

Rising And Falling Film Evaporation Educational Unit

Operations Pilot Plant

Item Number: LPK-DGZF



Introduction

Hands-on educational pilot plant for studying rising and falling film evaporation, flow regimes, and heat transfer. Customizable for university labs with industrial instrumentation and data acquisition. Enables comparative evaluation of evaporation modes and energy efficiency.

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Experimental Module / System Spec	Technical and Operational Details	Curricular Alignment & Textbook Knowledge Points
Two-Phase Flow Observation Module	Single vertical tube heated section with sight glass; real-time control of heat flux and liquid feed rates to stabilize different flow regimes.	Two-Phase Flow & Heat Transfer to Boiling Liquids Directly links to theories in <i>Unit Operations of Chemical Engineering</i> regarding liquid-vapor mixtures, boiling regimes, and two-phase hydrodynamic transport.
Rising & Falling Film Evaporation	Dual-configuration feed routing; adjustable liquid distribution for uniform film thickness; vacuum and atmospheric pressure operation.	Evaporation Equipment & Film Dynamics Illustrates the principles of heat-sensitive liquid concentration as detailed in <i>Transport Processes and Unit Operations</i> , focusing on film heat transfer coefficients and boiling-point elevation.
Industrial Control & Data Acquisition	Integrated industrial touch-screen workstation; automated sensor calibration; real-time PID control loops for heating and feed systems.	Process Control & Instrumentation Applies concepts of process control, sensor integration, and system design as discussed in <i>Chemical Engineering Design</i> , preparing students for modern digitalized plant environments.
Mass and Energy Balances	Precision flowmeters, temperature transmitters, and pressure sensors located at critical inlets and outlets for accurate balance calculation.	Conservation of Mass and Energy Supports practical calculations of overall heat transfer coefficients, vapor yields, and thermal efficiency, aligning with fundamental mass and energy balance chapters in classic chemical engineering curricula.