

Bio-Fermentation Ethanol Production Practical Training Unit Operations Pilot Plant

Item Number: LPK-IBFE



Introduction

Bio-fermentation ethanol production pilot plant for hands-on training in unit operations: fermentation, solid-liquid filtration, membrane separation, and distillation. Bridges theory with industrial practice using industrial-grade components, customizable for university labs. Hybrid automated and manual control for comprehensive learning.

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Unit Module	Key Operations & Functional Specifications	Dimensions (L × W × H)
Public Utility Unit	- Supplies stable softened water, cooling water, compressed air, and vacuum. - Features an on-site touchscreen interface for automatic main control combined with manual operation points.	≤ 2200mm × 1120mm × 2050mm
Fermentation Unit	- Supports aerobic fermentation, anaerobic fermentation, and seed culture. - Features steam sterilization, jacketed heat exchange, and pneumatic air transfer. - Equipped with quantitative feeding and automatic temperature control via a water bath.	≤ 2200mm × 1120mm × 2050mm
Product Refining Unit	- Conducts solid-liquid separation via plate-and-frame filtration. - Performs membrane separation to filter out glucose macromolecules. - Equipped with a quantitative feeding system.	≤ 2200mm × 1120mm × 2050mm
Packed Distillation Unit	- Supports batch and continuous distillation with adjustable reflux ratios. - Features constant power or automatic pressure self-control for the reboiler. - Centralized exhaust management to prevent chemical vapors from escaping.	≤ 2200mm × 1120mm × 2285mm

Textbook Reference	Associated Unit Operation	Practical Application in the Pilot Plant
<i>Unit Operations of Chemical Engineering</i>	Distillation & Mass Transfer	Operating the packed column under continuous and batch modes, adjusting reflux ratios, and analyzing concentration profiles.
<i>Transport Processes and Unit Operations</i>	Solid-Liquid Separation & Filtration	Performing slurry separation via the plate-and-frame filter press and clarifying products via the membrane filtration system.
<i>Chemical Engineering Design</i>	Bioreactor Design & Thermal Control	Managing jacketed heat transfer, sterilization cycles, and mass balances across aerobic and anaerobic fermentation processes.
<i>Transport Processes and Unit Operations</i>	Fluid Flow & Piping Dynamics	Managing fluid transport, pump calibration, pneumatic material transfer, and utility supply distribution.