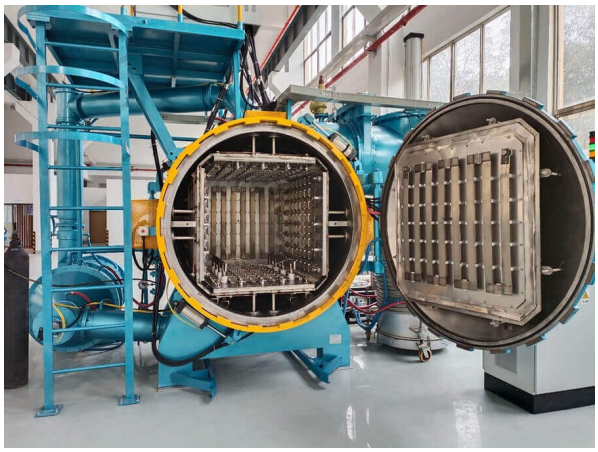
SYNHTE PRODUCT TECHNICAL GUIDE

VTB Aluminum Vacuum Brazing Furnace

Reference models and selection data for flux-free brazing of aluminum thermal assemblies.

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



750°C	6 × 10□⁴ Pa	±3°C	100-2000 kg
Maximum temperature	Ultimate vacuum	Temperature uniformity	Reference loading 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-vacuum-aluminum-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.

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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

Aluminum plate-fin heat exchangers

Application 02

Battery and server liquid-cooling plates

Application 03

Radiators, condensers and evaporators

Application 04

Radar antennas, waveguides and manifolds

Application 05

Leak-tight aluminum thermal assemblies

Typical process route

01	02	03	04	05
Prepare	**Load & evacuate**	**Heat**	**Join / hold**	**Cool & inspect**
Drawing, surface, filler and fixture	Clean handling and pump-down	Qualified ramp and equalization	Time-temperature-vacuum window	Joint, leak, dimensions and records

Stage	Primary control	RFQ / qualification question
Prepare	Drawing, surface, filler and fixture	Define input, control limit and evidence owner
Load & evacuate	Clean handling and pump-down	Define input, control limit and evidence owner
Heat	Qualified ramp and equalization	Define input, control limit and evidence owner
Join / hold	Time-temperature-vacuum window	Define input, control limit and evidence owner
Cool & inspect	Joint, leak, dimensions and records	Define input, control limit and evidence owner

Suitable when

Joining quality begins with design, preparation and fixturing | The furnace is configured around the qualified loaded process | Inspection methods and pass limits should be agreed before production

Re-check the route when

Unresolved joint clearance or filler placement should be corrected before furnace sizing | A chamber-size request without fixture and load data does not define the process system

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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

Joint system

Base material, filler/interlayer, clearance and cleanliness

Load

Part + fixture envelope, mass and thermal symmetry

Vacuum/thermal

Pump route, hot zone, sensors and cooling

Evidence

Leak, strength, dimensions, appearance and batch data

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 VTB configurations use Cr-Ni heating elements, ±3°C published temperature uniformity, 6 × 10□⁴ Pa ultimate vacuum and 0.3 Pa/h pressure-rise data.

Model	Effective work zone W × H × L (mm)	Reference load (kg)	Heating power (kW)	Max. temp. (°C)
VTB-335	300 × 300 × 500	100	40	750
VTB-446	400 × 400 × 600	200	60	750
VTB-557	500 × 500 × 700	300	80	750
VTB-669	600 × 600 × 900	500	100	750
VTB-8812	800 × 800 × 1200	800	160	750
VTB-9912	900 × 900 × 1200	1000	180	750
VTB-9920	900 × 900 × 2000	1500	400	750
VTB-3.6L	1100 × 1100 × 3600	2000	500	750

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
Rotary-vane, diffusion or molecular pumping combinations	Material chemistry or contamination requirement	Changes heater/shielding compatibility and maximum useful temperature
Custom work-zone dimensions and loading fixtures	Pump-down, cleanliness or working-pressure target	Changes pump train, gauges, isolation and acceptance tests
Batch trays, double-door loading and handling systems	Load geometry, orientation or factory handling	Changes chamber orientation, tooling and clearances
Cooling route selected for part geometry and throughput	Cooling result, cycle time or surface requirement	Changes gas/oil/water duty and heat-rejection design
PLC, touchscreen, recipe storage and batch 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	Assembly drawing and aluminum alloy / filler designation	Drawing, value, method or standard
Part / tooling	Largest assembly and fixture envelope	Drawing, value, method or standard
Cycle / atmosphere	Batch mass, annual volume and target takt	Drawing, value, method or standard
Production	Required joint, leak and surface-quality acceptance	Drawing, value, method or standard
Site / utilities	Available power, cooling water and plant layout	Drawing, value, method or standard
Quality / records	FAT/SAT, temperature-uniformity and vacuum 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-vacuum-aluminum-brazing-furnace/

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