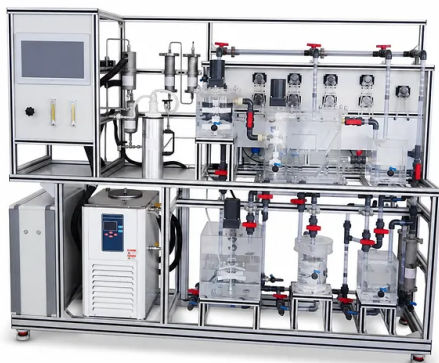


Thermal Desorption Exhaust Gas And Tail Water Treatment Educational Pilot Plant

Item Number: LPK-CRTF



Introduction

Bench-scale educational pilot plant for treating thermal desorption exhaust gas and tail water integrates condensation, Fenton oxidation, precipitation, filtration, and carbon adsorption. Ideal for chemical engineering and environmental labs, teaching unit operations, process control, and real-time data analysis.

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System Module / Component	Technical Details & Features	Associated Unit Operations & Textbook Mapping
Exhaust Gas Condensation & Recovery	Multi-stage condensation loop featuring standard cooling and deep cryogenic condensation, paired with a high-efficiency gas-liquid separator.	Condensation, Gas-Liquid Equilibrium, Heat Transfer Operations (<i>Unit Operations of Chemical Engineering</i>)
Fenton Advanced Oxidation Reactor	Transparent reaction vessel equipped with an adjustable speed agitator, chemical dosing ports, and real-time pH and temperature monitoring.	Chemical Reaction Kinetics, Reactor Design, Advanced Oxidation Processes (<i>Chemical Engineering Design</i>)
Precipitation & Solid-Liquid Separation	Gravity-based sedimentation clarifier designed to facilitate flock formation, settling, and sludge separation.	Gravity Settling, Sedimentation, Fluid-Particle Mechanics (<i>Transport Processes and Unit Operations</i>)
Deep Filtration & Adsorption Column	Dual-column system featuring sand/media filtration and multi-stage activated carbon adsorption beds.	Fixed-Bed Adsorption, Deep Bed Filtration, Mass Transfer Operations (<i>Unit Operations of Chemical Engineering</i>)
Control & Instrumentation Suite	Integrated PLC system with a touchscreen interface, digital flow sensors, pH transmitters, and temperature controllers.	Process Dynamics and Control, Data Acquisition & Instrumentation (<i>Chemical Engineering Design</i>)