CARBOLITE®
a VERDER company


# TF TUBE FURNACE RANGE

**Carbolite's versatile new TF tube furnace range incorporates high-quality heating elements and innovative thermal insulation design to achieve first class performance while maintaining both reduced case temperatures and power consumption.**

The TF range has been designed with flexibility in mind. Slide-in accessory work tubes and the use of tube adapters allow a single furnace to accommodate a variety of tube diameters, whilst the work tubes themselves can easily be exchanged to meet the different physical or chemical requirements of a process.

Optional work tube packages enable users to equip the TF for operation under vacuum or modified atmosphere.

## OVERVIEW

**Max temp**
1100, 1200, 1600°C

**Furnace Ø**
32, 60, 100, 125 mm

**Heated length(s)**
150, 180, 300, 450, 600, 800, 1000, 1200 mm

**Number of heated zones**
1 zone or 3 zones

**Orientation**
All models available orientated either horizontally or vertically

TF TUBE FURNACE 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

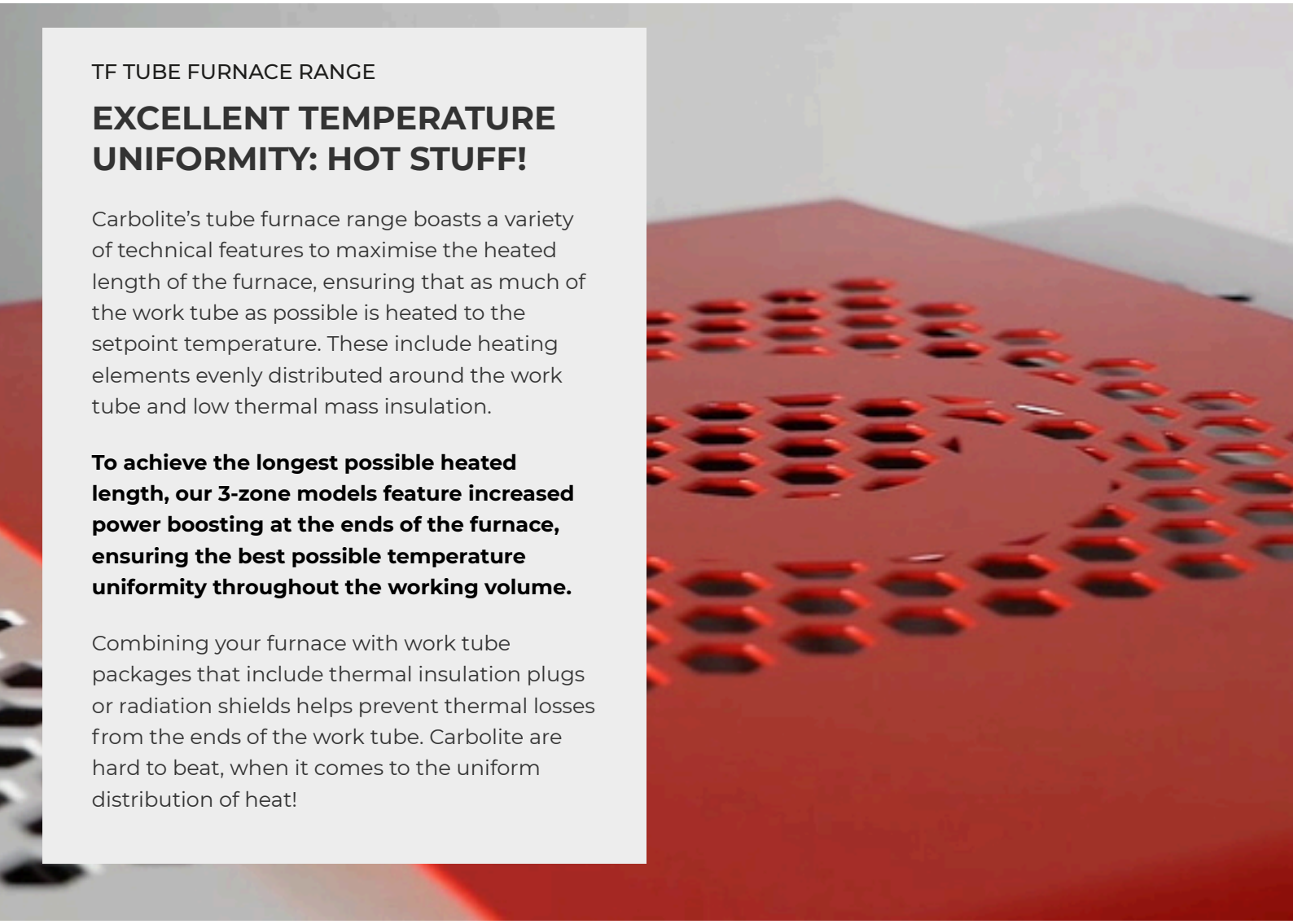
- Excellent temperature uniformity
- Fast heat-up and cool-down rates
- Unsurpassed temperature uniformity along the entire heated length

### HIGH QUALITY THERMAL INSULATION

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

Click to view video

Product Video: TF Tube Furnace Range



TF TUBE FURNACE RANGE

## EXCELLENT TEMPERATURE UNIFORMITY: HOT STUFF!

Carbolite's tube furnace range boasts a variety of technical features to maximise the heated length of the furnace, ensuring that as much of the work tube as possible is heated to the setpoint temperature. These include heating elements evenly distributed around the work tube and low thermal mass insulation.

**To achieve the longest possible heated length, our 3-zone models feature increased power boosting at the ends of the furnace, ensuring the best possible temperature uniformity throughout the working volume.**

Combining your furnace with work tube packages that include thermal insulation plugs or radiation shields helps prevent thermal losses from the ends of the work tube. Carbolite are hard to beat, when it comes to the uniform distribution of heat!

TF TUBE FURNACE RANGE

# TEMPERATURE CONTROL & COMMUNICATIONS

**TF tube furnaces are equipped with ethernet communications and a programmable controller with 24 segments as standard:**

- Single zone furnaces fitted with Carbolite EPC3016P1 controller
- Three zone furnaces fitted with Carbolite CC-T1 touch-screen controller

## OPTIONS

- Over-temperature protection (recommended to protect valuable contents and for unattended operation); 1600°C models are equipped with this option as standard
- A range of sophisticated digital controllers, multi-segment programmers and data loggers is available. These can be fitted with RS232, RS485 or Ethernet communications. - More Information.


CC-T1 Touch Screen Controller

TF TUBE FURNACE RANGE

# RAPID HEATING RATES

Carbolite tube furnaces are equipped with high-quality heating elements designed to achieve fast heat-up rates.

**Optimise your lab time by speeding up your heat treatment processes!**

Precise temperature measurements are carried out in the Carbolite testing laboratory and available for all models.

# MOUNTING CONFIGURATIONS

This range of tube furnaces is supplied in one of two standard mounting configurations.

1. For heated lengths up to 600 mm the furnace body is mounted on top of the control box. The furnace body can easily be detached and separated for remote operation.
2. For heated lengths of 800 mm and above the furnace body and control box are always separate.

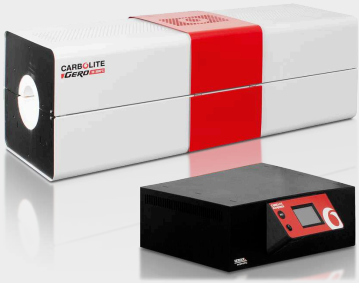
Both configurations include a 2 metre cable (furnaces with 125 mm Ø incl. plug and socket) between the furnace body and control box. This flexible arrangement allows for easy conversion to optional mounting arrangements e.g. attaching to a vertical stand, a mounting bracket or inside a fume cupboard.

**FURNACE BODY ON TOP OF CONTROL BOX**

Configuration for heated lengths up to 600 mm

**DETACHABLE FURNACE BODY**

Easy conversion to optional mounting arrangements

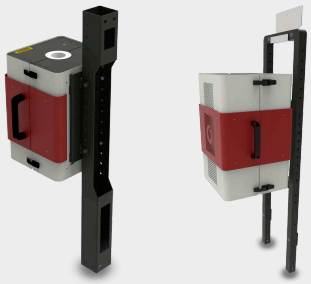


**FURNACE BODY AND SEPARATE CONTROL BOX**

Configuration for heated lengths of 800 mm and above

**OPTION: VERTICAL STAND**

Vertical mounting stand for the furnace body



**OPTION: MOUNTING BRACKET**

Used to mount the furnace body to customer equipment

**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)

HIGH-QUALITY THERMAL INSULATION

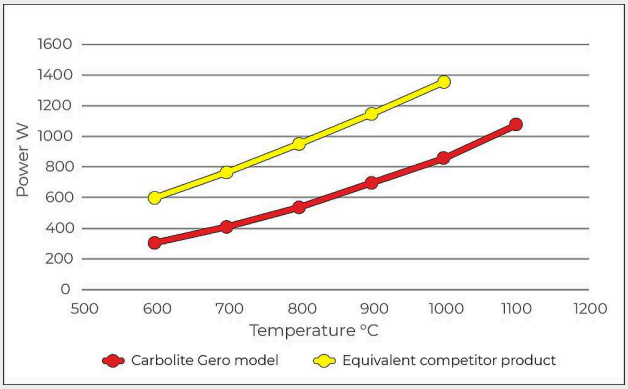
# LOW ENERGY CONSUMPTION

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 TF1 12/60/600 model (red) and equivalent competitor product (yellow); measured at each temperature after 2 hours soak.

TF TUBE FURNACE RANGE

## MODIFIED ATMOSPHERE & VACUUM EQUIPMENT

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

### OPTIONS

- A range of additional work tubes, end seals and complete work tube packages
- Vacuum packages with a choice of rotary vane pumps or turbomolecular pumps
- Inert gas package modules allow for the use of up to 3 non-reactive gases (available with either manual or automatic control)
- Laboratory Gas Safety System for safe use with hydrogen above 750 °C


Click to view video

Introduction to modified atmosphere and vacuum options for tube furnaces

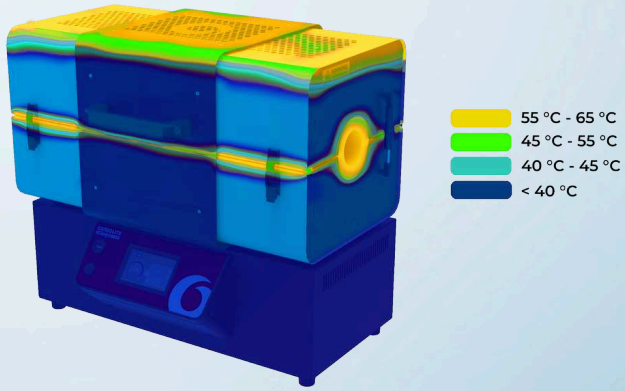
TS SPLIT TUBE FURNACE RANGE

## THAT'S COOL! 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.**

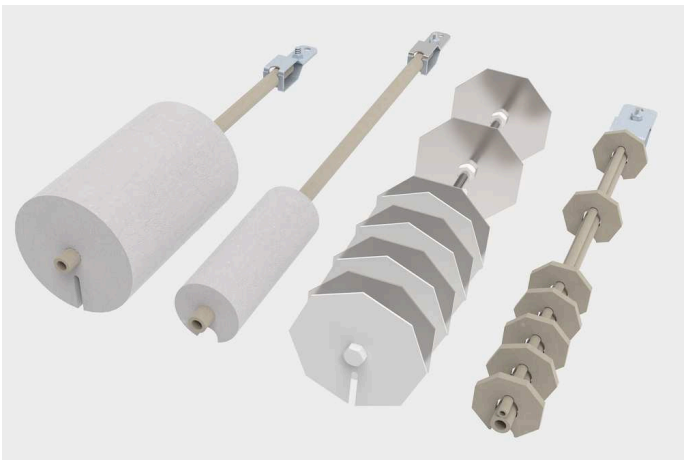
Not only does this help mitigate the risk of injury to the operator, the reduction in the amount of heat escaping the furnace ensures a comfortable working environment, and also means that less energy is wasted during use.  When the heat is on, Carbolite can help you keep a cool head!



# ACCESSORIES

### LARGE SELECTION OF WORK TUBES

Wide choice of tube diameters, lengths & materials



### INSULATION PLUGS & RADIATION SHIELDS

Prevent heat loss & improve temperature uniformity



# TECHNICAL DATA

| | TF1 11/32/150 | TF1 12/60/150 | TF1 12/60/300 |
|---|---|---|---|
| **Number of heated zones** | 1 | 1 | 1 |
| **Max temp (°C)** | 1100 | 1200 | 1200 |
| **Furnace Ø** | 32 | 60 | 60 |
| **Heated length (mm)** | 150 | 150 | 300 |
| **Heat-up time (mins)** | 27 | 40 | 35 |
| **Tube length for use in air (mm)** | 300 | 430 | 580 |
| **Tube length for use with modified atmosphere (mm)** | 500 | 600 | 750 |
| **Dimensions: External H x W x D (mm)** | 455 x 335 x 470 | 575 x 485 x 480 | 575 x 495 x 480 |
| **Uniform length ±5°C (mm)** | 58 | 93 | 177 |
| **Max power (W)** | 575 | 750 | 1500 |
| **Weight (kg)** | 16 | 31 | 37 |

| | TF1 12/60/450 | TF1 12/60/600 | TF1 12/125/400 |
|---|---|---|---|
| **Number of heated zones** | 1 | 1 | 1 |
| **Max temp (°C)** | 1200 | 1200 | 1200 |
| **Furnace Ø** | 60 | 60 | 125 |
| **Heated length (mm)** | 450 | 600 | 400 |
| **Heat-up time (mins)** | 45 | 45 | 88 |
| **Tube length for use in air (mm)** | 730 | 880 | 750 |
| **Tube length for use with modified atmosphere (mm)** | 900 | 1050 | 1000 |
| **Dimensions: External H x W x D (mm)** | 575 x 645 x 480 | 575 x 795 x 480 | 665 x 665 x 480 |
| **Uniform length ±5°C (mm)** | 318 | 474 | 284 |
| **Max power (W)** | 2000 | 2500 | 1860 |
| **Weight (kg)** | 49 | 56 | 71 |

| | TF1 12/125/600 | TF1 12/125/800 | TF1 12/125/1000 |
|---|---|---|---|
| **Number of heated zones** | 1 | 1 | 1 |
| **Max temp (°C)** | 1200 | 1200 | 1200 |
| **Furnace Ø** | 125 | 125 | 125 |
| **Heated length (mm)** | 600 | 800 | 1000 |
| **Heat-up time (mins)** | 90 | 85 | 80 |
| **Tube length for use in air (mm)** | 950 | 1150 | 1350 |
| **Tube length for use with modified atmosphere (mm)** | 1200 | 1400 | 1600 |
| **Dimensions: External H x W x D (mm)** | 665 x 865 x 575 | 445 x 1065 x 575* | 445 x 1265 x 575* |
| **Uniform length ±5°C (mm)** | 456 | 635 | 847 |
| **Max power (W)** | 2510 | 3160 | 3810 |
| **Weight (kg)** | 89 | 102 | 120 |

| | TF1 12/125/1200 | TF1 16/60/180 | TF1 16/60/300 |
|---|---|---|---|
| **Number of heated zones** | 1 | 1 | 1 |
| **Max temp (°C)** | 1200 | 1600 | 1600 |
| **Furnace Ø** | 125 | 60 | 60 |
| **Heated length (mm)** | 1200 | 180 | 300 |
| **Heat-up time (mins)** | 82 | -- | -- |
| **Tube length for use in air (mm)** | 1550 | 680 | 800 |
| **Tube length for use with modified atmosphere (mm)** | 1800 | 900 | 1020 |
| **Dimensions: External H x W x D (mm)** | 445 x 1465 x 575* | 665 x 595 x 585 | 665 x 715 x 585 |
| **Uniform length ±5°C (mm)** | 969 | 100 | 175 |
| **Max power (W)** | 4460 | 2500 | 4000 |
| **Weight (kg)** | 134 | 43 | 51 |

| | TF1 16/100/450 | TF1 16/100/600 | TF3 12/60/450 |
|---|---|---|---|
| **Number of heated zones** | 1 | 1 | 3 |
| **Max temp (°C)** | 1600 | 1600 | 1200 |
| **Furnace Ø** | 100 | 100 | 60 |
| **Heated length (mm)** | 450 | 600 | 450 |
| **Heat-up time (mins)** | -- | -- | 55 |
| **Tube length for use in air (mm)** | 1030 | 1180 | 730 |
| **Tube length for use with modified atmosphere (mm)** | 1250 | 1400 | 900 |
| **Dimensions: External H x W x D (mm)** | 790 x 940 x 705 | 790 x 1090 x 705 | 575 x 645 x 480 |
| **Uniform length ±5°C (mm)** | 320 | 425 | 340 |
| **Max power (W)** | 6000 | 7000 | 2000 |
| **Weight (kg)** | 90 | 100 | 49 |

| | TF3 12/60/600 | TF3 12/125/600 | TF3 12/125/800 |
|---|---|---|---|
| **Number of heated zones** | 3 | 3 | 3 |
| **Max temp (°C)** | 1200 | 1200 | 1200 |
| **Furnace Ø** | 60 | 125 | 125 |
| **Heated length (mm)** | 600 | 600 | 800 |
| **Heat-up time (mins)** | 55 | 90 | 85 |
| **Tube length for use in air (mm)** | 880 | 950 | 1150 |
| **Tube length for use with modified atmosphere (mm)** | 1050 | 1200 | 1400 |
| **Dimensions: External H x W x D (mm)** | 575 x 795 x 480 | 665 x 865 x 575* | 445 x 1065 x 575* |
| **Uniform length ±5°C (mm)** | 501 | 507 | 715 |
| **Max power (W)** | 2500 | 2510 | 3160 |
| **Weight (kg)** | 56 | 89 | 102 |

| | TF3 12/125/1000 | TF3 12/125/1200 | TF3 16/100/450 |
|---|---|---|---|
| **Number of heated zones** | 3 | 3 | 3 |
| **Max temp (°C)** | 1200 | 1200 | 1600 |
| **Furnace Ø** | 125 | 125 | 100 |
| **Heated length (mm)** | 1000 | 1200 | 450 |
| **Heat-up time (mins)** | 80 | 82 | -- |
| **Tube length for use in air (mm)** | 1350 | 1550 | 1030 |
| **Tube length for use with modified atmosphere (mm)** | 1600 | 1800 | 1250 |
| **Dimensions: External H x W x D (mm)** | 445 x 1265 x 575* | 445 x 1465 x 575* | 790 x 940 x 705 |
| **Uniform length ±5°C (mm)** | 855 | 1055 | 375 |
| **Max power (W)** | 3810 | 4460 | 6800 |
| **Weight (kg)** | 120 | 134 | 90 |

| | TF3 16/100/600 |
|---|---|
| **Number of heated zones** | 3 |
| **Max temp (°C)** | 1600 |
| **Furnace Ø** | 100 |
| **Heated length (mm)** | 600 |
| **Heat-up time (mins)** | -- |
| **Tube length for use in air (mm)** | 1180 |
| **Tube length for use with modified atmosphere (mm)** | 1400 |
| **Dimensions:<br>External H x W x D (mm)** | 790 x 1090 x 705 |
| **Uniform length ±5°C (mm)** | 460 |
| **Max power (W)** | 8000 |
| **Weight (kg)** | 100 |

## MODEL NAMES EXPLAINED

| | |
|---|---|
| TF**1** 11/32/150 | Number of heated zones: 1 zone or 3 zones |
| TF1 **11**/32/150 | Max temp: **11**00, **12**00, **16**00°C |
| TF1 11/**32**/150 | Furnace Ø: **32**, **60**, **100**, **125** mm |
| TF1 11/32/**150** | Heated length(s): **150**, **180**, **300**, **450**, **600**, ... mm |

## 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
- Uniform temperature lengths are measured with insulation plugs fitted at 100°C below maximum temperature
- Maximum continuous operating temperature is 100 °C below maximum temperature
- 1100°C and 1200°C models are equipped with thermocouple type N, 1600°C models with type R
- * Furnace with separate control box

**www.carbolite.com/tf**