

Fluid Transport And Piping Dynamics Practical Training Unit Operations Pilot Plant

Item Number: LPK-LTSS



Introduction

This industrial-scale fluid transport and piping dynamics training pilot plant provides essential hands-on experience with pump operations, cavitation, piping resistance, flow metering, and process control. Customizable to fit specific academic engineering curricula.

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System / Module	Specifications & Equipment	Educational & Practical Training Value
Physical Infrastructure	Dimensions: 3930 × 2560 × 3900 mm (customizable to site dimensions). Carbon steel frame with protective powder coating. Two-level operating deck with 3mm anti-slip checker plate flooring and 1.2m safety guardrails. Access stairs included.	Practical understanding of industrial plant layouts, spatial awareness, safe high-altitude operations, and routine plant inspection protocols.
Pumping & Transport Systems	Centrifugal pump, vortex pump, gear pump, vacuum pump, electromagnetic metering pump, and industrial air compressor. Supports series/parallel configurations and gravity, pressure, or vacuum-driven transport.	Hand-on familiarity with diverse fluid machinery, pump selection criteria, performance curve generation, and transport dynamics.
Cavitation & Air Binding Demonstration	Suction line equipped with controlled air injection valves and transparent observation sections.	Visual and diagnostic identification of air binding and cavitation, and training on proper pump priming and troubleshooting.
Piping Resistance & Hydraulics	Straight pipes of varying diameters, standard elbows, reducers, and diverse valves (gate, globe, ball). Equipped with differential pressure transmitters and manometers.	Direct measurement of major and minor friction losses, calculation of friction factors, and evaluation of valve resistance coefficients.
Flow Metering & Calibration	Glass rotameter, orifice plate flowmeter, metal float flowmeter, and turbine flowmeter. Calibrated volumetric collection vessel.	Comparative study of flow measurement principles, calibration techniques, and metering pump stroke-versus-flow rate calibration.
Level Control Loop	Vertical process vessels and storage tanks with level transmitters (differential pressure or ultrasonic), pneumatic/electric control valves, and manual bypasses.	Practical exposure to manual level regulation and automated loop control, sensor feedback, and control valve characteristics.