Carbon Dioxide Pvt Curve Determination Educational Unit Operations Pilot Plant

Item Number: LPK-SPVT

Introduction

Enable hands-on learning of thermodynamic principles with this carbon dioxide PVT curve determination pilot plant. Students visualize critical opalescence, phase transitions, and generate P-V isotherms across liquid, gas, and supercritical regions. Robust safety features, adaptable for university engineering labs.

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Parameter	Description
Working Fluid	Carbon Dioxide (CO_2)
Frame Material	High-strength industrial aluminum alloy with integrated caster wheels
Overall Dimensions	$\le$ 1480 mm × 580 mm × 1780 mm (L × W × H)
Key Instrumentation	Piston manometer, constant-temperature circulating water bath, digital temperature display
Safety Features	Protective high-pressure acrylic shield, over-temperature protection, dual pressure gauges

Experimental Module	Lab Activity	Key Physical Concepts Covered
PVT Data Determination	Measuring pressure, volume, and temperature coordinates under constant temperature conditions.	P-V-T state relations, phase envelopes, compressibility factor
Critical State Observation	Heating the system to the critical temperature of CO_2 (31.1°C) to observe the vanishing meniscus.	Critical point, critical pressure, critical temperature, critical opalescence
Isothermal Curve Plotting	Recording pressure-volume steps at multiple temperatures to construct P-V isotherms.	Subcooled liquid region, superheated vapor region, saturation curve, vapor pressure