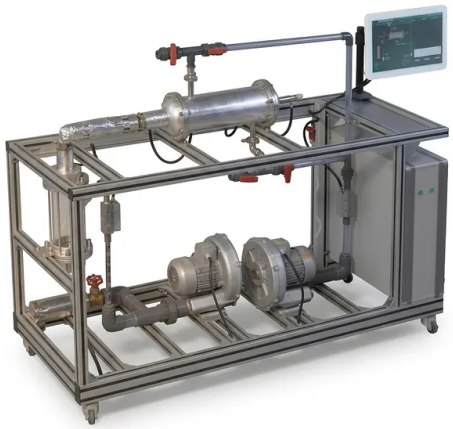
Shell And Tube Heat Exchanger Heat Transfer Coefficient Determination Educational Pilot Plant

Item Number: LPK-LGHR



Introduction

LABPARK's shell and tube heat exchanger pilot plant enables students to investigate heat transfer coefficients, LMTD, co-current vs counter-current flow, bridging theory and industrial practice. Customizable for chemical, mechanical, environmental engineering curricula. Ideal for unit operations and process engineering labs.

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System Component / Parameter	Technical Description	Educational & Experimental Objective
Shell and Tube Heat Exchanger	Stainless steel construction with a multi-tube bundle and shell baffles to promote turbulent flow.	Study of heat exchanger geometry, boundary layer resistance, and thermal contact area.
Fluid Circulation System	Variable-speed industrial pumps/blowers for precise flow control of hot and cold media.	Determination of the relationship between fluid velocity (Reynolds number) and convective heat transfer.
Data Acquisition System	High-precision temperature transmitters and electromagnetic/turbine flow meters.	Calculation of overall heat transfer coefficients (U) and verification of steady-state energy balances.
Control Console	Industrial all-in-one PC integrated into a robust, mobile aluminum profile chassis.	Hands-on experience with industrial automation, real-time data plotting, and sensor calibration procedures.

Experimental Module	Corresponding Unit Operations Concepts	Associated Academic Disciplines
LMTD Determination	Co-current vs. counter-current temperature profiles, LMTD correction factor computation.	Chemical Engineering, Mechanical Engineering
Heat Transfer Coefficient (U) Analysis	Convective heat transfer, conductive wall resistance, fluid flow rate dependencies.	Process Engineering, Food Engineering
Energy Balance Verification	Enthalpy changes in hot and cold streams, system heat loss estimation.	Environmental Engineering, Thermal Engineering