



Thermic Edge

Vacuum Heating Technology

Furnace Overview



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ABOUT US

At Thermic Edge, we take pride in our state-of-the-art products and ever-evolving technology. We offer an end-to-end design, manufacturing, and testing service, with various versatile products tailored for high-temperature, high vacuum applications.

WHAT WE OFFER

With a relentless pursuit of innovation and a dedication to customer satisfaction, Thermic Edge Ltd continues to push the boundaries of vacuum heating technology. Whether you need advanced coatings, precision ceramics, or high-performance graphite products, trust us to deliver excellence that exceeds expectations.

- collaboration and customisation
- developing tailored solutions
- exceptional service every step of the way



FOUNDER

Robert Burgess

Managing Director



In 2003, Robert Burgess founded Thermic Edge Ltd., A company that has become world renowned for providing high temperature heating solutions to the semi-conductor Industry.

The company was established with a clear vision: to provide innovative products for industries requiring precision and reliability in high-temperature UHV environments.

Thermic Edge's growth and success are a testament to Bob's vision, dedication, and relentless pursuit of excellence, making it a trusted name in high-performance heating solutions worldwide.

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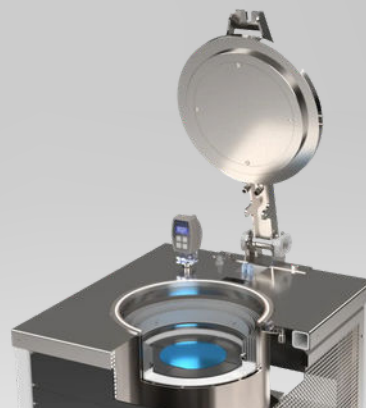
Overview

Thermic Edge are suppliers of Vacuum Furnaces, and we offer a standard range of laboratory Vacuum Furnaces, heating in excess of 2000°C, to research institutes and universities for thermal processing, annealing, vacuum sintering, and vacuum heat treatment in high purity, clean environment.

Our Semi-Automatic Furnaces allow the use of single or multiple gasses allowing processing from atmospheric pressure to high vacuum with either graphite, SiC coated graphite, tungsten hot zones all controlled via a simple one-click HMI touchscreen display based on a small footprint, lightweight and moveable frame.

Available Furnace Options:

- Laboratory vacuum furnace
- Benchtop vacuum furnace
- ALD (Atomic Layer Deposition) System
- Muffle Furnace



All our vacuum furnaces are customisable allowing us to cater to the needs of our customers and their exact requirements. We can do this by adjusting the hot zones from our standard sizes to include dual hot zones or cater to hold a specific size sample.

We can also customise the water-cooled chamber by adding ports to allow for extra data analysis in the form of extra hot zone thermocouples, internal crucible thermocouples, residual gas analysers (RGA's), pyrometers, and more.

**Have an enquiry or
need some expert advice?**

From standard and bespoke furnace systems to mechanical design services, our team can help develop the right solution for your application.



Contact Us

LABORATORY FURNACES

Furnace Size	Maximum Temperature	Hot Zone	Crucible Size	DC Power Supply
Medium	2100°C	Graphite	Ø60.5 × 75 mm or Ø102 × 51 mm	5 kW
Large	2000°C	Graphite	Ø150 × 75 mm	15 kW
Extra Large	2000°C	Graphite	Ø180 × 140 mm	20 kW

5x10-2mbar base pressure as standard, 5x10-6mbar with High vacuum Pump installed.

Wafer Size	Hot Zone Material	DC Power Supply
4"	Graphite	5 kW
6"	Graphite	10 kW
8"	Graphite	15 kW

System Operations and Functions

Thermic Edge’s HMI touchscreen allows full control of pump-down, gas processing, and venting. Displays show valve states and interlocks. Manual override options included.

Gas flow is manually regulated via needle valves. Chamber pressure is controlled using a vacuum Speedi valve.

Eurotherm Nanodac handles data logging and temperature regulation. External PC connection is supported for process analysis and repeat cycles.

All power feedthroughs and chamber exteriors remain cool due to full water cooling, enabling extended use.



BENCHTOP FURNACES

Maximum Temperature	Furnace Type	Hot Zone Material	Crucible Sizes	DC Power Supply
2000°C	Benchtop Crucible Furnace	Graphite	Ø20 × 30 mm, Ø30 × 40 mm, Ø40 × 50 mm	1.5 kW
3000°C	Benchtop Crucible Furnace	Graphite	Ø20 × 30 mm, Ø30 × 40 mm, Ø40 × 50 mm	6 kW

Maximum Temperature	Furnace Type	Hot Zone Material	Wafer Sizes	DC Power Supply
2000°C	Benchtop Wafer Furnace	Graphite	1", 2" and 3"	1.5 kW
1250°C	Benchtop Wafer Furnace	SiC Coated Graphite	1", 2" and 3"	1.5 kW
2000°C	Benchtop Wafer Furnace	Tungsten	1", 2" and 3"	3 kW

5x10-2mbar base pressure as standard, 5x10-5mbar with High vacuum Pump installed.

Key Features

Thermic Edge benchtop vacuum furnaces deliver high performance thermal processing in a compact, user friendly package. Operating in vacuum and atmospheric pressure conditions, they achieve temperatures up to 2000°C, ramp rates of approximately 100°C/min, and base pressures below 5×10^{-2} mBar. Automatic pump purge sequences help remove residual oxygen, while the fully water cooled stainless steel chamber features an electrically driven lid with integrated safety interlocks.

Suitable for both crucible and wafer heating applications, the furnaces combine responsive Eurotherm controlled heating, touchscreen operation, manual gas and pressure regulation, and comprehensive safety protection, providing reliable and repeatable processing with a small footprint.



MUFFLE FURNACES

Model	Maximum Temperature	Internal Size H × W × D	Volume	Power	Heating Element	Thermocouple
MF 112	1200°C	100 × 100 × 150 mm	1.5 L	2 kW	FeCrAl	Type N
MF 312	1200°C	95 × 175 × 300 mm	5 L	2.8 kW	FeCrAl	Type N
MF 412	1200°C	150 × 175 × 300 mm	7.9 L	3.2 kW	FeCrAl	Type N
MF 512	1200°C	230 × 200 × 400 mm	18.5 L	8 kW	FeCrAl	Type N
HF 1400	1400°C	150 × 170 × 270 mm	6.9 L	4 kW	SiC	Type R
HF 1600	1600°C	150 × 170 × 270 mm	6.9 L	4 kW	MoSi ₂	Type B
HF 160 G	1600°C	200 × 175 × 340 mm	12 L	5 kW	MoSi ₂	Type B
HF 1800	1800°C	110 × 150 × 240 mm	4 L	4 kW	MoSi ₂	Type B
HF 1800 G	1800°C	180 × 150 × 330 mm	9 L	5 kW	MoSi ₂	Type B

Standard Features

Thermic Edge muffle furnaces are designed for accurate and reliable heat treatment, testing, and laboratory processing applications, with maximum operating temperatures up to 1800°C.

Excellent temperature uniformity is achieved through a silicon carbide cavity, advanced refractory construction, and energy efficient low thermal mass insulation, while a 7 segment LED display provides temperature control accuracy of ±1°C. Integrated over temperature protection, thermocouple break protection, and solid state relay or thyristor power control ensure safe and dependable operation.

Available in a range of standard chamber sizes or customised to specific requirements, Thermic Edge muffle furnaces can also be supplied with programmable PID control, data logging capability, and provisions for vacuum or gas purging applications. An observation port allows convenient monitoring of samples throughout the heating cycle.



ALD SYSTEMS

As the semiconductor technology advances, the demand for atomically thin, high-performance materials continues to grow. Our single-chamber Atomic Layer Deposition (ALD) and High-Temperature Annealing system is engineered for up to 8" wafer processing, delivering precise layer growth, defect elimination, and enhanced crystallinity & uniformity—all in one integrated platform.



The Thermic Edge ALD platform combines precise Atomic Layer Deposition with high temperature annealing to support the development of advanced semiconductor, sensing, and electronic materials.

The ALD process enables the controlled deposition of thin films including MoS_2 , MoO_3 , WS_2 , and WO_3 , delivering excellent uniformity across substrates up to 8 inches in diameter.

A showerhead gas delivery system ensures even precursor distribution, while the self-limiting nature of ALD provides exceptional conformity and thickness control, even on complex structures.

Following deposition, the system offers high temperature annealing up to 1200°C to enhance film crystallinity and optimise material properties. Processing can be carried out using reactive or inert gases including H_2S , H_2Se , O_2 , O_3 , N_2 , and Ar. Integrated wafer gas cooling and sample lifting technology support rapid cooldown and improved thermal management, helping to maintain process consistency and repeatability.



ALD SYSTEMS

Parameter	Specification
Temperature	1200°C max substrate temperature
Footprint of the frame x 2 frame (two separate frames per system)	600mm width x 650mm depth x 1400mm height (free standing pump)
Vacuum level	ATM to 5x10-2mbar base pressure as standard. 5x10-5mbar with High vacuum Pump installed.
Sample size	150mm (6”) / 200mm (8”)
Substrate holder material	SiC ³ Coated Graphite (Ceramic Coatings)
Chamber	Full water cooled 316SS
Vacuum pump	Chemical Resistant Screw pump
Controls	Eurotherm / Mitsubishi PLC
Compatibility	O ₂ , H ₂ S
Purge Gas	N ₂ and Ar
Precursor Delivery system	2 heated lines heated to 150°C. Fast Acting ALD Valves and MFC's
Power	400V Three Phase
Substrate Heating	SiC ³ Coated Graphite
Thermocouples	x3 (one on substrate)
Heater uniformity	less than 2%
Ramp Rate	100°C/min
Cleanroom capability	Cleanroom 100

HOT ZONE TECHNOLOGIES

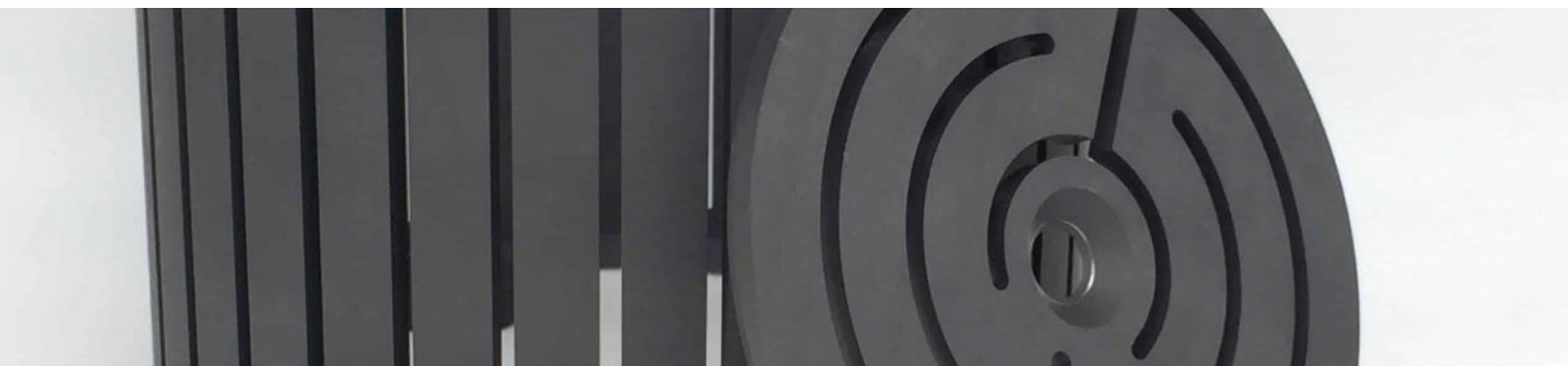
All Thermic Edge vacuum furnaces are customisable, allowing systems to be adapted to customer requirements. Hot zones can be adjusted from standard sizes, configured as dual hot zones, or designed to hold a specific sample size.

Thermic Edge can also customise the water cooled chamber by adding ports for additional data analysis and monitoring options. These may include extra hot zone thermocouples, internal crucible thermocouples, residual gas analysers, pyrometers, and other process monitoring requirements.

Graphite

Thermic Edge vacuum furnaces utilise high purity graphite hot zones designed for efficient and reliable high temperature processing. Graphite offers excellent thermal stability, low thermal expansion, and increased strength at elevated temperatures, making it ideal for heating elements, insulation, fixtures, and furnace furniture. Its resistance to thermal shock and repeated heat cycling helps provide long service life and consistent performance.

Available in a range of configurations to suit different process requirements, our graphite hot zones deliver rapid ramp rates, excellent temperature uniformity, and efficient heat transfer. For demanding applications, components can also be enhanced with silicon carbide (SiC³) or titanium carbide coatings to improve purity, durability, and resistance to wear.



Silicon Carbide (SiC) Coated Graphite

Thermic Edge furnace systems use heating technologies matched to the process, atmosphere and temperature requirement. Graphite hot zones are used across our laboratory vacuum furnace range, providing efficient heating, rapid ramp rates and stable high temperature performance in vacuum and inert gas environments.

For oxygen containing or corrosive atmospheres, Silicon Carbide (SiC) coated graphite elements can provide added protection and are suitable for selected high temperature furnace applications. Specialist heater technologies, including PG and PBN options, can also be considered where the process, material or system design requires a tailored heating solution.



HOT ZONE TECHNOLOGIES

Tungsten

Thermic Edge tungsten hot zones are designed for high temperature furnace processing where durable metallic heating is required. Tungsten has the highest melting point and lowest vapour pressure of all metals, making it well suited to high vacuum technology and the construction of high temperature furnaces.

Thermic Edge tungsten hot zone furnaces can heat up to 2000°C. The hot zone uses tungsten mesh or flat plate heating elements, tungsten foil heat shields and alumina fibre insulation, with crucible and wafer configurations available across the furnace range.



PROCESS GAS & VACUUM OPTIONS

The standard laboratory vacuum furnace offers two gas supplies into the chamber. This allows the use of a vent gas into the top of the chamber and a process gas feeding directly into the hot zone. Both gas flows are manually controlled with flow meters mounted on the front of the chamber.

Typically, Argon is used for the pump down procedure and venting, while other gases can be used for processing.

The Thermic Edge benchtop furnace uses a single gas input into the hot zone, acting as both vent gas and process gas, with the flow also manually controlled.

To allow a variety of gases to be fed into the process gas line of the laboratory vacuum furnace, or into the single supply on the benchtop furnace, Thermic Edge offers a Gas Supply Box. This allows multiple gases to be connected, with only a single gas supplied into the rear of the furnace.

Using the manual flow control on each furnace, the Gas Supply Box allows the user to switch between different process gases during the heating process, controlled by the HMI touchscreen.

CUSTOMISATION & ENGINEERING SERVICES

Thermic Edge supplies custom vacuum furnace options for customers with specific hot zone, chamber, pumping and gas supply requirements. These options allow vacuum furnace systems to be adapted around sample size, process needs, chamber access, target vacuum level, gas handling and data analysis requirements. They are suitable across Thermic Edge’s furnace range, including laboratory vacuum furnace systems and benchtop furnaces.

Thermic Edge also provides mechanical design services for customers who need support moving from an initial concept through to manufacture. Our in-house design engineering team can assist with CAD modelling, part and assembly design, manufacturing drawings, material selection, tolerancing and production planning. For furnace projects, this support helps ensure designs are developed around real operating requirements, including temperature, vacuum conditions, access, handling and overall process performance.

Our vacuum furnace engineering covers both standard and bespoke systems for research, materials development, semiconductor processing and advanced heat treatment. Depending on the application, systems can be configured with different graphite hot zones, crucible or wafer layouts, and operating temperatures of up to 3000°C, providing a solution tailored to processes such as annealing, vacuum sintering and high-purity thermal treatment.

From idea to CAD

If you have a sketch, a concept, or an idea that has not yet been modelled, our team can develop it using SolidWorks and prepare it for review.

From CAD to drawings

We can produce detailed manufacturing drawings, welded assembly drawings, build instructions, and design specifications that can be used by suppliers and production teams.

From design to production

If required, Thermic Edge can also provide pricing and lead times for manufacture, helping you understand the next practical stage before production begins.





THANK YOU FOR YOUR INTEREST

Please visit our website for more information including features and applications of our products, technical drawings, our blog, and more



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