

Solid Waste Pyrolysis And Refining Educational Pilot Plant For Unit Operations

Item Number: LPK-ISOP



Introduction

This pilot plant for solid waste pyrolysis and refining integrates pyrolysis, separation, distillation, and catalytic hydrogenation into one educational unit. It provides visual process observation, smart data logging, and industrial safety for hands-on learning of engineering unit operations.

[Learn More](#)

Component / System	Technical Specifications & Material Details
Primary Structural Material	High-grade 304 and 316 stainless steel for chemical resistance and high-temperature durability
Pyrolysis Heating System	Ceramic fiber electric heating furnace with integrated PID temperature controllers
Refining Subsystem	Distillation column, catalytic hydrogenation desulfurization, and denitrification reactors
Safety Mechanisms	High-temperature cut-offs, real-time pressure gauges/transmitters, explosion-proof motors
Control Interface	15.6-inch industrial touchscreen with remote cloud data monitoring (5G/Bluetooth)
Observation Elements	Borosilicate glass gas-liquid separators and column sections for flow process visualization

Experimental Module	Core Unit Operation / Knowledge Point	Textbook Alignment Reference
Solid Waste Pyrolysis	Thermochemical conversion, solid-state kinetics, conductive heat transfer in packed beds	<i>Transport Processes and Unit Operations</i> <i>Chemical Engineering Design</i>
Multiphase Separation	Gas-solid separation (gravitational/inertial settling), gas-liquid separation, phase equilibrium	<i>Unit Operations of Chemical Engineering</i> <i>Transport Processes and Unit Operations</i>
Pyrolysis Oil Distillation	Continuous and batch distillation, vapor-liquid equilibrium (VLE), reflux ratio, column hydrodynamics	<i>Unit Operations of Chemical Engineering</i> <i>Chemical Engineering Design</i>
Catalytic Hydrogenation (Desulfurization & Denitrification)	Heterogeneous catalysis, chemical reaction kinetics, mass transfer in multiphase reactors	<i>Chemical Engineering Design</i>