



Thermic Edge

Vacuum Heating Technology

Vacuum Heaters | Furnaces | Ceramic Coatings | Graphite
Power Supplies | Components | Thermocouples | Elements



sales@thermic-edge.com

www.thermic-edge.com

Linkedin: @Thermicedgetd

CONTENTS



- 01** About Us
- 02** Vacuum Furnaces Overview
- 03** Graphite Furnaces
- 04** Benchtop Furnaces
- 05** ALD Systems
- 06** CVD Systems
- 07** Vacuum Heaters Overview
- 08** Versatile Heaters
- 09** Nickel Chrome Heaters
- 10** High Temperature Heaters
- 11** PG/PBN Heaters
- 12** All Ceramic Heaters
- 12** Button Heaters
- 13** Stage Heaters
- 14** Bespoke/Custom Heaters
- 15** Cubic Silicon Carbide Coatings
- 16** Elements
- 17** DC Lab Power Supplies
- 18** PID Heater Controller



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.

VACUUM FURNACES

Thermic Edge Vacuum Furnaces 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, ALD (Atomic Layer Deposition), oxidization systems and vacuum heat treatment in high purity, clean environments.



Our Semi-Automatic Vacuum Furnaces allow the use of single or multiple gasses allowing processing from atmospheric pressure to high vacuum with graphite SiC3 hot zones all controlled via a simple one-click HMI touchscreen display based on a small footprint, lightweight and moveable frame.

We also supply a range of Benchtop Furnaces for use in smaller laboratories for small sample testing, thermal processing, vacuum sintering, and heat treatment. The furnaces are used for extreme high purity in clean room environments.

GRAPHITE FURNACES

Thermic Edge laboratory vacuum furnaces offer a range of graphite hot zones to suit a variety of uses.

Our standard medium vacuum heat treating furnace with a crucible size of $\text{Ø}102 \times 51\text{mm}$ has a maximum temperature of 2100°C . We also offer an alternative deeper medium-hot zone size of $\text{Ø}60.5 \times 75\text{mm}$, a larger size of $\text{Ø}150 \times 75\text{mm}$, and an extra-large hot zone size of $\text{Ø}180 \times 140\text{mm}$. We also offer flat wafer hot zones for $\text{Ø}4''$, $\text{Ø}6''$ and $\text{Ø}8''$ sample sizes.

The cylindrical graphite elements are very efficient and allow for fast ramps, are extremely stable, and by using a dual hot zone improves temperature uniformity by a deviation of $< \pm 1\%$.

Wafer Sample Hot Zones

For wafer sample testing our laboratory vacuum furnaces use a CCC element enclosed in a graphite hot zone to heat both individual large Dia. samples and smaller samples held in a susceptor plate.

Wafer sample furnaces range from $4''$ to $8''$ Dia sample size, with dual zone option on $8''$.



Medium to Large Furnace Sizes:

Crucible Sizes:
 $\text{Ø}60.5 \times 75\text{mm}$, $\text{Ø}102\text{mm} \times 51\text{mm}$, $\text{Ø}150 \times 75\text{mm}$ and $\text{Ø}80 \times 140\text{mm}$

Wafer Sizes:
 $4''$ $6''$ and $8''$

BENCHTOP FURNACES

Thermic Edge supplies compact Benchtop Furnaces for small laboratories, ideal for small sample testing, thermal processing, vacuum sintering, and heat treatment in a high-purity environment.

The Benchtop unit is lightweight with a small footprint and features a one-touch HMI touchscreen display, integrated power supply, rotary pump, and manual flow control. Temperature control and data logging are managed by a Eurotherm Nanodac controller, with optional remote PC control and data analysis.

We also offer custom solutions tailored to meet specific customer requirements.

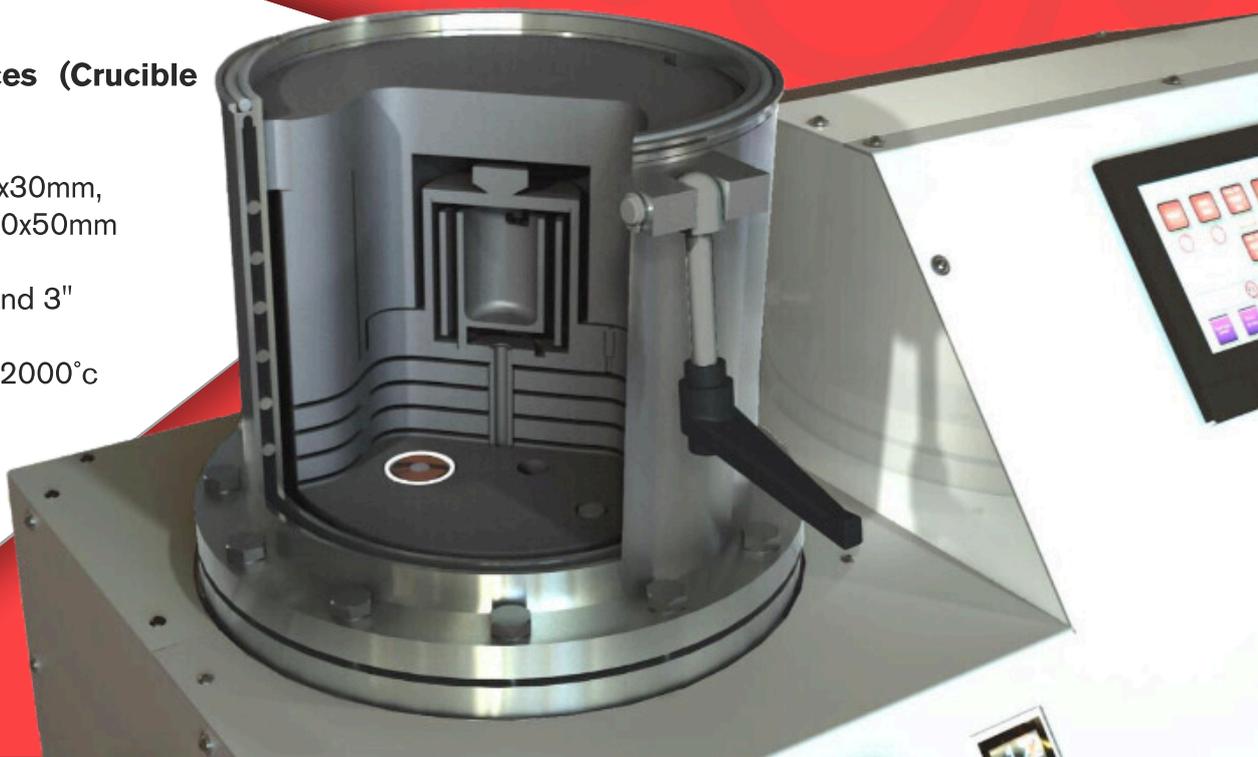


Benchtop Furnaces (Crucible & Wafer Sizes)

Crucible sizes: Ø20x30mm, Ø30x40mm and Ø40x50mm

Wafer Sizes: 1" 2" and 3"

Temperatures up to 2000°C



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.



Why Semiconductor Manufacturers Choose Our Solution

Our ALD System is engineered to accelerate 2D material integration into next-gen semiconductor devices, offering single-chamber ALD and annealing to reduce contamination, high-temperature processing up to 1250°C, and multi-gas compatibility for oxide, sulfide, and nitride deposition.

With wafer-scale support up to 8" and advanced cooling and handling, it delivers precision, efficiency, and scalability for cutting-edge applications.

Step 1: Atomic Layer Deposition (ALD) – Controlled Growth at the Atomic Scale

Our ALD process delivers precise, scalable deposition of 2D materials such as MoS₂, MoO₃, WS₂, and WO₃ for advanced electronics. It supports up to 8" wafers, offers excellent step coverage, and operates at low temperatures, with a showerhead gas system ensuring uniform distribution.

Step 2: High-Temperature Annealing (Up to 1200°C) – Enhanced Material Properties

Post-deposition annealing enhances film quality and electronic performance through gas-controlled environments and advanced cooling. Operating up to 1200°C, it supports reactive and inert gases and features wafer gas cooling with sample lifting for uniform thermal control.



CVD SYSTEMS

Thermic Edge Ltd's CVD System: Delivering Scalable, High-Yield Coating Solutions with Precision and Reliability

The CVD System from Thermic Edge is a purpose-built Hot Wall Chemical Vapor Deposition platform engineered for high-volume production of proprietary SiC₃ cubic silicon carbide coatings. Developed to meet the stringent demands of sectors such as semiconductor manufacturing, the system delivers exceptional coating performance, process control, and operational reliability.

Key Features and Benefits

Cubic SiC Coating Performance

- Well-defined crystal structure
- Isotropic, dense, and high-purity coatings
- Excellent mechanical and chemical resistance

Optimised for Production Environments

- Robust thermal uniformity
- Controlled gas flow dynamics
- Consistent, repeatable results across large batches

Substrate Flexibility

- Compatible with complex graphite geometries
- Effective on porous ceramics and composites
- Suitable for critical process hardware and tooling

Integrated Process Expertise

- Over a decade of in-house operational experience
- Proven coating recipes and process optimisation
- Comprehensive support for setup, tuning, and maintenance



VACUUM HEATERS

At Thermic Edge, we supply cost-effective, high-uniformity sample heaters to research and industry for thin film deposition and sample processing. Sample heaters can be supplied with retainers or clips to hold a range of semiconductor wafers or samples. Custom sample holders are also available upon request.

All heaters go through comprehensive testing. Our in-house testing capabilities include helium leak checking, full temperature testing using vacuum test system and uniformity testing using a FLIR thermal imaging camera. Thermic Edge is ISO 9001:2015 registered.

The Thermic Edge design team work closely with clients to provide:

- Professionally managed projects from start to finish
- Cost effective solutions
- Detailed technical drawings and written specifications
- 3D CAD models
- A heating solution that is supplied fully tested and ready to integrate with your system
- Manual detailing installation and operation instructions



VERSATILE HEATERS

At Thermic Edge, we have developed a range of cost-effective sample heaters. These heaters can be supplied flange mounted or fitted to our heater stages. All heaters are supplied with power leads and internal thermocouples and can be provided with power supplies and controllers providing a complete turnkey solution to your sample heating requirements.

They are cost-effective and customisable with optional features such as water cooling, sample rotation, and various mounting options. High power density for rapid ramp-up, low mass for swift cool-down, and excellent thermal uniformity across the entire hot zone.

Versatile Heater Standard Range

1000c ceramic top plate temperature with inconel body, alumina / inconel heatshields and SiC₃ coated graphite element. For use in High vacuum, O₂, N₂, H₂ environment or Air

1000c ceramic top plate temperature with molybdenum body, heatshields and CCC element For use in High vacuum, N₂ or inert atmosphere

1600c ceramic top plate temperature with molybdenum body, heatshields and CCC element For use in High vacuum, N₂ or inert atmosphere. Good for UHV with top plate removed



Versatile Heaters - Features

Our versatile heaters are available in hot zone sizes from Ø2" (51 mm) to Ø8" (203mm) and can be configured for high vacuum, UHV, or air (oxygen compatible). They use materials such as Inconel, Molybdenum, carbon-carbon composites (CCC), pure silicon carbide (SiC₃) CVD coated

graphite, and tungsten. Designed for fast ramping and efficiency, they include an internal thermocouple for temperature control and can be free-standing or flange-mounted. These heaters operate in any orientation with high heating uniformity (<2%) and offer water cooling to reduce chamber heat load. Customisable and stage-mountable with options for rotation, Z-shift, and RF or DC bias, they come with in-vacuum cable assemblies and are built and tested in the UK.

NICKEL-CHROME HEATERS

NiCr heaters are versatile and cost-effective, reaching 800°C on the ceramic top plate. They feature an integrated type K thermocouple, ramp rates up to 50°C per minute, and can be mounted in any orientation.

Standard sizes range from Ø1" to Ø8", with custom options available. Suitable for high vacuum, inert atmospheres, and O₂/air, they can replace halogen lamp heaters and be adapted for various mounting options.

Additional Options include, but are not limited to:

- Water cooling to minimise heat load on chamber and other equipment
- Sample holder clips, masks or retainers
- Flange or heater stage mounting (for rotation and sample transfer)
- Sample bias (DC or RF up to 1000W)
- Second thermocouple
- Power Supply
- Temperature Controller
- Spare elements



HIGH-TEMPERATURE HEATERS

We offer standard heating solutions including 1000°C graphite or CCC ceramic topped heaters (inert and vacuum compatible), 1300°C SiC3 coated graphite ceramic topped substrate heaters (inert, air, and vacuum compatible), 1700°C CCC ceramic topped heaters (water cooled, inert, and vacuum compatible), and 1900°C all graphite heaters (inert and vacuum compatible).

These heaters can be integrated with our stages to provide rotatable wafer, Z-shift, RF or DC bias up to 1000W, and water or gas cooling.



Additional options:

- Water cooling to minimise heat load on chamber and other equipment
- Sample holder clips, masks or retainers
- Flange or heater stage mounting (for rotation and sample transfer)
- Sample bias (DC or RF up to 1000W)
- Second Thermocouple
- Power Supply
- Temperature Controller
- Spare Elements



PG/PBN HEATERS

Thermic Edge offer PG-PBN heaters for applications where fast temperature ramping is required in a reactive environment. A pyrolytic graphite (PG) element track is formed on a pyrolytic boron nitride (PBN) substrate.

The track is then covered in PBN to insulate and protect it. Standard heater sizes range from 0.5" to 4" but larger heaters available upon request.

All heaters can be supplied with power connection kits, thermocouples, power supplies, controllers and flange/stage mounting options.

They have a maximum temperature of 1600°C and are suitable for HV, UHV, Inert and O₂ (up to 600°C) environments.

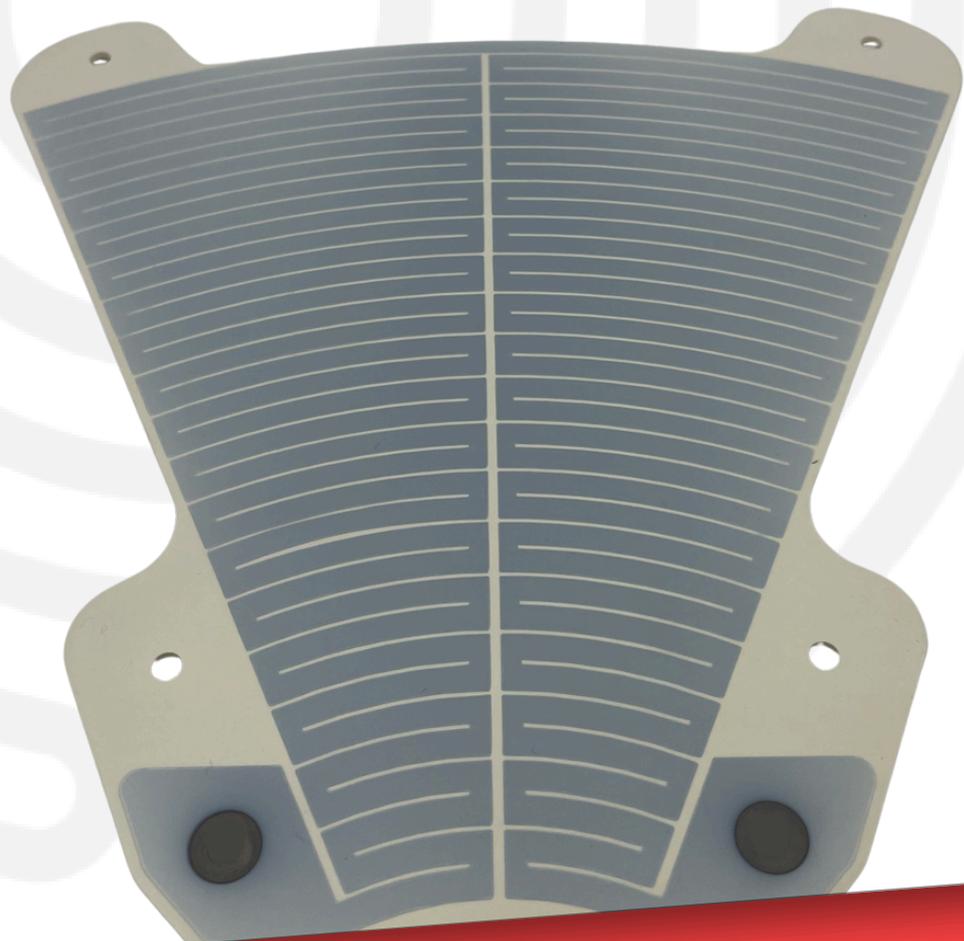


Options:

Element Rectangular (with Tabs) Element Rectangular
Element Circular (with Tabs) Element Circular

Features

- 1400°C maximum temperature in vacuum 500°C maximum temperature in air High vacuum, UHV and corrosive environments
- Very fast ramp rate, with low mass
- Very inert
- PG element is encapsulated in PBN completely protected from deposition product
- Sample can be placed directly onto heater ceramic element plate
- Available in sizes up to 4" square or round



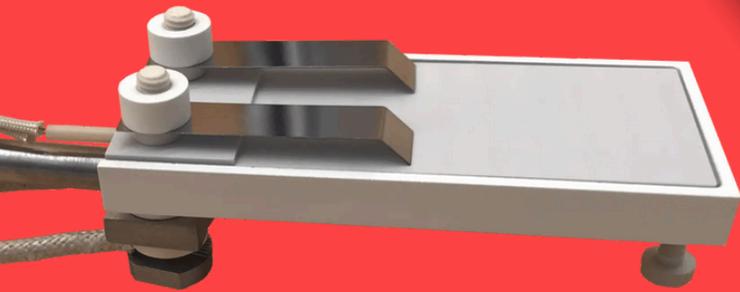
ALL CERAMIC HEATERS

Thermic Edge offer a range of All Ceramic heaters to 1200°C. A CCC element housed within a ceramic body, internal thermocouple and M6 central stud for mounting.

Heaters come ready with Molybdenum sample clips and the heater shape can be modified to suit the shape of your sample.

Standard top plate sizes include 25 x 50mm and 25 x 40mm.

Suitable for HV, UHV and Inert environments.



BUTTON HEATERS

The Thermic Edge Button Heater range offers a fresh method for sample heating. This high-performance heater boasts a high power density for rapid ramp-up times, a lightweight body to minimize cool-down periods, and excellent thermal uniformity across the entire hot zone.

The UHV-compatible full molybdenum hot zone heater can achieve a ceramic top plate temperature of 1000°C in just three minutes from ambient. Thermic Edge also offers plates with apertures for holding samples and providing masking as needed, and can supply clips for securely holding samples in place.



STAGE HEATERS

Heaters and samples can be mounted in any orientation and our range of manipulators provides cost-effective options for sample rotation, heater rotation, sample transfer and sample/heater positioning.

Every stage comes with the necessary power, thermocouple and water feedthroughs required so all you need to do is connect the services and it is ready to use. Heater controllers and power supplies are also available from Thermic Edge.

Mounting options for our Standard Linear Manipulator include various standard flanges ranging from DN25CF to DN400CF or ISO200-400K/F. Custom flange options are also available to meet specific requirements. Z-shift standard stroke sizes are 50mm, 100mm, 150mm, and 250mm, with increased stroke sizes available up to 1000mm.

Rotation

- Manual (handwheel) or motor driven
- Sample rotation through central shaft or outer cradle
- Cost-effective Viton® sealed rotary feedthroughs for high vacuum applications



BESPOKE & CUSTOM HEATERS

Thermic Edge specialises in providing bespoke solutions for heating applications that cannot be fulfilled using standard heaters and stages. These heaters can be any shape to suit your application.

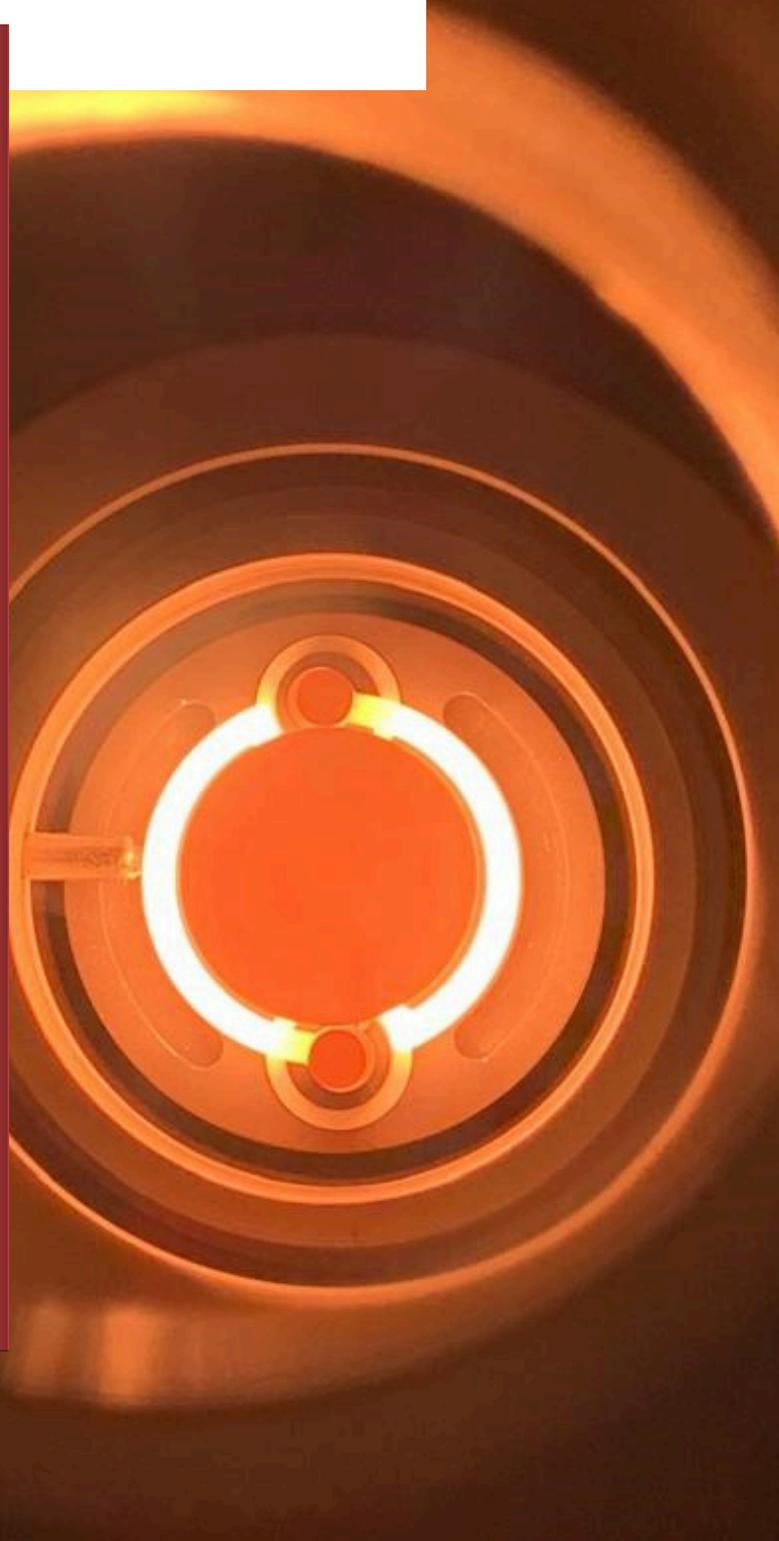
OPTIONS:

- Customizable shape
- Small and large diameter heaters
- Tubular heaters
- Rectangular heaters
- Materials to suit application and environment
- Top plates with RF or DC bias.
- Water cooling
- Gas cooling
- Temperatures up to 1900°C

Thermic Edge can provide heaters with RF sample bias up to 1000W and DC sample bias up to 1000W for sample preparation and to improve the quality and purity of thin films.

Where the option of RF or DC biasing is required, Thermic Edge will also provide airside RF shielded cabling and filters.

We also produce biased hot stages, with sample rotation, tilting, and automatic or manual sample transfer.



CUBIC SILICON CARBIDE COATINGS

Our Revolutionary SiC3 - Silicon Carbide Coating

This very high-purity coating is mainly intended for use in the semiconductor and electronics industries, for protecting wafer carriers, susceptors and heating elements from corrosive and reactive environments such as MOCVD and EPI processes, used for wafer processing and device manufacture.

The coating is also suitable for vacuum furnaces and sample heating in high vacuum, reactive and Oxygen environments protecting crucial parts up to 1600°C from oxidation.

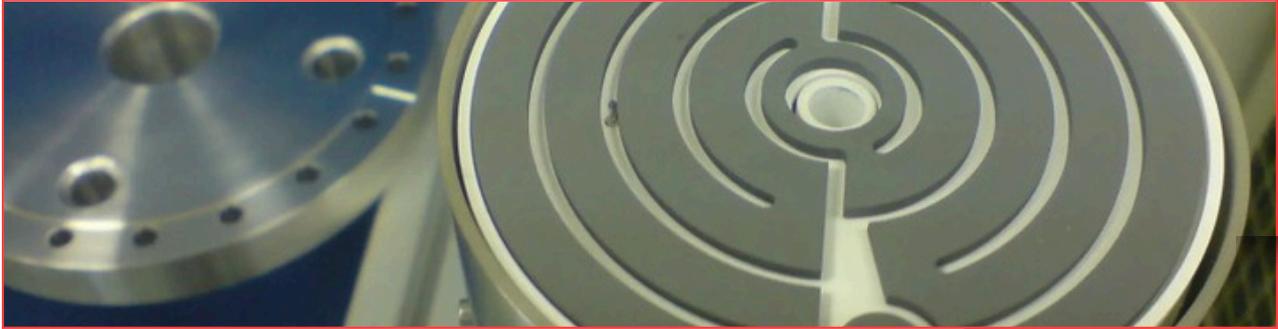
SiC3 High Purity Silicon Carbide Coating overview

SiC3 is our trade name for our high purity cubic Silicon Carbide ceramic coating. It is applied to components to protect them from Oxidation or reaction with other gasses at high temperature. The SiC3 coating is applied using a high temperature, high purity Chemical Vapour Deposition (CVD) reactor.

Layer thickness can vary but typically a layer of 80 – 100µm is applied. Thermic Edge's state-of-the-art machine shop allows us to offer a complete solution including the manufacture of the base graphite, ceramic or refractory metal component, and the SiC3 ceramic coating. We also provide a coating-only service for customer-supplied parts.

ELEMENTS

To accommodate our customers' needs Thermic Edge provides a wide range of (PG Elements, Graphite Elements, and SiC Elements) resistance heating elements for high temperature heaters. These elements are available to be purchased from our standard designs or produce bespoke designs to suit your specific requirements.



ELEMENTS IN CERAMIC HOUSING

Thermic Edge offer, for every element, the option to include a ceramic insulation housing for the element to sit in. Providing both protection and electrical isolation for resistance elements when integrated into the customers system. This is of particular use when space is limited within the customers process, or where heating is required in two directions above and below the element.



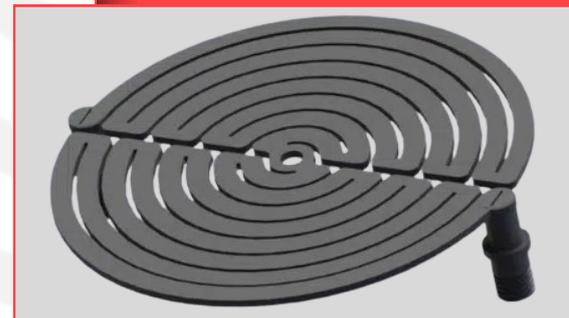
GRAPHITE ELEMENTS

Graphite elements are highly inert and actually strengthen with heat. Additionally, they have a low expansion coefficient and resist degradation from constant heat cycling, ensuring good lifespan and a fast ramp rate. Made from high-purity graphite blocks, they can be machined into detailed forms for one-off or low-volume batches with the right material selection.



SILICON CARBIDE HEATING ELEMENTS

Thermic Edge has developed a range of standard Silicon Carbide (SiC) coated graphite elements to provide a cost-effective solution for high-temperature heating in oxygen and corrosive environments. SiC coating is suitable for use in oxygen environments up to 1600°C and in high vacuum up to 1200°C, and is compatible with hydrogen and inert gas environments.



DC LAB POWER SUPPLIES



Thermic Edge supply DC power supplies along with heater temperature controllers to customers located around the world. Systems can be tailored to suit any application and customer requirements.

Thermic Edge have extensive experience in the operation and support of power supply units for use both in Laboratory and Industrial applications. All power supplies have been designed to offer excellent functionality combined with ease of use and provide a complete package for controlled power systems to a variety of applications, not limited to heating systems.

The power supply unit features a 24 V interlock that cuts power if the interlock is broken, remote enable, and a 0-10 V input for remote control. It has local and remote switches, with stock models available in 2.1 kW, 2.4 kW, 3 kW, and 4.8 kW. It offers voltage and current limit control, auto-switching CV/CC modes, and displays on a 3 1/2" LED screen.

With intelligent fan cooling, it supports continuous and dynamic loads, and includes overheat and over-current protection. Voltage and current are adjustable via a 10-turn potentiometer. Applications include resistance heating, LED, motor and DC fan testing, accumulator charging, labs, factories, small electrolysis systems, and burn-in tests for various components.

PID HEATER CONTROLLER



PID temperature controllers manage thermal systems like heaters or furnaces by comparing the actual temperature, measured via a sensor, with the setpoint. They adjust the heater power to maintain the desired temperature precisely, avoiding overshooting.

Compatible with various thermocouples, typically configured for type 'C', these controllers feature auto-tuning for accurate, stable temperature control. They offer ON/OFF control, with programmable ramp rates to prevent exceeding maximum temperatures.

Standard features include RS-232 input, safety functions, and software for easy external control. A 24V interlock ensures safety by cutting the enable signal if needed. The unit comes with a mains cable, connector kit, and requires earthing via a rear panel stud.

Features

- Eurotherm PID controllers for precise temperature control.
- Front-mounted enable switch.
- LED status display for supply, interlock, and output.
- Data logging with Eurotherm iTools software.
- Auto-tuning to prevent overshooting.
- Remote control via Modbus RS232 or RS485.
- 24V interlock circuit for safety features.





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

 **Address: Unit 2 & 3 Iberian Park, Drury Lane. TN38 9XP**

 **Email: sales@thermic-edge.com**

 **Website: www.thermic-edge.com**

 **Telephone: +44 (0) 1424 850811**



Thermic Edge

Vacuum Heating Technology

Phone: +44 (0)1424 850811
E-mail: sales@thermic-edge.com
Website: www.thermic-edge.com