40 Ton 400X400Mm Vacuum Hot Press With Independent Temperature And Pressure Control

Item Number: XP24

Introduction

40-ton vacuum hot press with 400x400mm platens, high-vacuum chamber, dual gas inlets, and programmable temperature-pressure profiles for precision material processing. Ideal for battery, ceramic, composite, and polymer research. Engineered for demanding lab environments with uniform heating and closed-loop frame.

Learn More

Application	Description	Key Benefit
Li-Ion Battery Electrode Densification	Vacuum hot pressing of cathode/anode films (e.g., NMC, LFP) to achieve target porosity and enhance electrical conductivity.	Uniform compaction force eliminates density gradients, boosting energy density and cycle life.
Solid-State Battery Layer Lamination	Laminating electrolyte separators with lithium metal anodes under vacuum to avoid interfacial voids and oxidation.	Ultra-clean bonding interfaces ensure low ionic resistance and superior cell safety.
Advanced Ceramic Sintering	Pressure-assisted densification of engineering ceramics (alumina, zirconia, silicon carbide) at high temperature in vacuum or inert gas.	Reaches near-theoretical density with fine grain structure, enhancing mechanical strength and wear resistance.
Powder Metallurgy Compaction	Compressing metal or alloy powders into near-net shape preforms with reduced porosity, followed by sintering.	High green density leads to improved material homogeneity and less shrinkage during sintering.
CFRP and Composite Molding	Curing carbon fiber reinforced prepregs under heat and pressure while vacuum evacuates air to eliminate delamination.	Lightweight structural parts with minimal void content for aerospace and automotive applications.
Microfluidic Chip Fabrication	Hot embossing of thermoplastic substrates (PMMA, COC) using precision-machined molds under vacuum for bubble-free replication.	High-fidelity feature transfer down to micron dimensions, essential for lab-on-a-chip devices.
Sputtering Target Bonding	Bonding indium or other bond layers between target material and backing plate under controlled heat and pressure in vacuum.	High bond integrity and thermal conductivity for reliable thin-film deposition runs.
High-Performance Polymer Processing	Compression molding of PEEK, PEKK, and other high-temp thermoplastics under vacuum to prevent oxidative degradation.	Consistent mechanical properties and surface finish for demanding medical or semiconductor components.

Module	Parameter	Specification
General	Model	XP24
Force	Maximum Working Pressure	0–40 Tons (0–400 kN), continuously adjustable via hydraulic precision pressure control
	Effective Platen Area	400 × 400 mm
	Platen Surface Flatness	≤ 0.05 mm across entire surface
	Load Frame Design	Rigid four-column closed-loop frame, net weight 600 kg, minimal elastic deformation at full load
Thermal	Temperature Range	Room temperature to 300°C (maximum design temperature 320°C)
	Heating Power	5.5 kW (5500 W), 380V 3-phase, resistive heating element matrix
	Heating Rate	2–5°C/min, dependent on tooling and sample thermal mass

Module	Parameter	Specification
	Cooling System	Integrated dual water-cooling channels in platens; requires external chiller (recommended capacity ≥2.0 kW, 15–25°C water)
	Thermal Protection	Insulator barriers between heated platens and hydraulics prevent heat migration
Vacuum & Atmosphere	Chamber Material	SUS304 stainless steel, thick-walled, internal mirror polish for low outgassing
	Vacuum Level	Static vacuum down to -0.1 MPa (approx. 10 Pa) via external vacuum pump
	Leak Detection	High-pressure nitrogen and helium mass spectrometer tested for chamber integrity
	Gas Supply	Dual independent channels for N_2/Ar with precision micro-flow control and safety exhaust valve
Utility & Installation	Power Requirement	AC 380V, 50Hz, 3-phase + neutral + PE (5-wire); recommended circuit breaker 16A, 3P+N+PE with leakage protection; cable cross-section ≥4 mm^2 copper
	Vacuum Pump Requirement	External pump with displacement ≥4 L/s, oil-mist filter or dry scroll type recommended
	External Dimensions (W×D×H)	900 × 850 × 1300 mm (floor-standing, require solid, level concrete floor)
	Net Weight	Approx. 600 kg
	Cooling Water Interface	Quick-connect fittings for external chiller connection