

Fixed Bed Gas Solid Catalytic Reaction Educational Pilot Plant

Item Number: LPK-GDCQG



Introduction

Fixed-bed gas-solid catalytic reaction unit operations pilot plant for chemical engineering education. Features split-furnace, mass flow controllers, PID control, safety interlocks. Ideal for heterogeneous catalysis, reactor dynamics, catalyst evaluation studies. Fully customizable configurations for university laboratories and academic research.

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System Component / Module	Technical Description & Parameters	Related Curriculum Concepts
Reactor Configuration	Fixed-bed tubular reactor (stainless steel or quartz options, customizable dimensions) rated for high-temperature operations.	Packed-bed dynamics, void fraction, catalyst bed loading.
Heating & Temperature Control	Programmable electric split-furnace with multi-zone PID temperature controllers and thermocouple sensors.	Reaction kinetics, activation energy, thermal effects in reactors.
Feed & Flow Control	Precision mass flow controllers (MFCs) for gas feeds; optional dosing pump for liquid vaporization feeds.	Space velocity (GHSV/LHSV), residence time distribution, stoichiometry.
Control & Instrumentation	Industrial Panel PC with integrated data acquisition software, real-time parameter display, and historical data export.	Process control, sensor calibration, computerized data acquisition.
Safety Interlocks	Dual-level over-pressure and over-temperature safety shutdown valves and audible/visual alarms.	Process safety management, pressure relief, industrial safety standards.
Experimental Capability	Catalyst activity testing, conversion rate calculation, regeneration cycles, and kinetic parameter determination.	Reaction rates, catalyst deactivation, Arrhenius plots, regeneration kinetics.