

Two Phase Flow Pattern Velocity Resistance Measurement

Educational Pilot Plant

Item Number: LPK-TSFR



Introduction

Benchtop educational pilot plant for university labs studying gas-liquid two-phase flow patterns, velocity, and resistance across circular, square, and rectangular conduits. Features 15.6-inch touchscreen, 5G connectivity, differential pressure sensors, safe water-air operation. Supports chemical engineering curricula.

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Parameter	Specification / Detail
Experimental Geometries	Circular, square, and rectangular conduits
Material Construction	High-transparency acrylic glass for test sections; corrosion-resistant alloys and polymers for fluid circulation loops
Control & Interface	15.6-inch integrated touchscreen console
Connectivity	5G / Bluetooth enabled for remote monitoring and cloud data storage
Safety Features	Real-time differential pressure monitoring, low-voltage control circuits, automatic pressure-relief protocols
Working Fluids	Water and air (non-toxic, low-maintenance)

Experimental Module	Academic Focus	Core Concepts Addressed	Textbook Alignment
Two-Phase Flow Regime Mapping	Multiphase Fluid Dynamics	Transition boundaries between bubbly, slug, plug, and churn flow regimes.	<i>Unit Operations of Chemical Engineering</i>
Frictional Resistance & Drag Analysis	Momentum Transfer	Pressure drops in smooth vs. obstructed conduits; calculation of friction factors and head loss.	<i>Transport Processes and Unit Operations</i>
Conduit Geometry Comparison	Fluid Mechanics	Effects of non-circular cross-sections on hydraulic diameter and Reynolds number calculations.	<i>Unit Operations of Chemical Engineering</i>
Instrumentation Calibration & Design	Process Control & Piping Design	Differential pressure transmitter calibration, rotameter operations, and sizing of industrial piping lines.	<i>Chemical Engineering Design</i>