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a VERDER company



TUBE FURNACE RANGE

TF

carbolite.com/products/tube-furnace-range/universal-tube-furnaces/tf-range/

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

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

TF

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.

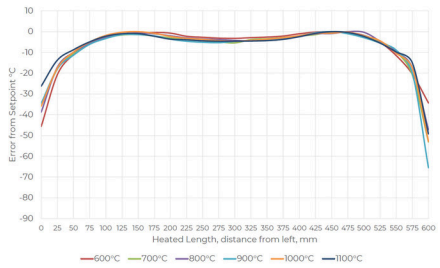
To achieve the longest possible heated length, our 3-zone models feature increased power boosting at the ends of the furnace, ensuring the best possible temperature uniformity throughout the working volume.

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!

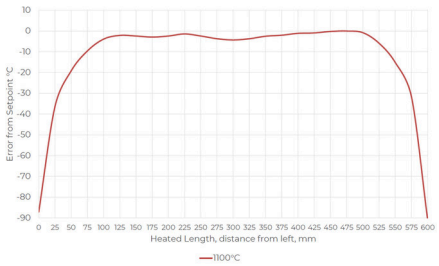
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TEMPERATURE UNIFORMITY MEASUREMENTS

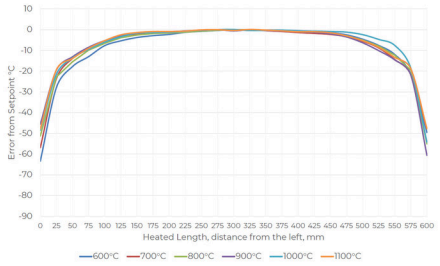
TF3 12/125/600



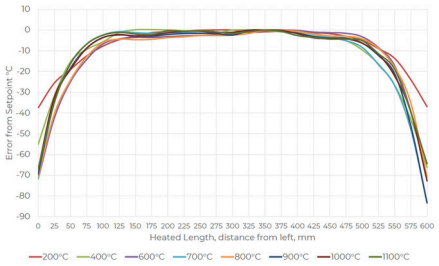
TF3 12/60/600



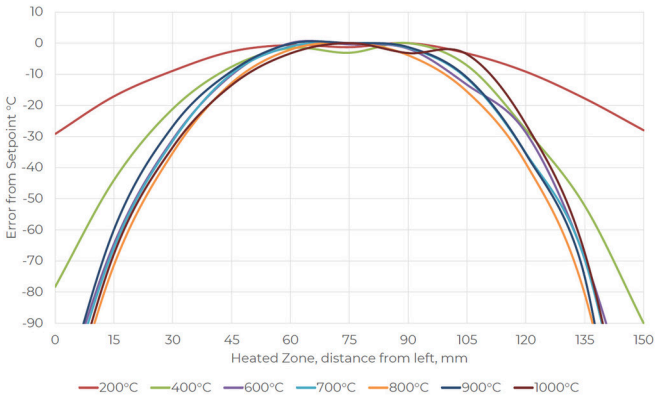
TF1 12/125/600



TF1 12/60/600



TF1 11/32/150



Measured under controlled laboratory conditions. Results may vary depending on process-specific variables, e.g. gas flow rates, vacuum levels, and sample material, size/density.

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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 AriesPlus touch-screen controller



Temperature controller AriesPlus

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 RS485 or Ethernet communications.

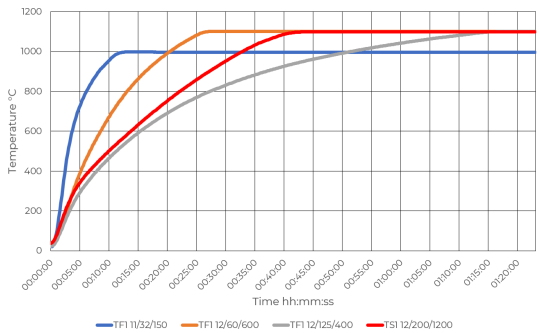
Control options → carbolite.com/products/control-options/

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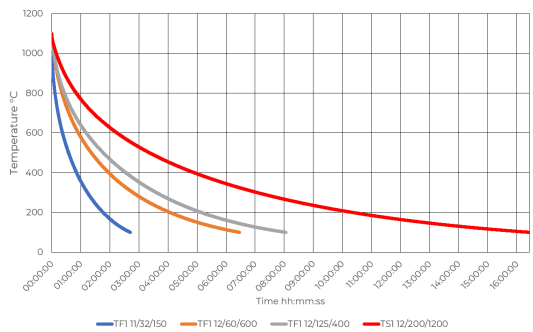
RAPID HEATING RATES

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.

MAXIMUM HEATING RATES



COOLING RATES



Exemplary tube furnace models; measured with a quartz work tube and insulation plugs fitted.

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MOUNTING CONFIGURATIONS

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



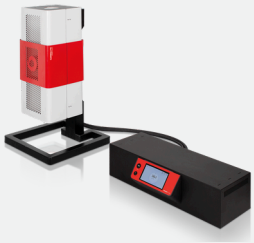
FURNACE BODY ON TOP OF CONTROL BOX

Configuration for heated lengths up to 600 mm



DETACHABLE FURNACE BODY

Easy conversion to optional mounting arrangements



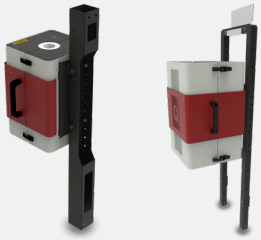
FURNACE BODY AND SEPARATE CONTROL BOX

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

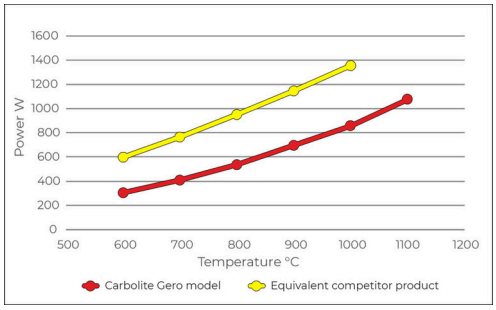
LOW ENERGY CONSUMPTION

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.

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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.

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



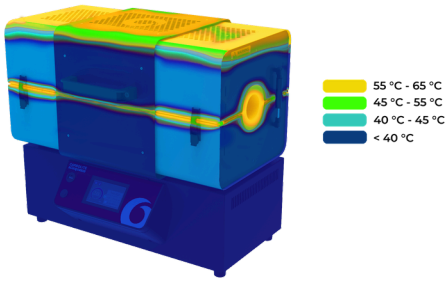
Modified atmosphere & vacuum equipment → carbolite.com/products/modified-atmosphere/

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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!



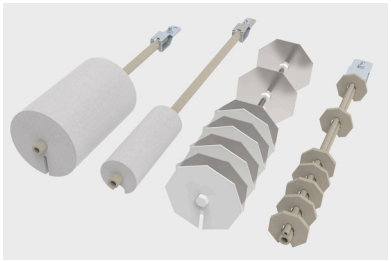
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ACCESSORIES



LARGE SELECTION OF WORK TUBES

Wide choice of tube diameters, lengths & materials



INSULATION PLUGS & RADIATION SHIELDS

Prevent heat loss & improve temperature uniformity

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TECHNICAL DATA

TEMPERATURE, HEATING ZONES & DIMENSIONS OF HEATING AREA

Model	Heated zones	Max temp (°C)	Furnace Ø (mm)	Heated length (mm)	Heat-up time (mins)
TF1 11/32/150	1	1100	32	150	27
TF1 12/60/300	1	1200	60	300	35
TF1 12/60/450	1	1200	60	450	45
TF1 12/60/600	1	1200	60	600	45
TF1 12/125/400	1	1200	125	400	88
TF1 12/125/600	1	1200	125	600	90
TF1 12/125/800	1	1200	125	800	85
TF1 12/125/1000	1	1200	125	1000	80
TF1 12/125/1200	1	1200	125	1200	82
TF1 16/60/180	1	1600	60	180	--
TF1 16/60/300	1	1600	60	300	--
TF1 16/100/450	1	1600	100	450	--
TF1 16/100/600	1	1600	100	600	--
TF3 12/60/450	3	1200	60	450	55
TF3 12/60/600	3	1200	60	600	55
TF3 12/125/600	3	1200	125	600	90
TF3 12/125/800	3	1200	125	800	85
TF3 12/125/1000	3	1200	125	1000	80
TF3 12/125/1200	3	1200	125	1200	82
TF3 16/100/450	3	1600	100	450	--
TF3 16/100/600	3	1600	100	600	--

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.

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TECHNICAL DATA · WORK TUBES & PERFORMANCE

Model	Tube length, air (mm)	Tube length, modified atmosphere (mm)	External H × W × D (mm)	Uniform ±5°C (mm)	Max power (W)	Weight (kg)
TF1 11/32/150	300	500	455 × 335 × 470	58	575	16
TF1 12/60/300	580	750	575 × 495 × 480	177	1500	37
TF1 12/60/450	730	900	575 × 645 × 480	318	2000	49
TF1 12/60/600	880	1050	575 × 795 × 480	474	2500	56
TF1 12/125/400	750	1000	665 × 665 × 480	284	1860	71
TF1 12/125/600	950	1200	665 × 865 × 575	456	2510	89
TF1 12/125/800	1150	1400	445 × 1065 × 575*	635	3160	102
TF1 12/125/1000	1350	1600	445 × 1265 × 575*	847	3810	120
TF1 12/125/1200	1550	1800	445 × 1465 × 575*	969	4460	134
TF1 16/60/180	680	900	665 × 595 × 585	100	2500	43
TF1 16/60/300	800	1020	665 × 715 × 585	175	4000	51
TF1 16/100/450	1030	1250	790 × 940 × 705	320	6000	90
TF1 16/100/600	1180	1400	790 × 1090 × 705	425	7000	100
TF3 12/60/450	730	900	575 × 645 × 480	340	2000	49
TF3 12/60/600	880	1050	575 × 795 × 480	501	2500	56
TF3 12/125/600	950	1200	665 × 865 × 575*	507	2510	89
TF3 12/125/800	1150	1400	445 × 1065 × 575*	715	3160	102
TF3 12/125/1000	1350	1600	445 × 1265 × 575*	855	3810	120
TF3 12/125/1200	1550	1800	445 × 1465 × 575*	1055	4460	134
TF3 16/100/450	1030	1250	790 × 940 × 705	375	6800	90
TF3 16/100/600	1180	1400	790 × 1090 × 705	460	8000	100

* Furnace with separate control box. 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.

Holding power is measured at continuous operating temperature. 1100°C and 1200°C models are equipped with thermocouple type N, 1600°C models with type R.

TF TUBE FURNACE RANGE

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