

Tubular Reactor Flow Characteristics Determination Educational Unit Operations Pilot Plant

Item Number: LPK-GSFYQ



Introduction

Educational pilot plant for investigating tubular reactor flow characteristics and residence time distribution. Features adjustable recycle for plug flow and backmixing studies, industrial touchscreen interface, and real-time data acquisition. Ideal for chemical engineering unit operations laboratory training and education.

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System Component / Module	Technical Description	Educational & Curriculum Focus
Reactor & Flow Loop	Clear vertical tubular column with integrated bypass and recycle lines; variable speed pump for flow rate control.	Flow rate control, recycle ratio adjustments, and fluid velocity calculations.
Detection System	High-precision inline conductivity sensors located at key process points; pulse injection port for salt tracer.	Pulse tracer method, conductivity calibration, and signal processing.
Control Interface	Industrial all-in-one touchscreen workstation running dedicated data acquisition and analysis software.	Digital process monitoring, real-time plotting, and industrial control systems.
Plug Flow Experiment	Operation with the recycle loop closed ($R = 0$) to study ideal plug flow behavior.	Deviation from ideal plug flow, dispersion model, and Peclet number determination.
Recycle & Backmixing Experiment	Operation with varying recycle flows to simulate intermediate mixing levels.	Tanks-in-series model, backmixing degree, and reactor performance under recycle conditions.