

## Graphite Tube Furnace - HTRH-GR

### General Information

With the adjustable stand option, the Carbolite Gero graphite tube furnace range up to 2600 °C can be used at various angles, ranging from horizontal to vertical.

This range of cold wall tube furnaces is heated by graphite elements and insulated by graphite felt. At higher temperatures above 400 to 600 °C graphite is air sensitive and needs to be kept under either an inert gas or vacuum atmosphere. To maintain an oxygen free environment, the tube furnace is contained within in a water-cooled vacuum tight vessel sealed with rubber O-rings, which needs to be evacuated and purged with inert gas prior to heating.

The thermal conductivity of graphite felt insulation is very low making it an excellent material for furnace insulation. The thickness and quality of the insulation materials are specifically chosen depending on the maximum operating temperature of the tube furnace.

**NEW**

### Standard features

- 2200, 2400 or 2600 °C maximum operating temperature
- Graphite heating and insulation
- Heated length of 260 mm
- Semi-automatic control with Siemens KP 300 panel
- Eurotherm 3508P1 programmer
- Pyrometer for temperature measurement
- Automatic gas valves with manual flowmeter for one inert gas
- Single stage rotary vane pump
- Water cooled vessel (cooling water provided by customer)
- Over-temperature protection
- Leakage rate (clean, cold, dry and empty)
- Closed flanges during heat treatment mandatory

### Options (specify these at time of order)

- Full automated control by Siemens PLC S7-300
- Control panel TP1900 or WinCC for PLC
- Further inert gas controls (manual or automated)
- Double stage rotary and turbo pumps
- Adjustable angle stand
- Sliding thermocouple for accurate temperature control under 1500 °C
- Reference pyrometer (only with PLC)
- Water cooling chiller (if cooling water is not available)
- Special flanges with inert gas counter flow for open operation during heat treatment

### Technical Specifications

## Graphite Tube Furnace - HTRH-GR

### HTRH-GR 22/260

Max temp under Argon (°C)	2200
Max temp under vacuum (°C)	2200
Cooling time from 2000 °C (h)	5
Inner tube diameter (mm)	50
Heated length (mm)	260
Outer dimensions tube furnace without stand Ø* x W (mm)	400 x 900
Outer dimensions tube furnace with stand H x W x D (mm)	1800 x 900 x 1000
Outer dimensions control module H x W x D (mm)	1500 x 1500 x 1000
Furnace weight in total (kg)	600
Required Argon gas flow (l/h)	50-500
Required cooling water flow (l/min)	25
Max power (W)	23000

### HTRH-GR 24/260

Max temp under Argon (°C)	2400
Max temp under vacuum (°C)	2200
Cooling time from 2000 °C (h)	5
Inner tube diameter (mm)	50
Heated length (mm)	260
Outer dimensions tube furnace without stand Ø* x W (mm)	400 x 900
Outer dimensions tube furnace with stand H x W x D (mm)	1800 x 900 x 1000
Outer dimensions control module H x W x D (mm)	1500 x 1500 x 1000
Furnace weight in total (kg)	700
Required Argon gas flow (l/h)	50-500
Required cooling water flow (l/min)	35
Max power (W)	32000

## Graphite Tube Furnace - HTRH-GR

### HTRH-GR 26/260

Max temp under Argon (°C)	2600
Max temp under vacuum (°C)	2200
Cooling time from 2000 °C (h)	5
Inner tube diameter (mm)	50
Heated length (mm)	260
Outer dimensions tube furnace without stand Ø* x W (mm)	400 x 900
Outer dimensions tube furnace with stand H x W x D (mm)	1800 x 900 x 1000
Outer dimensions control module H x W x D (mm)	1500 x 1500 x 1000
Furnace weight in total (kg)	800
Required Argon gas flow (l/h)	50-500
Required cooling water flow (l/min)	50
Max power (W)	42000

#### Please note:

- Heat up rate to 2000 °C approx. 10 °C/min, above 2000 °C lower
- Power supply by 3 phase power with 380-415 Volts with neutral and earth required
- \*Further to the diameter of the tube furnace the current feed in connections have an outer diameter of 800 mm
- Inert gas and cooling water supply mandatory
- Maximum continuous operating temperature is 100 °C below maximum temperature
- Above 2000 °C the wear down of the heating elements grows with raising temperature exponentially