

# Programmable Vacuum Hot Press Benchtop System For Advanced Material Synthesis

Item Number: XP35



## Introduction

KINTEK's programmable vacuum hot press: benchtop 10-ton hydraulic press with vacuum/inert gas, 400°C & 800°C configurations for battery lamination, diffusion bonding, powder metallurgy.

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| Application                                       | Description                                                                                                                                  | Key Benefit                                                                                                                               |
|---------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| Battery Pouch-Cell Lamination                     | Bonding and sealing of lithium-ion battery electrodes and separators under precise temperature, pressure, and inert gas.                     | Eliminates voids, prevents oxidation at electrode interfaces, and improves cell impedance and longevity.                                  |
| Polymer Film Lamination & Encapsulation           | Multilayer bonding for flexible electronics, optical films, or barrier packaging using controlled heat and force.                            | Achieves optically clear, defect-free bonds with consistent thickness and zero residual stress.                                           |
| Powder Metallurgy Compaction                      | Uniaxial pressing of metal or ceramic powders into high-density green bodies, often followed by in-situ sintering under vacuum or inert gas. | Increases sintered density, reduces porosity, and enhances mechanical strength and electrical conductivity.                               |
| Diffusion Bonding of Advanced Alloys              | Solid-state joining of dissimilar metals or high-temperature alloys at elevated temperatures in a clean vacuum environment.                  | Creates high-integrity, contamination-free interfaces for aerospace, nuclear, and medical components.                                     |
| Ceramic Matrix Composite Lamination               | Consolidation of ceramic prepreps or fiber-reinforced green tapes under heat and pressure.                                                   | Ensures uniform resin distribution, minimal void content, and improved interlaminar shear strength for demanding structural applications. |
| Thermoelectric & Piezoelectric Material Synthesis | Processing of novel functional materials under precisely controlled thermal and atmospheric conditions.                                      | Enables reproducible phase formation and densification, critical for optimizing energy conversion and sensor performance.                 |
| Vacuum Lamination of Solar Cell Encapsulants      | Bonding of encapsulant layers onto photovoltaic cells with minimal thermal degradation.                                                      | Protects against moisture ingress and improves module reliability in outdoor installations.                                               |
| Hermetic Sealing of MEMS & Sensor Packages        | Vacuum-assisted sealing of micro-electromechanical systems (MEMS) or optical sensor packages under inert gas.                                | Achieves leak-tight seals with controlled internal atmosphere, extending device lifetime and accuracy.                                    |

| Parameter                 | XP35 Standard Edition                                           | XP35 Extreme High-Temp Edition                                  |
|---------------------------|-----------------------------------------------------------------|-----------------------------------------------------------------|
| Max Working Pressure      | Up to 10 Tons (100 kN)                                          | Up to 10 Tons (100 kN)                                          |
| Max Platen Temperature    | ≤ 400 °C                                                        | ≤ 800 °C                                                        |
| Platen Material           | Standard Tool/Die Steel                                         | Nickel-based Superalloy                                         |
| Rated Heating Power       | ≤ 3200 W                                                        | 4500 W                                                          |
| Platen Dimensions         | 150 mm × 150 mm                                                 | 150 mm × 150 mm                                                 |
| Platen Opening (Daylight) | ≤ 60 mm                                                         | 50 mm                                                           |
| Pressure Control          | Programmable touchscreen (auto-pressurize, hold, timed release) | Programmable touchscreen (auto-pressurize, hold, timed release) |
| Chamber Vacuum Level      | -0.1 MPa (Relative)                                             | -0.1 MPa (Relative)                                             |
| Atmospheric Gas           | Nitrogen (N <sub>2</sub> ) / Argon (Ar)                         | Nitrogen (N <sub>2</sub> ) / Argon (Ar)                         |

| Parameter        | XP35 Standard Edition           | XP35 Extreme High-Temp Edition                                  |
|------------------|---------------------------------|-----------------------------------------------------------------|
| Chamber Material | SUS 304 Stainless Steel         | SUS 304 Stainless Steel                                         |
| Safety Systems   | Standard over-pressure relief   | Auto door shutdown, over-pressure & over-temperature interlocks |
| Power Supply     | AC 220 V / 50 Hz (Single Phase) | AC 208 V – 240 V / 60 Hz                                        |
| Certification    | CE compliant                    | CE compliant                                                    |