

SYNTE PRODUCT TECHNICAL GUIDE

VMPE 100T Vacuum Hot Press Furnace

Reference technical data for
pressure-assisted densification and
high-temperature material processing.

From published reference data to an
application-matched furnace specification.



100 T

Rated press force

1600°C

Maximum temperature

9×10^{-4} Pa

Ultimate vacuum

Ø155×50 mm

Uniform hot zone

Use this document to

Screen the application, compare reference configurations, identify the engineering variables that change the proposal, and define measurable quotation and acceptance inputs.

**Current online
reference**

<https://syn-v2.com/vacuum-sintering-furnace/vacuum-hot-press-furnace/>

All published values are reference data for preliminary selection. Final configuration, supply scope and acceptance conditions are controlled by the project proposal and technical agreement.

SYNTE APPLICATION-LED ENGINEERING

01 / APPLICATION

Application fit and process boundary

Use the furnace family as a starting point. The correct configuration is determined by material, complete loaded geometry, process result, throughput and measurable acceptance evidence.

Application 01 Technical ceramics and composite materials	Application 02 Powder consolidation and pressure sintering
Application 03 Graphite-die and high-temperature tooling processes	Application 04 Material development requiring recorded temperature, force and vacuum

Typical process route

01	02	03	04	05
Prepare die	Evacuate / backfill	Heat & load	Densify	Cool & release
Material, tooling and load path	Atmosphere and outgassing control	Coordinated temperature-force ramp	Dwell, displacement and force feedback	Safe unloading and dimensional verification

Stage	Primary control	RFQ / qualification question
Prepare die	Material, tooling and load path	Define input, control limit and evidence owner
Evacuate / backfill	Atmosphere and outgassing control	Define input, control limit and evidence owner
Heat & load	Coordinated temperature-force ramp	Define input, control limit and evidence owner
Densify	Dwell, displacement and force feedback	Define input, control limit and evidence owner
Cool & release	Safe unloading and dimensional verification	Define input, control limit and evidence owner

Suitable when	Thermal and mechanical cycles must be engineered together Recorded displacement can support densification review when the test method is agreed Final tooling and sample geometry control the usable work zone
Re-check the route when	Pressureless sintering may be more economical when force is not required A sample-only force value is insufficient without die/contact-area data

02 / ENGINEERING

System architecture and sizing logic

SYNHTE reviews the furnace as a connected process system. Each subsystem is selected against the same loaded cycle and acceptance plan.

Subsystem	Engineering scope	Input that changes the choice
Process chamber	Usable zone, orientation, door/loading route and service clearances	Largest complete production load and site access
Hot zone	Heating material, insulation/shielding, zones and sensor arrangement	Temperature, chemistry, contamination and survey basis
Vacuum / gas	Pump train, valves, gauges, purge/backfill and process-gas control	Pressure range, outgassing, gas purity and cycle time
Cooling / quench	High-pressure gas circuit, controlled oil route, programmed cooling or natural/assisted cooling as applicable	Target metallurgical result, load density and utilities
Handling / tooling	Tray, fixture, setter, basket, carrier or press interface	Drawing, mass, center of gravity and repeatability
Controls & records	PLC/HMI recipes, interlocks, alarms, trends and batch identity	User roles, data fields, protocols and retention
Installation	Electrical, water, gas, exhaust, floor/loading and maintenance boundary	Site utility data and local safety requirements

Four engineering decisions that should stay connected

Die interface Geometry, friction, insulation and press alignment	Force envelope Contact area, curve, stroke and feedback
Hot-zone chemistry Temperature, atmosphere and contamination limits	Result Density, dimensions, microstructure and records

SYNHTE project path

Application review → configuration and utility definition → technical agreement → manufacturing and assembly → FAT / documentation → installation, SAT and process handover as agreed in the project scope.

03 / REFERENCE DATA

Published configuration envelope

The final hot zone, force, stroke, vacuum train, atmosphere and tooling interface are selected around the material, die drawing, sample geometry and thermal-pressure cycle.

Parameter	VMPE 100T reference
Maximum / working temperature	1600°C / 1400-1500°C
Ultimate / working vacuum	9×10 ⁻⁴ Pa / 9×10 ⁻³ Pa
Pressure rise / pump-down	≤0.3 Pa/h / ≤40 min
Temperature uniformity	≤±7.5°C at 1000°C, empty, five-point
Rated force / control	100 T / ±0.1% FS above 1 T
Stroke / displacement	100 mm / 0.001 mm display
Uniform hot zone	Ø155 × 50 mm
Heating power	75 kW

How to read the table

The usable work zone must contain parts, fixtures, trays/setters, transfer clearance and the qualified sensor arrangement. Reference load is not a substitute for a gross loaded drawing. Vacuum, temperature and cooling values require an agreed test condition.

What changes the final configuration

Option / feature	Selection trigger	Engineering impact
Four-column hydraulic press with force feedback	Material chemistry or contamination requirement	Changes heater/shielding compatibility and maximum useful temperature
Molybdenum-lanthanum heating and reflective shielding	Pump-down, cleanliness or working-pressure target	Changes pump train, gauges, isolation and acceptance tests
Temperature, force, displacement and vacuum records	Load geometry, orientation or factory handling	Changes chamber orientation, tooling and clearances
Project-specific die, press-head and gas-system configuration	Cooling result, cycle time or surface requirement	Changes gas/oil/water duty and heat-rejection design

04 / QUALIFICATION

RFQ, proposal and acceptance framework

A precise enquiry reduces redesign and makes supplier proposals comparable. Attach drawings and define the pass/fail method wherever possible.

Input block	Information to provide	Preferred evidence
Material / process	Material composition and sample drawing	Drawing, value, method or standard
Part / tooling	Die, contact area and load-path drawing	Drawing, value, method or standard
Cycle / atmosphere	Temperature, force, dwell and release curve	Drawing, value, method or standard
Production	Vacuum/inert-gas or partial-pressure requirement	Drawing, value, method or standard
Site / utilities	Target density, geometry and acceptance method	Drawing, value, method or standard
Quality / records	Utilities, controls, safety and FAT/SAT evidence	Drawing, value, method or standard

Recommended acceptance evidence

Thermal

Defined survey or loaded-cycle evidence, sensor locations and allowable deviation

Vacuum / atmosphere

Pump-down, ultimate/working pressure, pressure-rise or gas condition under stated test conditions

Functional

Recipes, interlocks, alarms, manual recovery and agreed utility-loss cases

Process result

Witness-load or sample evidence using agreed hardness, leak, density, dimensional, joint or metallographic methods

Documentation

Approved drawing, utilities, manuals, component list, records and test reports in the agreed scope

Site

Installation boundary, SAT checks, training and open-item closure responsibility

Direct engineering contact

Email info@synthe-corp.com or WhatsApp +86 155 3785 7393. Include this document title and the current product page:
<https://syn-v2.com/vacuum-sintering-furnace/vacuum-hot-press-furnace/>

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