

Polymerization Granulation And Pellet Processing Educational Unit Operations Pilot Plant

Item Number: LPK-CJH30



Introduction

Integrated pilot plant for teaching polymer processing from polymerization to pelletizing. Includes 30L reactor, hydrolyzer, extruder-granulator, vibration dryer, crusher, and sieve. Atmospheric pressure operation for safety, corrosion-resistant SS, customizable for chemical and polymer engineering education. Ideal for university labs.

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Equipment Module	Technical Features & Configuration	Core Curriculum Topics & Unit Operations	Textbook Context & Reference Concepts
Batching Tank & Polymerization Reactor	30L Stainless steel vessel, electric heater, constant temperature bath, ribbon agitator.	Mixing and Agitation; Liquid-Phase Chemical Reactions; Heat Transfer in Agitated Vessels.	Liquid-state mixing dynamics, power consumption in agitation, and heat transfer coefficients in jacketed vessels (<i>Unit Operations of Chemical Engineering</i>).
Hydrolyzer	Dedicated stirring and electric heating system.	Reaction Kinetics; Thermal Conditioning of Viscous Media; Mass Transfer.	Mass transfer with chemical reaction, temperature dependence of reaction rates (<i>Transport Processes and Unit Operations</i>).
Pelletizer (Granulator)	Extrusion and pelletizing assembly.	Particulate Solids Processing; Polymer Rheology; Extrusion Mechanics.	Rheology of non-Newtonian fluids, mechanical separation, and size reduction operations (<i>Chemical Engineering Design</i>).
Vibration Dryer	Vibration-assisted transport and thermal drying.	Direct Contact Drying; Heat and Mass Transfer in Solids; Conveying of Particulates.	Drying rate curves, equilibrium moisture content, and gas-solid heat transfer (<i>Transport Processes and Unit Operations</i>).
Crusher & Sieve	Mechanical mill and vibratory sieving system.	Size Reduction; Particle Characterization; Mechanical Screening.	Screen efficiency, cumulative analysis of particle size distributions, and energy consumption in grinding (<i>Unit Operations of Chemical Engineering</i>).