

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.

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| 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 |

| Module | Parameter | Specification |
|------------------------|-----------------------------|---|
| | 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 |
| | 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 |