SYNHTE PRODUCT TECHNICAL GUIDE

VTHB High-Temperature Vacuum Brazing Furnace

Selection data for clean brazing of stainless steel, titanium, superalloys, carbide and precision assemblies.

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

1300°C	6 × 10□⁴ Pa	±5°C	60-360 kW
Maximum temperature	Ultimate vacuum	Temperature uniformity	Published heating-power range

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-brazing-furnace/high-temperature-vacuum-brazing-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.

SYNHTE 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

Stainless-steel heat exchangers and assemblies

Application 02

Titanium and nickel-alloy components

Application 03

Carbide tools and superhard materials

Application 04

Sensors, waveguides and aerospace hardware

Application 05

Copper-, silver- and nickel-base filler systems

Typical process route

01	02	03	04	05
Define incoming state	**Load & protect**	**Heat**	**Soak & cool**	**Verify**
Grade, prior process and target result	Fixture, vacuum or gas route	Ramp and equalization	Qualified time-temperature-cooling path	Hardness, structure, stress or dimensions

Stage	Primary control	RFQ / qualification question
Define incoming state	Grade, prior process and target result	Define input, control limit and evidence owner
Load & protect	Fixture, vacuum or gas route	Define input, control limit and evidence owner
Heat	Ramp and equalization	Define input, control limit and evidence owner
Soak & cool	Qualified time-temperature-cooling path	Define input, control limit and evidence owner
Verify	Hardness, structure, stress or dimensions	Define input, control limit and evidence owner

Suitable when

The tempering route starts with the incoming metallurgical state | Hot-zone, pumping and cooling options are selected together | Loaded acceptance conditions should be agreed before equipment release

Re-check the route when

A furnace temperature rating alone does not establish cycle capability | Unspecified incoming hardness or prior heat treatment makes result guarantees unreliable

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	Controlled cooling selected around filler solidification, part mass, distortion and throughput	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

Thermal duty

Tempering temperature, load mass and cycle time

Surface result

Vacuum/gas, hot-zone cleanliness and contamination limits

Cooling

Rate, unload temperature and distortion risk

Qualification

Survey condition, witness load and batch 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.

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03 / REFERENCE DATA

Published configuration envelope

Reference models consolidate the current published VTHB family range. Final load depends on fixture mass, hot-zone material, pumping system and cooling route.

Model	Effective work zone W × H × L (mm)	Reference load (kg)	Hot-zone options	Max. temp. (°C)
VTHB-335	300 × 300 × 500	100	Graphite / Mo	1300
VTHB-446	400 × 400 × 600	150	Graphite / Mo	1300
VTHB-557	500 × 500 × 700	280	Graphite / Mo	1300
VTHB-669	600 × 600 × 900	450	Graphite / Mo	1300
VTHB-8812	800 × 800 × 1200	800	Graphite / Mo	1300
VTHB-1115	1000 × 1000 × 1500	1200	Graphite / Mo	1300

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
Graphite or all-metal molybdenum hot zone	Material chemistry or contamination requirement	Changes heater/shielding compatibility and maximum useful temperature
Rotary-vane, diffusion or molecular pumping combinations	Pump-down, cleanliness or working-pressure target	Changes pump train, gauges, isolation and acceptance tests
Nitrogen, argon, hydrogen or mixed-gas modules	Load geometry, orientation or factory handling	Changes chamber orientation, tooling and clearances
Custom trays, fixtures and loading systems	Cooling result, cycle time or surface requirement	Changes gas/oil/water duty and heat-rejection design
PLC/touchscreen controls, recipe management and records	Traceability, integration or quality-system need	Changes controls, I/O, records and FAT/SAT cases

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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	Base material, filler family and governing specification	Drawing, value, method or standard
Part / tooling	Joint drawing, clearances, filler placement and fixture concept	Drawing, value, method or standard
Cycle / atmosphere	Part and fixture envelope plus batch mass	Drawing, value, method or standard
Production	Temperature profile, vacuum target and cooling plan	Drawing, value, method or standard
Site / utilities	Joint-quality, leak, strength and inspection criteria	Drawing, value, method or standard
Quality / records	Throughput, utilities, traceability and acceptance 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-brazing-furnace/high-temperature-vacuum-brazing-furnace/

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