

Product Overview

Ovens & Furnaces up to 3000°C



Leading Heat Technology

The Carbolite Gero brand is synonymous with high quality, leading heat technology. The company specialises in the design and manufacture of laboratory and industrial ovens and furnaces ranging from 30°C to 3000°C and sold globally to over 100 countries.

On 1st January 2016 Carbolite (UK) and Carbolite Gero (Germany) joined to become one company under the name of Carbolite Gero. With the combined product portfolio the company will strengthen its market position locally and globally. In the past, both companies gained strong, established reputations for engineering expertise in applied heating technology.

Carbolite Gero has two manufacturing and sales sites. One is based in Derbyshire, United Kingdom, where Carbolite has been manufacturing laboratory and industrial ovens and furnaces up to 1800°C since 1938; the second facility is located in Neuhausen, southern Germany, where high temperature furnaces up to 3000°C with a large variety of solutions for vacuum and other modified atmospheres have been produced since 1982.

In addition to the wide range of standard products as shown in this catalogue, Carbolite Gero has a high level of expertise and a long tradition in the development of customized equipment for complex heat treatment processes. Solving customers' individual application requirements has given Carbolite Gero an important reputation in aerospace, engineering, materials science, heat treatment, medical, bioscience and contract testing laboratories.

Not only can Carbolite Gero supply products with Standards-compliant furnace and oven designs e.g. Nadcap heat treatment processes (AMS2750E), but also with fully traceable certification for control, measurement, recording and data acquisition devices, issued by an independent UKAS accredited laboratory.

www.carbolite-gero.com

Carbolite Gero, Neuhausen/Germany



Carbolite Gero, Hope/United Kingdom



Application Specific Icons

Icons are displayed against products that feature these details:



New product



Maximum operating temperature (°C)



Product incorporates rotary motion



Chamber capacity (litre)



Heated lengths (mm)



Product incorporates vertical & horizontal motion

Selection

The type of atmosphere required for the heat treatment process is the first step in determining the appropriate product. The table below provides an overview of product type, its heating element material and the type of atmospheres or vacuum in relation to the temperature range

Heating methods (may need further equipment)	Temperature ranges and their related atmospheres and vacuum ability						
	30°C – 700°C	up to 1100°C	up to 1300°C	up to 1600°C	up to 1800°C	up to 2200°C	up to 3000°C
Ovens with convection heating (CrFeAl)	Air and modified atmosphere, No vacuum available						
Chamber furnaces with inconel retort (CrFeAl)	Air and modified atmosphere, No vacuum available						
Chamber furnaces (CrFeAl)	Air and limited modified atmosphere, No vacuum available						
Chamber furnaces (SiC)	Air and limited modified atmosphere, No vacuum available						
Chamber furnaces (MoSi ₂)	Air and limited modified atmosphere, No vacuum available						
Tube furnaces (CrFeAl)	Air, modified atmosphere and vacuum						
Tube furnaces (SiC)	Air and modified atmosphere up 1600°C, vacuum limited to 1500°C						
Tube furnaces (MoSi ₂)	Air and modified atmosphere up 1800°C, vacuum limited to 1500°C						
Molybdenum Vacuum chamber furnace (Mo heating elements and radiation shields)	N ₂ , Ar, H ₂ , vacuum (no oxygen or air)						
Tungsten Vacuum chamber furnace (W heating elements and radiation shields)	N ₂ , Ar, H ₂ , vacuum (no oxygen or air)					Ar, H ₂ , vacuum	2500°C on request
Graphite Vacuum chamber furnace (Gr heating elements and graphite felt)	N ₂ , Ar, H ₂ , vacuum (no oxygen or air)						Ar

Applications

Carbolite Gero standard ovens and furnaces are used in a wide range of applications including chemistry research, advanced materials, coal and steel, precious metals, aerospace and technical ceramics. Alongside these products Carbolite Gero offers a wide range of application specific furnaces which include:

- Ashing / calcination / LOI / burn-off
- Sintering
- Pyrolysis
- Transport reactions (including CVD)
- Hardening / tempering
- Melting
- Materials testing
- Tensile testing
- Thermocouple calibration
- Annealing / stress relieving
- Drying / moisture extraction
- Stoving & curing
- Clean room applications
- Precious metals applications
- Coal assay including ash fusibility
- Asphalt binder analysis
- Dental applications
- Carbon-14 & tritium
- Carbon nanotubes
- Metal injection molding (MIM)
- Vacuum brazing & soldering

More Products

For detailed information about Carbolite Gero products please visit our website and download our catalogues:

- Laboratory & Industrial Ovens & Furnaces
- Custom Designed Ovens & Furnaces up to 1800°C
- Vacuum, Inert and Reactive Gas Furnaces up to 3000°C

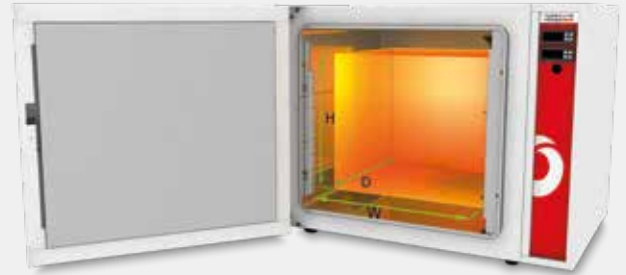
www.carbolite-gero.com/downloads

We are happy to send you a printed copy on request.



Laboratory Ovens & Industrial Ovens up to 700 °C

Ovens are available in sizes from 3 litres to 14,000 litres and can be supplied with load handling options. Maximum operating temperatures range from 250°C to 700°C. Temperature control options comprise simple and accurate PID set point controllers as well as sophisticated multiple zone, cascade and programmable, temperature control systems.



Laboratory Ovens

The extensive range of Carbolite Gero laboratory ovens provides excellent temperature uniformity and complies with the safety standard BS EN 61010-2-010:2003. The ovens are ideal for general laboratory work, routine drying and heating applications.



AX – Laboratory Bench Mounted Ovens



LHT – High Temperature Bench Mounted Ovens

Controlled Atmosphere Ovens

The HTMA range of modified atmosphere high temperature ovens is designed for use with inert atmospheres, making them suitable for non-oxidising heating applications such as the testing and manufacture of electronic components, batteries, solar cells and catalysts.



HTMA – High Temperature Modified Atmosphere Ovens

Clean Room Ovens

The Carbolite Gero range of clean room ovens, once processed through a customer's standard material entry regime, is suitable for operation within an ISO 14644-1 Class 5 environment. All sources of particulate contamination are fully sealed. Their easily cleaned stainless steel interiors and gloss white epoxy exteriors prevent the shedding of particulate contamination.



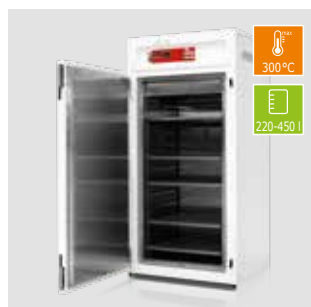
CR – Clean Room Ovens



HTCR – High Temperature Clean Room Ovens

Industrial Ovens for Batch Processing

With capacities of up to 14,000 litres this range of ovens is ideal for heat treatment applications on a pilot or industrial scale meeting the demands of different industrial applications and customer requirements. These standard ovens can be supplied for use according to specific standards such as AMS2750E and the automotive industry standard CQI-9.



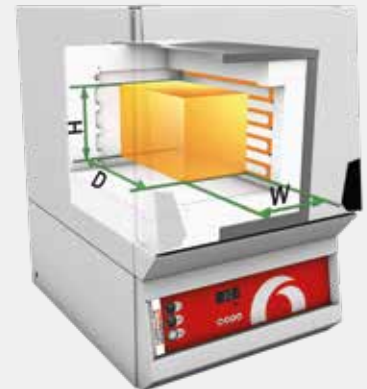
GP – General Purpose Ovens



LGP – Large General Purpose Ovens

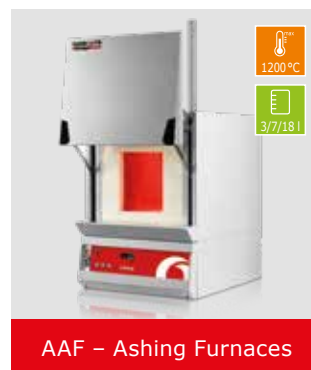
Chamber Furnaces up to 1800 °C

Carbolite Gero's extensive chamber furnace range has a maximum operating temperature of 1800°C and chamber capacities up to 725 litres. The furnaces are suitable for a variety of laboratory, pilot scale and industrial applications. Although there is flexibility in size and temperature, if the application requires the use of modified atmosphere (above 1100°C) or vacuum then a furnace from Carbolite Gero's tube furnace range should be selected.



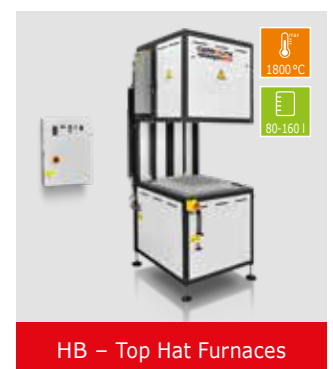
Laboratory Chamber Furnaces

The Carbolite Gero laboratory chamber furnace range combines **excellent temperature uniformity** with high quality components. The PID temperature controller with timer provides **temperature stability**. These benchtop size furnaces are suitable for specific heat treatments ranging from hardening and tempering to ashing and calcination.



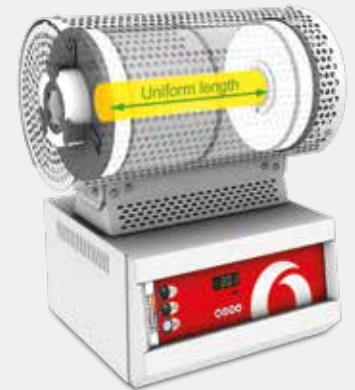
Industrial Chamber Furnaces

The robust construction of the Carbolite Gero industrial chamber furnace range makes the furnaces ideal for larger scale, pilot or industrial applications such as heat treatment ranging from steels and alloys to sintering ceramics. This range of furnaces can often be modified to precisely meet the customer's requirements. They can also provide a foundation upon which a wide range of custom designs can be added.



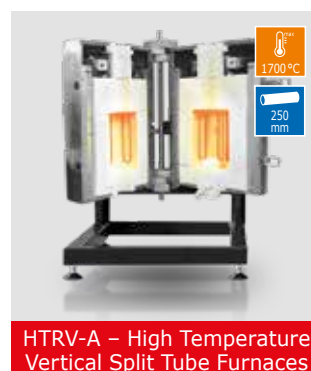
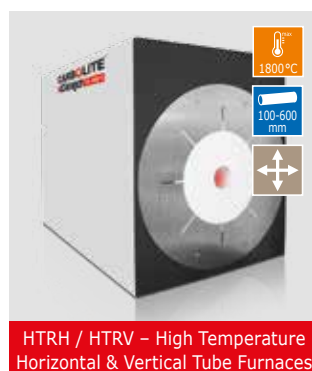
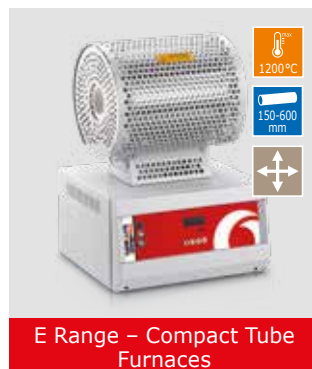
Horizontal & Vertical Tube Furnaces

Tube furnaces are frequently the most economical way to heat a small sample and offer a high degree of uniformity, especially where volatile materials need to be captured for analysis or an atmosphere other than air is required. Rapid temperature changes are possible by simply adding a push-rod to move the sample along with the length of the tube.



Universal Tube Furnaces

Carbolite Gero offers an extensive range of tube furnaces with operating temperatures from 1000°C up to 1800°C and options of horizontal or vertical and single or 3-zone models, all of which can be operated with the customer's choice of atmosphere, air, inert gas or vacuum.



Split or Nonsplit Tube Furnace Models

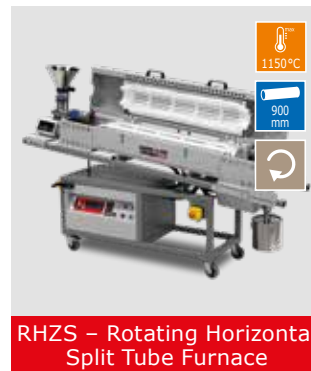
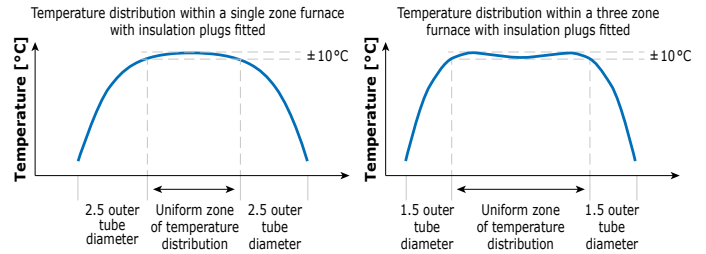
Both vertically and horizontally configured furnaces are available with the furnace body split and hinged along its length. This enables easy access where work tubes are to be changed between jobs or where the furnace is to be wrapped around the sample, for example in tensile test rigs.



Split Tube Furnace
EST 12/300

3-Zone Tube Furnaces

Tube furnaces provide a high level of uniformity which is ideal for applications that require a specific temperature uniformity. The length of the central uniform zone can be further increased by adding heated zones at the ends in the form of a 3-zone design.



Work Tube Accessories & Packages

In order to provide optimum conditions for the different test requirements, Carbolite Gero provides a variety of tube furnace options and accessories for heating in air, modified atmosphere and vacuum. These include, for example, insulation plugs, gas tight seals, radiation shields and end seals for low and high vacuum applications. Work tube packages comprise a work tube of the specified diameter with a pair of end seals and heat shields appropriate for the operating atmosphere. A probe thermocouple is included in all packages for furnaces up to 1200°C for connection to a separate display or recorder.



Standard Configuration

Carbolite Gero offers a variety of stand options for different applications

Furnace shown is MTF



Blanked Base



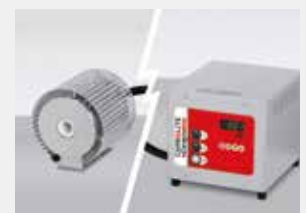
L-stand: Vertical Use



Horizontal Use



Wall Bracket



Separated Controls (No Stand)

Vacuum, Inert & Reactive Gas Furnaces up to 3000 °C

Carbolite Gero offers solutions for heat treatment under vacuum, inert gas and reactive atmosphere, e. g. hydrogen. The furnaces are available with manual operation or fully automatic control and can be equipped with a pre-vacuum pump, roots pump or turbomolecular pump. All standard process gases can be used for heat treatment. For the use of combustible gases, automated safety systems are required to ensure safe operation.



Chamber, Hood & Laboratory Furnaces from 1.5 to 600 litres

The different furnace base materials of the cold wall furnaces up to 3000°C, which is equipped with a water-cooled vessel, offer a broad application range. **Graphite furnaces** (Gr) are employed under vacuum, protective gases and reaction gases, **metallic furnaces** made of molybdenum (Mo) and tungsten (W) permit highest possible purity process atmospheres and the best possible vacuum. **Ceramic fiber insulated furnaces** are employed for processes with defined oxygen percentages or 100% oxygen atmosphere. The graphitisation SERIE 3000 is based on the high temperature furnaces LHT and HTK allowing for heat treatment up to 3000°C under inert atmosphere.



HTK 80 GR/30 – Chamber
 Furnace from SERIES 3000



Scheme of the HTK
 heating cassette



HBO – Hood Furnaces



LHT – Laboratory
 Furnaces up to 3000 °C

Bottom Loading Furnaces

The HTBL Bottom Loading Furnaces are available from 50 to 200 litres. The maximum temperature range is from 1600°C to 2200°C and the insulation, heating element and retort materials are graphite, molybdenum and tungsten.



HTBL 60 GR/22 –
 Bottom Loading Furnaces



HTBL GR heating element



HTBL W heating element



Scheme of the heating
 element and bottom plate

Annealing Furnaces

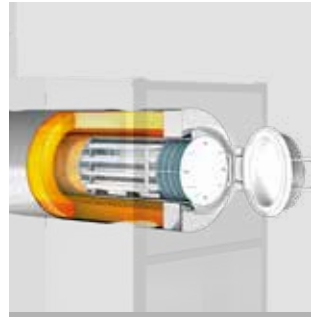
The retort GLO annealing furnaces are available from 10 to 120 litres with maximum temperatures ranging from 600°C to 1100°C. The CrFeAl heating elements are embedded in ceramic fibre insulation.



GLO 40/11 -
Annealing Furnaces



Retort with charging rack



Scheme of the retort with
charging rack and radiation shields



VGLO-Top Loader

Tube Furnaces

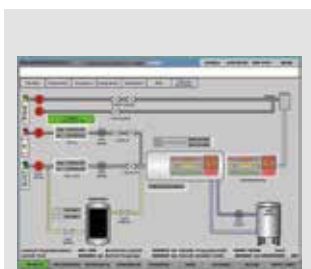
For the F series up to 1350°C, heated by CrFeAl wire mounted on a ceramic fibre module, and the HTRH and HTRV models up to 1800°C, using molybdenum disilicide heating elements in a vertical hanging position, a comprehensive range of accessories is available for applications under vacuum or process gas. Tightly sealed, high purity Al₂O₃ and Al₂O₃ / SiO₂ tube materials, water-cooled stainless steel flanges and gas supply equipment allow for thermal treatment under specified atmospheres. In such treatment processes the gas flow can be controlled either manually with the use of a flow meter or automatically with the use of a mass flow controller. Complete vacuum pumping systems, rotary vane pumps, turbomolecular pumps, data recording systems and visualization software complete the product range. The Hydrogen Tube Furnace HTRH-H₂ is designed to meet the required regulations for safe handling of hydrogen gas.



HTRV 18/70/250 with
inert gas package



AZ - 8-Zone Tube Furnace
with high vacuum equipment



Touch panel interface for
automated operation

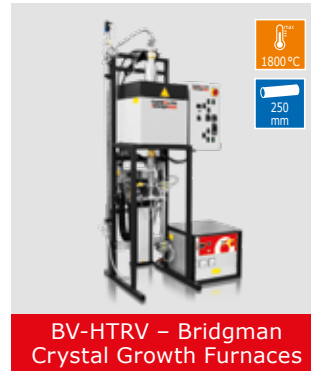


HTRH-H₂ - Hydrogen
Tube Furnace

Application Specific Furnaces

Products in this section introduce Carbolite Gero's range of application specific furnaces with maximum operating temperatures up to 1800°C. Carbolite Gero furnaces are used for many different applications in various industries including Advanced Materials, Aerospace, Chemistry, Coal & Coke, Precious Metals, Technical Ceramics. Various designs for crystal growing like the Bridgman method and systems for Metal Injection Moulding (MIM) and Ceramic Injection Moulding (CIM) processes can be provided. Equipment for operation in vacuum or inert atmosphere is also available.

Furnaces for Special Applications



Furnaces for Coal and Coke



Industry Specific Furnaces



Custom Designed Ovens & Furnaces

Carbolite Gero has full control of manufacturing from design to construction with market leading expertise in heating technology – adding customised modifications or producing fully bespoke products is a regular part of the service we offer to our customers. Some examples are illustrated below. Full details of these and other products can be found in the „Custom Designed Ovens & Furnaces“ catalogue.



HTRH with Glove Box



3-Metres-F-Type-Carbonisation Furnace



4-Metres-HTRV-A Carbonisation-Graphitization Furnace



GLO 10 000 KE/09-1G



Eight Lane Strand Furnace



Top Hat Furnace System with Twin Retorts



3-zone Split Tube Furnace with Rotating and Tilting Mechanism



Debinding Furnace with Retort & Forced Cooling



NADCAP Large Chamber Furnace with Loading System



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