

25 Ton Manual Hot Press 600°C For Laboratory Material Processing

Item Number: XP13



Introduction

Designed for high-temperature compression in material science labs, this 25-ton manual hot press reaches 600°C with a 180x180mm heated platen area. Perfect for ceramic sintering, polymer composite molding, and solid-state battery electrolyte compaction. Exceptionally durable, precise, and CE certified.

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| Application | Description | Key Benefit |
|--|---|--|
| Advanced Ceramic Sintering | Densification of ceramic powders (alumina, zirconia, silicon carbide) into fully dense components for structural and electronic applications. The press's uniform temperature and high force achieve near-theoretical density with controlled grain growth, producing high-strength, fine-grained ceramics for electronic substrates, cutting tools, and biomedical implants. | Superior mechanical properties and dimensional accuracy, reducing post-sintering grinding and finishing. |
| Solid-State Battery Electrolyte Compaction | Hot pressing of sulfide or oxide solid electrolyte powders into dense, crack-free sheets is critical for all solid-state batteries. Controlled pressure and temperature eliminate voids and enhance interfacial contact between electrolyte and electrode materials, improving ionic conductivity. | High-quality electrolyte membranes with consistent thickness and reduced interfacial resistance, accelerating battery R&D. |
| Polymer Composite Consolidation | Thermal compression molding of carbon-fiber or glass-fiber reinforced thermoplastics and thermosets. The large platen and uniform heating ensure complete resin flow and fiber wet-out without void formation, producing lightweight, durable composite panels. | Consistent mechanical properties and high strength-to-weight ratios for aerospace and automotive prototyping. |
| Hot Embossing & Microstructuring | Transfer of micro- and nanostructures onto polymer films using heated molds. Precise force modulation allows embossing of delicate features without substrate damage, suitable for lab-on-chip, optical, and microfluidic devices. | High-fidelity replication of intricate patterns for prototyping and small-batch production. |
| Metal Matrix Composite Fabrication | Consolidation of metal powders (aluminum, titanium) reinforced with ceramic whiskers or particles. The manual force ramp prevents particle segregation, ensuring homogeneous dispersion of reinforcement phases. | Enhanced wear resistance and elevated-temperature strength in niche aerospace and automotive components. |
| Diffusion Bonding | Solid-state joining of dissimilar materials such as metals to ceramics or glass to metals under controlled temperature and pressure. The press's stable pressure hold and clean hydraulic actuation avoid contamination, producing hermetic bonds. | Strong, void-free bonds without melting, preserving parent microstructures for multi-material assemblies. |
| R&D Material Screening | Rapid, reproducible hot-pressing of small powder batches to evaluate compaction behavior, sintering kinetics, and phase evolution. The programmable controller ensures identical thermal-pressure profiles for every run. | Faster material discovery cycles with reliable data for scaling to production. |

| Parameter | Specification |
|------------------------------|-------------------------------------|
| Model | XP13 |
| Force Capacity | 0.0 - 25.0 metric tons (0 - 250 kN) |
| Actuation | Manual hydraulic pump |
| Platen Daylight | 50 mm |
| Temperature Range | 0.0°C - 600.0°C |
| Temperature Control Accuracy | ≤ ±5°C |
| Platen Dimensions | 180 × 180 mm |

| Parameter | Specification |
|--------------------------|--|
| Heating Power | 4000 W (embedded heating elements) |
| Thermal Barrier | Multi-layer high-density industrial ceramic insulation |
| Cooling Circuit | Integrated copper channels with quick-connect ports |
| Optional Chiller | Recirculating Fluid Chiller (950 AUD upgrade) |
| Power Supply | 220V / 50Hz, Single-Phase |
| Electrical Connection | Dedicated 20A / 32A outlet or hardwired via air switch |
| Net Weight | Approx. 95 kg |
| Outer Dimensions (WxDxH) | 260 × 340 × 442 mm |
| Certification | CE Certified |