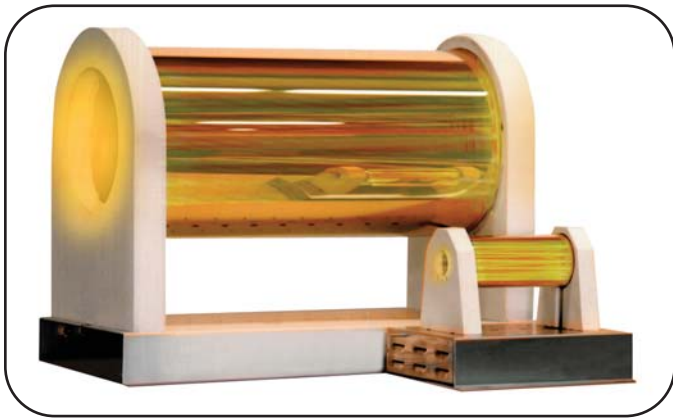


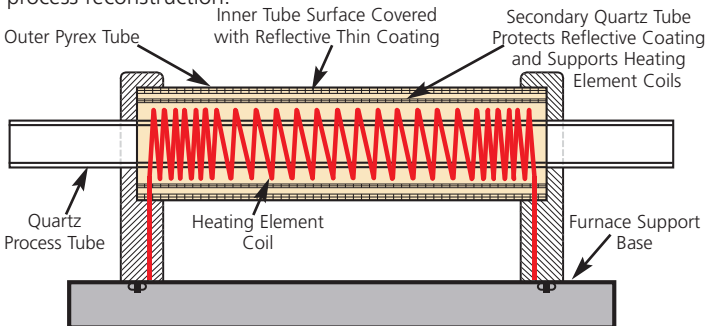


1100° Transparent Tube Furnaces



Transparent Tube Furnace

Carbolite presents an innovative 1100°C tube furnace design that is suitable for a wide variety of applications in research. Carbolite is specifically offering this unique tube furnace for processes that are helpful to visually observe during heating. The benefit to view selected materials while heating allows observation of changes in size, shape, surface conditions, and other physical properties as a function of temperature. Adjustments can then be quickly made to optimize a process without waiting for post-cooldown characterization and process reconstruction.



Furnace Design

The furnace consists of a concentric set of three glass tubes and a coaxially mounted specially designed open-wound coil heater. The outer tube is pyrex that has been internally coated with an advanced thin film reflective gold material. This mirror-like coating reflects nearly all of the infrared heat back into the chamber of the furnace. Simultaneously, the gold coating allows visible light wavelengths to pass through, providing visibility of the central core of the furnace. The efficiency of this design allows furnace operating temperatures up to 1100°C, with a relatively low outer tube temperature.

A second tube serves to protect the mirror coating and retain the heater coil. This quartz tube is transparent to both visible wavelengths and infrared energy. Finally, a quartz process tube used to support the furnace load, extends entirely through the furnace chamber. This tube also isolates the load from the heater coils. Like the second tube, the process tube is also transparent to both visual and infrared wavelengths. This tube frequently extends beyond the ends of the furnace to allow connection of gas tight end seals.

Improved Uniformity

In a conventionally insulated single zone tube furnace, reasonable temperature uniformity is generally limited to the central third of the furnace heated length. Beyond this distance, the temperature drops off rather rapidly due to heat losses at each end. Through proper design of the tubular heating element coil and the uniformity of the continuously reflected infrared energy, excellent temperature uniformity can be achieved over 60% of the heated length in the Carbolite Transparent Tube Furnace.



Illustration of furnace visual transparency showing element coil.

Furnace Sizes

Carbolite transparent tube furnaces are available in multiple chamber sizes ranging up to 8" diameter and 40" heated lengths. The furnace sizes listed at the bottom of this page simply represent three standard sizes that have been provided in the past and are readily available. These furnaces are available in single and 3 zone designs, and can be provided for horizontal or vertical operation.

Additional Benefits

Two often overlooked benefits of this style furnace relate to its cleanliness and heating and cooling rates. A transparent tube furnace with a 2.5" diameter process tube x 20" heated length can reach 1000°C in approximately 15 minutes, and will cool to 600°C in about 10 minutes. Because this furnace incorporates no traditional insulation materials, and the non-dusting design of all components, the furnace is well suited for clean environments such as clean room applications.

1100°C Transparent Tube Furnaces

Furnace Model	Max. Temp. (°C)	Maximum O.D. Tube ✓ Inches (mm)	Heated Length Inches (mm)	No. of Zones	External Dimensions Inches (mm)			TC Type	Max. Power (kW)	Furnace Voltage	Shipping Weight (lb.)
					Height	Length	Depth				
TTF 11/38/300	1100	1.50 (38)	12.00 (300)	1	9.00 (229)	16.00 (407)	9.62 (245)	K	1.575	120	60
TTF 11/38/500	1100	1.50 (38)	20.00 (500)	1	9.00 (229)	16.00 (407)	9.62 (245)	K	2.449	120 or 240	95
TTF 11/65/500	1100	2.50 (65)	20.00 (500)	1	11.00 (280)	24.00 (610)	9.62 (245)	K	3.419	240	105

Note: See information described above under Furnace Sizes.

✓ Specify tube OD at time of order.

Specify voltage at time of order. Furnaces operate on single phase voltage.