Steam Methane Reforming Hydrogen Production And Purification Educational Pilot Plant

Item Number: LPK-CCHTH

Introduction

This bench-scale educational pilot plant combines steam methane reforming with hydrogen purification, offering safe, hands-on unit operations training for university engineering laboratories. Its customizable design and high-precision monitoring enable real-time study of catalysis, phase separation, and process dynamics.

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Experimental Module / System Component	Technical Specifications	Curricular Focus & Target Measurements
Steam Reforming Reactor System	High-temperature catalytic reactor chamber; 316L/304 stainless steel construction; integrated ceramic fiber insulation jacket.	Heterogeneous catalysis, calculation of reaction conversion rates, and thermal energy efficiency in endothermic reactions.
Separation & Purification Column	Multi-stage condensation and separation column; precise liquid level monitoring; integrated gas-liquid separator.	Gas-liquid equilibrium (VLE), phase separation fundamentals, and mass transfer efficiency under steady-state conditions.
Thermal Monitoring & Control Network	High-precision Type K thermocouples; digital temperature transmitters; system accuracy of 0.1°C.	Process dynamics, PID temperature controller tuning, and transient thermal behavior analysis.
Fluid Delivery & Vaporization Unit	Micro-metering liquid pumps; mass flow controllers for gases; high-efficiency steam generator.	Stoichiometric feed ratio control, vapor-liquid feed mixing, and fluid flow dynamics in packed beds.