

TSR ROTATING TUBE FURNACE RANGE



Rotating tube furnace TSR

Carbolite's TSR rotating tube furnace range incorporates the same innovations developed for the TS split tube furnace series with the equipment required to process large batches of free-flowing material, such as powders.

The TSR range comprises a split tube furnace horizontally mounted on a base frame, and fitted with a friction drive rotation system, allowing for work tube rotations of up to 10 rpm. The frame can be manually tilted up to a maximum angle of 6° to suit the requirements of the material being processed.

Accessory work tubes can easily be exchanged to meet the different physical or chemical requirements of a process.

Optional built-in gas systems enable users to equip the TSR rotating tube furnace for operation under a modified atmosphere.

OVERZICHT

**Maximum
temperatuur**
1150 °C

Oven Ø
125 mm

Verwarmde lengtes
1000 mm

**Aantal verwarmde
zones**
1 zone of 3 zones

Orientatie
horizontaal

TSR ROTATING TUBE FURNACE RANGE

TOONAANGEVENDE HITTE TECHNOLOGIE

Het nieuwe assortiment buisovens van Carbolite is het toppunt van ovenontwerp. Het hoogtepunt van meer dan 80 jaar ervaring in thermische engineering; een combinatie van de laatste technologische ontwikkelingen met een solide constructie, hoogwaardige componenten en een strakke, moderne esthetiek.

The rotating motion of the TSR helps increase the surface area of the sample material exposed to the atmosphere within the work tube, helping to speed up reaction times and improve the overall yield. A 5 litre capacity vibratory feeder and corresponding collection hopper makes the TSR the ideal choice for continuous heat treatment processes.



HOGE KWALITEIT VERWARMINGSELEMENTEN

- | Uitstekende temperatuursuniformiteit
- | Snelle opwarming en afkoeling
- | Ongeëvenaarde temperatuuruniformiteit over de gehele verwarmde lengte

HOGE KWALITEIT THERMISCHE ISOLATIE

- | Laag energie-verbruik
- | Lage temperatuur aan externe behuizing
- | Ontworpen voor lange levensduur

TSR ROTATING TUBE FURNACE RANGE

TEMPERATUURSCONTROLE & COMMUNICATIES



TSR-buisovens zijn standaard uitgerust met ethernetcommunicatie en een programmeerbare controller met 24 segmenten:

- | Enkelvoudige zone ovens, voorzien van de Carbolite EPC3016P1 controller
- | Drie-zone ovens voorzien van de Carbolite AriesPlus controller met aanraakscherm

OPTIES

- | Oververhitting bescherming (aanbevolen om waardevolle inhoud te beschermen of voor onbewaakt gebruik)
- | Een reeks gesofistikeerde digitale controllers, multi-segment sturingen en gegevens-schrijvers met digitale communicatie opties is beschikbaar. Meer informatie.

TSR ROTATING TUBE FURNACE RANGE

MODIFIED ATMOSPHERE AND MATERIAL MOVEMENT

The Carbolite TSR rotating tube furnace may be equipped with gas connections to accommodate modified atmosphere applications.

The gas system is built into the frame of the furnace and required gases and control method must be specified at time of order. Options include manual flowmeters or digital mass flow controllers.

The TSR is available with a choice of different work tubes. Please note that the maximum operating temperature is dependent on the properties of the work tube material selected.

To accurately control the flow of sample material into the furnace, the TSR is fitted with both a 5 litre hopper and vibratory feeder, as standard. A 5 litre collection hopper with manual discharge valve is also included to safely gather processed material.

OPTIES

- | Gas connectie kit om gebruik onder gemodificeerde atmosferen mogelijk te maken
- | Inert-gaspakketmodules maken het gebruik van maximaal 3 niet-reactieve gassen mogelijk (verkrijgbaar met handmatige of automatische regeling)
- | Input hopper with screw feeder



Standard quartz work tube and optional metallic work tube



Gas flow control by a digital flow meter

TSR ROTATING TUBE FURNACE RANGE
CUSTOM DESIGN OPTIONS

We have a wealth of knowledge built up over years of assisting customers with their rotating tube furnace applications. Certain applications will benefit from a selection of custom options including:

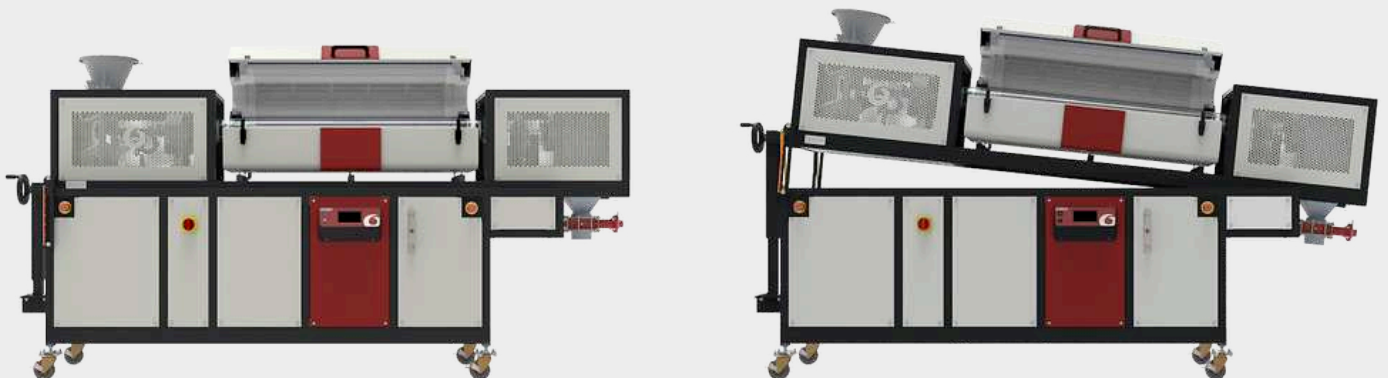
Material movement options to aid movement of the material including:

- | Metallic helical work tube inserts. These are used to control the movement of material through the work tube
- | Feed knockers and agitators
- | Scraper bars or wires within the work tube

- | Water cooled collection hopper
- | Automated discharge valve
- | Steam injection - digitally controlled evaporator/mixer unit with mass flow controllers for the delivery of a carrier gas (N₂) and water

TSR ROTATING TUBE FURNACE RANGE
ANGLE OF INCLINATION

To assist in the flow of material through the work tube, the TSR can be tilted to a maximum of 6° using the manual winding wheel. By adjusting the angle of inclination, the operator can control the residence time of the material within the heated zone of the rotating tube furnace; the ability to change the angle ensures that the TSR has the flexibility to process many different materials with various grain sizes, from granules to powder.



TOEPASSINGSVOORBEELDEN
TORREFACTION & BIO-COAL

Torrefaction is a thermochemical process carried out in the absence of oxygen to cause the partial decomposition of biomass. Water and volatiles are released from the biomass to leave a solid, dry material known as bio-coal. For some applications, bio coal can be used to replace traditional fossil fuels, thus helping to reduce CO₂ emissions.

In this video, both RETSCH cutting mill SM 300 and the CARBOLITE rotating tube furnace TSR have been used as a part of a torrefaction process to create bio-coal fuel.

The Verder Scientific companies provide solutions to support your process every step of the way, from sample preparation and analysis, to heat treatment, and more.



[Klik om video te bekijken](#)

Product Video: Torrefaction with Carbolite Gero & Retsch

TSR ROTATING TUBE FURNACE RANGE

TECHNISCHE GEGEVENS

	TSR1 11/125/1000	TSR3 11/125/1000
Max temp (°C)	1150	1150
Max. outer diameter accessory tube (mm)	125	125
Aantal verhitte zones	1	3
Verwarmde lengte (mm)	1000	1000
Work tube length (mm)	2000	2000
Afmetingen: Buiten H x B x D (mm)	1830 x 3150 x 700	1830 x 3150 x 700
Max vermogen (W)	6000	6000

OPGELET

- | Maximum continuous operating temperature is 1050 °C (Max. operating temperature dependent on work tube material)
- | Alle ovens zijn voorzien van thermokoppel type N

VERKLARING VAN MODELNAMEN

TSR 1 11/125/1000	Aantal verwarmde zones: 1 zone of 3 zones
TSR1 11 /125/1000	Maximum temperatuur: 1150 °C
TSR1 11/ 125 /1000	Oven Ø: 125 mm
TSR1 11/125/ 1000	Verwarmde lengtes: 1000 mm

www.carbolite.com/tsr