection Analysis	Calculating volumetric flux, solute rejection rates (PVA), and product recovery ratios under varying feed pressures.	Food Engineering, Biotechnology, Chemical Engineering	Transport Processes and Unit Operations: Concentration polarization, membrane transport equations, solute rejection, and physical separation processes.
Fouling Mitigation & Clean-in-Place (CIP)	Executing physical backwashing and chemical cleaning protocols to recover flux; learning preservation techniques.	Environmental Engineering, Process Design, Biotechnology	Chemical Engineering Design: Equipment fouling considerations, piping and instrumentation diagrams (P&ID), and operational safety in filtration systems.