

# 60-Ton Automatic Vacuum Hot Press For High-Density Material Consolidation

Item Number: XP19



## Introduction

KINTEK's 60-ton automatic vacuum hot press achieves 305.6 MPa precision compaction at up to 500°C with Tungsten Carbide mold, delivering void-free consolidation. Ideal for powder metallurgy and battery research under -0.1 MPa vacuum. Ensures safety with triple interlock.

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Application	Description	Key Benefit
High-Performance Thermoplastics	Vacuum hot pressing of PEEK, PEI, PPS, and PI films or powders to eliminate micro-bubbles and voids.	Produces fully dense polymer components with superior chemical resistance, mechanical strength, and thermal stability for aerospace and medical implants.
Powder Metallurgy & Hard Metals	Ultra-high pressure sintering of WC-Co, borides, and cermets to achieve high green density.	Near-theoretical density parts with exceptional hardness, wear resistance, and fine grain structure, ideal for cutting tools and wear parts.
Diffusion Bonding / Diffusion Welding	Solid-state joining of dissimilar metals (Cu/Al, steel/ceramic) under high pressure and temperature without filler.	Creates void-free, high-strength joints with pristine interfaces, essential for microelectronics, optical assemblies, and nuclear reactor components.
Battery Electrode & Solid-State Electrolytes	Densification of LLZO, LATP, and composite cathode/electrolyte layers for all-solid-state batteries.	Enhances ionic conductivity and mechanical integrity by eliminating interfacial voids, a critical requirement for next-gen battery performance and safety.
Functional Ceramics	Sintering of piezoelectric (PZT), dielectric (BaTiO <sub>3</sub> ), and ferrite powders under vacuum to maintain stoichiometry and purity.	Maximizes electromechanical properties by achieving full density without organic contaminants or porosity, vital for advanced sensors and actuators.
Metal Matrix Composites (MMCs)	Infiltration and hot pressing of aluminum or titanium matrices reinforced with SiC, Al <sub>2</sub> O <sub>3</sub> , or carbon fibers.	Uniform particle distribution and full consolidation, improving specific strength, stiffness, and thermal conductivity for lightweight structural applications.
Sputtering Targets & Thin Film Precursors	Consolidation of high-purity metal or oxide powders into target blanks for physical vapor deposition (PVD).	Achieves full density and fine grain structure, ensuring uniform thin film deposition and extended target lifetime in semiconductor manufacturing.
Carbon-Carbon Composites	Vacuum hot pressing of carbon fiber preforms with pitch or resin matrix to create high-density C/C composites.	Achieves uniform densification with exceptional thermal and mechanical properties for aerospace, braking, and thermal management applications.
Additive Manufacturing (AM) Post-Processing	Densification of additively manufactured metal or ceramic parts to eliminate internal porosity.	Transforms low-density AM prototypes into functional, fully dense components with improved fatigue life, strength, and surface finish.

Parameter	Specification
Model Number	XP19
Max Force	≤ 60.0 Tons (approx. 600 kN), auto-controlled
Active Pressure (on 50 mm mold)	~305.6 MPa
Mold Material	Tungsten Carbide (WC)
Mold Dimensions	Diameter: Φ 50 mm, Filling Height: 15 mm
Temperature Range	RT to 500°C, PID programmable
Vacuum Level	≤ -0.1 MPa (mechanical vacuum)

Parameter	Specification
Cooling System	Closed-loop water circulation (external chiller)
Power Supply	AC 220 V / 50 Hz, single phase
Certification	CE Certified

Interlock Mechanism	Protection Logic	Lab Safety Value
Door Limit Detection	Front door open triggers limit switch, cutting heating and pressurization instantly.	Prevents accidental contact with hot/pressurized zone, avoiding burns or crush injuries.
Pressure Overload Trip	Precision sensor detects overload >60 T; main relief valve opens and alarm sounds.	Protects the Tungsten Carbide mold from catastrophic failure due to over-pressure.
Thermal Runaway Fuse	Dual-redundant temperature monitoring; power cut if temperature exceeds 500°C.	Eliminates risk of thermal runaway, preserving vacuum chamber and sample integrity.