CARBOLITE®
a VERDER company



GRADIENT TUBE FURNACE RANGE

TG RANGE

carbolite.com/products/tube-furnace-range/gradient-tube-furnaces/tg-range/

TG RANGE

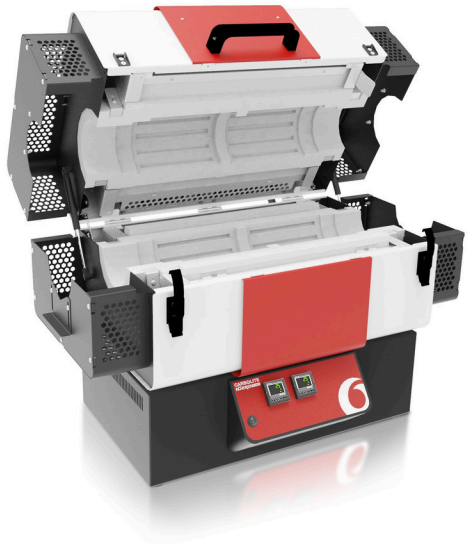
GRADIENT TUBE FURNACE RANGE

These compact split tube furnaces are specifically designed to provide a temperature gradient along the length of the heated zones. They use free radiating wire elements embedded within the insulation of the furnace body.

The benefit of this design is its flexibility; with the use of tube adapters the same furnace can be used with a variety of tube diameters.

The furnace body is split into two halves and hinged at the rear; pneumatic dampening struts at either end provide a smooth opening action. The ability to open the furnace makes it easier for operators to exchange work tubes, or insert vessels, such as reactors, with end flanges that would make them difficult to insert into a non-split furnace.

The TG2 tube furnace includes a 25 mm long unheated zone barrier between the two 200 mm heated zones while the TG3 includes two 75 mm long unheated zone barriers between the three 150 mm heated zones. Each heated zone has its own temperature controller and thermocouple.



OVERVIEW

- **Max temp:** 1200 °C
- **Furnace Ø:** 60, 125 mm
- **Heated length(s):** 425, 600 mm
- **Number of heated zones:** 2 zones or 3 zones
- **Orientation:** All models available orientated either horizontally or vertically

TG RANGE

LEADING HEAT TECHNOLOGY

Carbolite's new tube furnace range is at the pinnacle of furnace design. The culmination of over 80 years of experience in thermal engineering; combining the latest technological developments with solid construction, high-quality components and a sleek, modern aesthetic.

HIGH QUALITY HEATING ELEMENTS

- Excellent temperature uniformity
- Fast heat-up and cool-down rates
- Unsurpassed temperature uniformity along the entire heated length

HIGH QUALITY THERMAL INSULATION

- Low energy consumption
- Low external case temperature
- Designed for longevity

VIEW INSIDE

- 2-zone and 3-zone models
- Independent zone temperature control
- Thermal insulation barriers between heated zones

TG RANGE

TEMPERATURE CONTROL & COMMUNICATIONS

TG gradient furnaces are equipped with RS485 communications and a Carbolite EPC3016P1 programmable temperature controller with 24 segments for each heated zone as standard.

OPTIONS

Over-temperature protection (recommended to protect valuable contents and for unattended operation)



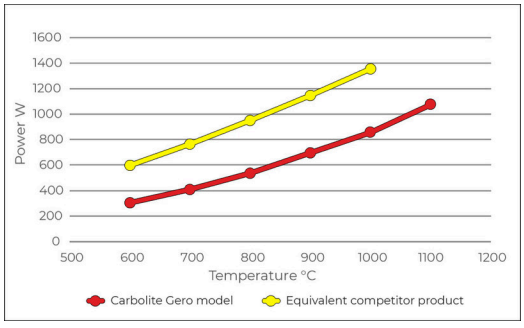
EPC3016P1 Temperature controller

HIGH-QUALITY THERMAL INSULATION

LOW ENERGY CONSUMPTION

Carbolite's new tube furnaces are very energy-efficient. Their high-quality thermal insulation is designed for longevity, low case temperature and most of all outstandingly low energy consumption.

Using a Carbolite tube furnace reduces your energy cost as well as the carbon footprint.



UP TO 50% LESS ENERGY REQUIRED!

Comparison with equivalent competitor product. Energy consumption for exemplary Carbolite TS1 12/60/600 model and equivalent competitor product; measured at each temperature after 2 hours soak.

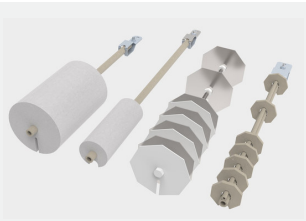
TG RANGE

ACCESSORIES



LARGE SELECTION OF WORK TUBES

Wide choice of tube diameters, lengths & materials



INSULATION PLUGS & RADIATION SHIELDS

Prevent heat loss & improve temperature uniformity

TG RANGE

MOUNTING CONFIGURATIONS

TG gradient tube furnaces are supplied mounted on top of the control box. The furnace body can easily be detached and separated for remote operation.

This configuration includes a 2 metre cable (furnaces with 125 mm Ø incl. plug and socket) between the furnace body and control box. This flexible arrangement allows for easy conversion to optional mounting arrangements e.g. attaching to a vertical stand, a mounting bracket or inside a fume cupboard.



FURNACE BODY ON TOP OF CONTROL BOX

Configuration for heated lengths up to 600 mm



DETACHABLE FURNACE BODY

Easy conversion to optional mounting arrangements

TG RANGE

MOUNTING OPTIONS



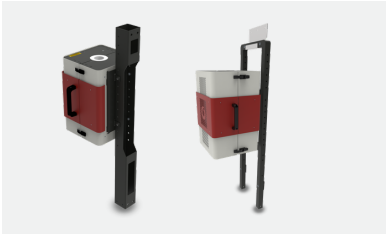
OPTION: 4 M CABLE EXTENSION

4 m long extension results in a total of 6 m between furnace body and control box (125 mm Ø models include plug and socket)



OPTION: VERTICAL STAND

Vertical mounting stand for the furnace body



OPTION: MOUNTING BRACKET

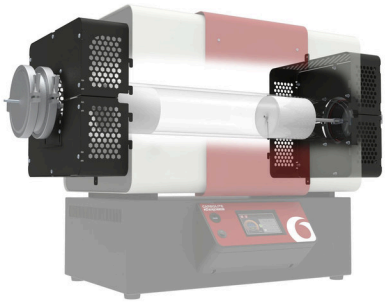
Used to mount the furnace body to customer equipment

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MODIFIED ATMOSPHERE & VACUUM EQUIPMENT

Carbolite tube furnaces may be equipped with many different options to accommodate modified atmosphere and/or vacuum applications.

MODIFIED ATMOSPHERE & VACUUM EQUIPMENT →
carbolite.com/products/modified-atmosphere/



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LOW CASE TEMPERATURE

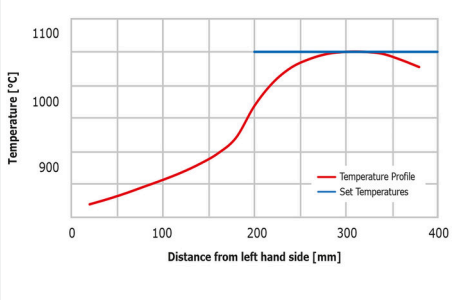
Carbolite tube furnaces are designed with user safety in mind. The robust construction and high-quality thermal insulation ensure that external case temperatures are much lower than other models.

Not only does this help mitigate the risk of injury to the operator, the reduction in the amount of heat escaping the furnace ensures a comfortable working environment, and also means that less energy is wasted during use. When the heat is on, Carbolite can help you keep a cool head!

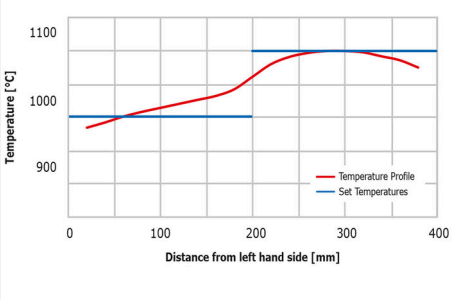
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HEAT TREATMENT IN A GRADIENT TUBE FURNACE

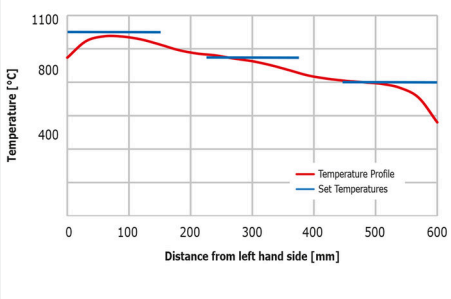
A sample could be moved between two temperature zones to achieve a desired heat cycle without waiting for a single zone furnace to heat or cool.



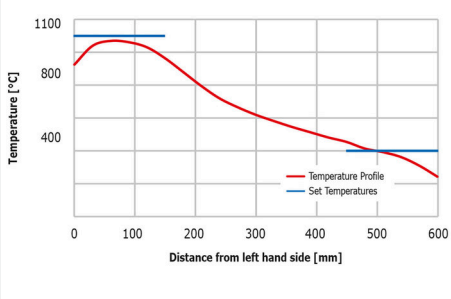
TG2 12/125/425 · 80 mm OD worktube
Zone 1: off, zone 2: 1100 °C



TG2 12/125/425 · 80 mm OD worktube
Zone 1: 1000 °C, zone 2: 1100 °C



TG3 12/60/600 · 60 mm OD worktube
Zone 1: 1100 °C, zone 2: 950 °C, zone 3: 800 °C



TG3 12/60/600 · 60 mm OD worktube
Zone 1: 1100 °C, zone 2: off, zone 3: 400 °C

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FREQUENTLY ASKED QUESTIONS

WHAT IS A GRADIENT TUBE FURNACE?

A gradient tube furnace is a split tube furnace with multiple heated zones, fitted with zone barriers. The zone barriers are pieces of insulation that fit between each heating element module, and help reduce the amount of heat transfer between heated zones.

HOW ARE THE GRADIENTS IN A GRADIENT TUBE FURNACE CONTROLLED?

Each heated zone is controlled by its own independent temperature controller, so it is possible to set different temperatures in each zone. The zone barriers reduce the amount of heat transfer between zones, increasing overall control and enabling the operator to create a temperature gradient across the heated length e.g., zone 1: 500°C, zone 2: 450°C, zone 3: 400°C.

WHICH APPLICATIONS REQUIRE A GRADIENT TUBE FURNACE?

There are many applications that require a gradient tube furnace, such as chemical vapour deposition (CVD), in which a substance is vaporised in the hottest zone, and transported along a work tube via a carrier gas, then [illegible]adient tube furnaces are ideal for this process, as each end of

TG RANGE

TECHNICAL DATA

	TG3 12/60/600	TG2 12/125/425
Max temp (°C)	1200	1200
Number of heated zones	3	2
Heat-up time (mins)	–	134
Furnace Ø (mm)	60	125
Heated lengths (mm)	600	425
Recommended tube length for use in air (mm)	880	750
Recommended tube length for use with modified atmosphere (mm)	1050	1000
Dimensions: External H x W x D (mm)	575 x 795 x 480	665 x 665 x 575
Control Box H x W x D (mm)	230 x 785 x 480	230 x 655 x 480
Max power (W)	2000	1860
Weight (kg)	56	71

PLEASE NOTE

- Heat up time is measured to 100 °C below max, using an empty quartz tube & insulation plugs
- Heat up rate when using an optional ceramic work tube must be limited to 5 °C/min
- Holding power is measured at continuous operating temperature
- Temperature gradients are measured with insulation plugs fitted
- Maximum continuous operating temperature is 100 °C below maximum temperature
- All furnaces are equipped with thermocouple type N

TG GRADIENT TUBE FURNACE RANGE

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