

## Tube furnace up to 1350 °C - FHA / FHC

### General Information

The FHA, single zone, and FHC, 3-zone, tube furnaces can be used either vertically or horizontally and have a maximum operating temperature of 1350 °C.

The extensive F range of tube furnaces is offered with a wide range of accessories. The furnaces comprise ceramic fibre modules with a high quality 5 mm APM wire heating element mounted in the insulation, held in position by a ceramic holding ridge. The low thermal mass ceramic fibre insulation ensures low energy consumption and allows fast heating rates. The control thermocouple is a high grade type S thermocouple. Additionally, the tube furnace is available with up to 8 heating zones for the most precise temperature control and uniformity.



### Standard features

- 1350 °C maximum operating temperature
- Single zone models fitted with Carbolite Gero 3216CC PID controller with single ramp to setpoint and process timer
- 3-zone models fitted with 1 x programmable 3216CC and 2 x 3216CC end zone controllers, with retransmission of setpoint
- Accepts work tubes with outer diameters up to 110 mm
- Heated lengths of 200, 500, 750, 1000 or 1250 mm
- Use in horizontal or vertical orientation
- Exceptional lifetime and temperature stability
- High grade type S thermocouple
- Low thermal mass ceramic fibre insulation
- High quality 5 mm APM wire as heating element
- Furnace fitted with separate control box with 3 m cable, plug and socket

### Options (specify these at time of order)

- A range of sophisticated digital controllers, multi-segment programmers and data loggers is available. These can be fitted with RS232, RS485 or Ethernet communications
- Over-temperature protection (recommended to protect valuable contents & for unattended operation)
- Wide choice of tube diameters and materials is available: eg quartz, ceramic, metal
- 'L' stand for vertical usage
- Insulation plugs & radiation shields to prevent heat loss & improve uniformity
- Modified atmosphere and vacuum assemblies are available
- Larger tube diameters on request
- Vacuum packages with a choice of rotary vane pump or turbomolecular pump are available for furnaces with tube inner diameters of 60 mm and above
- Oxygen sensor for inert gas packages

### Technical Specifications

## Tube furnace up to 1350°C - FHA / FHC

### FHA 13/32/200

Max outer diameter accessory tube (mm)	32
Heated length (mm)	200
Max temp (°C)	1350
Furnace dimensions H x W x D (mm)	420 x 400 x 350
Furnace weight (kg)	25
Tube length for use in air (mm)	390
Tube length for use with modified atmosphere (mm)	925
Control module dimensions H x W x D (mm)	480 x 560 x 500
Control module weight (kg)	50
Uniform length ±5°C (mm)	100
Power (kW)	1.2
Power supply	a

### FHA 13/32/500

Max outer diameter accessory tube (mm)	32
Heated length (mm)	500
Max temp (°C)	1350
Furnace dimensions H x W x D (mm)	420 x 700 x 350
Furnace weight (kg)	30
Tube length for use in air (mm)	690
Tube length for use with modified atmosphere (mm)	1225
Control module dimensions H x W x D (mm)	480 x 560 x 500
Control module weight (kg)	50
Uniform length ±5°C (mm)	250
Power (kW)	2.4
Power supply	a

## Tube furnace up to 1350 °C - FHA / FHC

### FHA 13/50/200

Max outer diameter accessory tube (mm)	50
Heated length (mm)	200
Max temp (°C)	1350
Furnace dimensions H x W x D (mm)	420 x 400 x 350
Furnace weight (kg)	30
Tube length for use in air (mm)	390
Tube length for use with modified atmosphere (mm)	925
Control module dimensions H x W x D (mm)	480 x 560 x 500
Control module weight (kg)	50
Uniform length ±5 °C (mm)	100
Power (kW)	1.5
Power supply	a

### FHA 13/50/500

Max outer diameter accessory tube (mm)	50
Heated length (mm)	500
Max temp (°C)	1350
Furnace dimensions H x W x D (mm)	420 x 700 x 350
Furnace weight (kg)	35
Tube length for use in air (mm)	690
Tube length for use with modified atmosphere (mm)	1225
Control module dimensions H x W x D (mm)	480 x 560 x 500
Control module weight (kg)	50
Uniform length ±5 °C (mm)	250
Power (kW)	3.0
Power supply	a

## Tube furnace up to 1350 °C - FHA / FHC

### FHA 13/50/750

Max outer diameter accessory tube (mm)	50
Heated length (mm)	750
Max temp (°C)	1350
Furnace dimensions H x W x D (mm)	420 x 950 x 350
Furnace weight (kg)	40
Tube length for use in air (mm)	940
Tube length for use with modified atmosphere (mm)	1475
Control module dimensions H x W x D (mm)	850 x 560 x 500
Control module weight (kg)	60
Uniform length ±5°C (mm)	375
Power (kW)	5.4
Power supply	b
Weight (kg)	40

### FHA 13/80/200

Max outer diameter accessory tube (mm)	80
Heated length (mm)	200
Max temp (°C)	1350
Furnace dimensions H x W x D (mm)	420 x 400 x 350
Furnace weight (kg)	35
Tube length for use in air (mm)	390
Tube length for use with modified atmosphere (mm)	925
Control module dimensions H x W x D (mm)	480 x 560 x 500
Control module weight (kg)	50
Uniform length ±5°C (mm)	100
Power (kW)	2.1
Power supply	a

## Tube furnace up to 1350 °C - FHA / FHC

### FHA 13/80/500

Max outer diameter accessory tube (mm)	80
Heated length (mm)	500
Max temp (°C)	1350
Furnace dimensions H x W x D (mm)	420 x 700 x 350
Furnace weight (kg)	40
Tube length for use in air (mm)	690
Tube length for use with modified atmosphere (mm)	1225
Control module dimensions H x W x D (mm)	480 x 560 x 500
Control module weight (kg)	60
Uniform length ±5 °C (mm)	200
Power (kW)	5.2
Power supply	b

### FHA 13/80/750

Max outer diameter accessory tube (mm)	80
Heated length (mm)	750
Max temp (°C)	1350
Furnace dimensions H x W x D (mm)	420 x 950 x 350
Furnace weight (kg)	50
Tube length for use in air (mm)	940
Tube length for use with modified atmosphere (mm)	1475
Control module dimensions H x W x D (mm)	850 x 560 x 500
Control module weight (kg)	70
Uniform length ±5 °C (mm)	375
Power (kW)	7.8
Power supply	c

## Tube furnace up to 1350°C - FHA / FHC

### FHA 13/80/1000

Max outer diameter accessory tube (mm)	80
Heated length (mm)	1000
Max temp (°C)	1350
Furnace dimensions H x W x D (mm)	420 x 1200 x 350
Furnace weight (kg)	80
Tube length for use in air (mm)	1190
Tube length for use with modified atmosphere (mm)	1725
Control module dimensions H x W x D (mm)	850 x 560 x 500
Control module weight (kg)	90
Uniform length ±5°C (mm)	500
Power (kW)	10.4
Power supply	c

### FHA 13/110/500

Max outer diameter accessory tube (mm)	110
Heated length (mm)	500
Max temp (°C)	1350
Furnace dimensions H x W x D (mm)	590 x 700 x 520
Furnace weight (kg)	55
Tube length for use in air (mm)	690
Tube length for use with modified atmosphere (mm)	1225
Control module dimensions H x W x D (mm)	850 x 560 x 500
Control module weight (kg)	70
Uniform length ±5°C (mm)	250
Power (kW)	7.8
Power supply	c

## Tube furnace up to 1350°C - FHA / FHC

### FHA 13/110/750

Max outer diameter accessory tube (mm)	110
Heated length (mm)	750
Max temp (°C)	1350
Furnace dimensions H x W x D (mm)	590 x 950 x 520
Furnace weight (kg)	70
Tube length for use in air (mm)	940
Tube length for use with modified atmosphere (mm)	1475
Control module dimensions H x W x D (mm)	850 x 560 x 500
Control module weight (kg)	90
Uniform length ±5°C (mm)	375
Power (kW)	11.4
Power supply	c

### FHA 13/110/1000

Max outer diameter accessory tube (mm)	110
Heated length (mm)	1000
Max temp (°C)	1350
Furnace dimensions H x W x D (mm)	590 x 1200 x 520
Furnace weight (kg)	100
Tube length for use in air (mm)	1190
Tube length for use with modified atmosphere (mm)	1725
Control module dimensions H x W x D (mm)	850 x 560 x 500
Control module weight (kg)	90
Uniform length ±5°C (mm)	500
Power (kW)	12.0
Power supply	d

## Tube furnace up to 1350°C - FHA / FHC

### FHA 13/110/1250

Max outer diameter accessory tube (mm)	110
Heated length (mm)	1250
Max temp (°C)	1350
Furnace dimensions H x W x D (mm)	590 x 1450 x 520
Furnace weight (kg)	130
Tube length for use in air (mm)	1440
Tube length for use with modified atmosphere (mm)	1975
Control module dimensions H x W x D (mm)	850 x 560 x 500
Control module weight (kg)	90
Uniform length ±5°C (mm)	610
Power (kW)	20.0
Power supply	d

### FHC 13/32/500

Max outer diameter accessory tube (mm)	32
Heated length (mm)	500
Max temp (°C)	1350
Furnace dimensions H x W x D (mm)	420 x 700 x 350
Furnace weight (kg)	30
Tube length for use in air (mm)	690
Tube length for use with modified atmosphere (mm)	1225
Control module dimensions H x W x D (mm)	480 x 560 x 500
Control module weight (kg)	50
Uniform length ±5°C (mm)	350
Power (kW)	2.4
Power supply	a



## Tube furnace up to 1350 °C - FHA / FHC

### FHC 13/50/500

Max outer diameter accessory tube (mm)	50
Heated length (mm)	500
Max temp (°C)	1350
Furnace dimensions H x W x D (mm)	420 x 700 x 350
Furnace weight (kg)	35
Tube length for use in air (mm)	690
Tube length for use with modified atmosphere (mm)	1225
Control module dimensions H x W x D (mm)	480 x 560 x 500
Control module weight (kg)	50
Uniform length ±5 °C (mm)	350
Power (kW)	3.0
Power supply	a

### FHC 13/50/750

Max outer diameter accessory tube (mm)	50
Heated length (mm)	750
Max temp (°C)	1350
Furnace dimensions H x W x D (mm)	420 x 950 x 350
Furnace weight (kg)	40
Tube length for use in air (mm)	940
Tube length for use with modified atmosphere (mm)	1475
Control module dimensions H x W x D (mm)	850 x 560 x 500
Control module weight (kg)	60
Uniform length ±5 °C (mm)	550
Power (kW)	5.4
Power supply	b

## Tube furnace up to 1350°C - FHA / FHC

### FHC 13/80/500

Max outer diameter accessory tube (mm)	80
Heated length (mm)	500
Max temp (°C)	1350
Furnace dimensions H x W x D (mm)	420 x 700 x 350
Furnace weight (kg)	40
Tube length for use in air (mm)	690
Tube length for use with modified atmosphere (mm)	1225
Control module dimensions H x W x D (mm)	480 x 560 x 500
Control module weight (kg)	60
Uniform length ±5°C (mm)	350
Power (kW)	5.2
Power supply	b

### FHC 13/80/750

Max outer diameter accessory tube (mm)	80
Heated length (mm)	750
Max temp (°C)	1350
Furnace dimensions H x W x D (mm)	420 x 950 x 350
Furnace weight (kg)	50
Tube length for use in air (mm)	940
Tube length for use with modified atmosphere (mm)	1475
Control module dimensions H x W x D (mm)	850 x 560 x 500
Control module weight (kg)	70
Uniform length ±5°C (mm)	550
Power (kW)	7.8
Power supply	c

## Tube furnace up to 1350°C - FHA / FHC

### FHC 13/80/1000

Max outer diameter accessory tube (mm)	80
Heated length (mm)	1000
Max temp (°C)	1350
Furnace dimensions H x W x D (mm)	420 x 1200 x 350
Furnace weight (kg)	80
Tube length for use in air (mm)	1190
Tube length for use with modified atmosphere (mm)	1725
Control module dimensions H x W x D (mm)	850 x 560 x 500
Control module weight (kg)	90
Uniform length ±5°C (mm)	800
Power (kW)	10.4
Power supply	c

### FHC 13/110/500

Max outer diameter accessory tube (mm)	110
Heated length (mm)	500
Max temp (°C)	1350
Furnace dimensions H x W x D (mm)	590 x 700 x 520
Furnace weight (kg)	55
Tube length for use in air (mm)	690
Tube length for use with modified atmosphere (mm)	1225
Control module dimensions H x W x D (mm)	850 x 560 x 500
Control module weight (kg)	70
Uniform length ±5°C (mm)	300
Power (kW)	7.8
Power supply	c

## Tube furnace up to 1350°C - FHA / FHC

### FHC 13/110/750

Max outer diameter accessory tube (mm)	110
Heated length (mm)	750
Max temp (°C)	1350
Furnace dimensions H x W x D (mm)	590 x 950 x 520
Furnace weight (kg)	70
Tube length for use in air (mm)	940
Tube length for use with modified atmosphere (mm)	1475
Control module dimensions H x W x D (mm)	850 x 560 x 500
Control module weight (kg)	90
Uniform length ±5°C (mm)	500
Power (kW)	11.4
Power supply	c

### FHC 13/110/1000

Max outer diameter accessory tube (mm)	110
Heated length (mm)	1000
Max temp (°C)	1350
Furnace dimensions H x W x D (mm)	590 x 1200 x 520
Furnace weight (kg)	100
Tube length for use in air (mm)	1190
Tube length for use with modified atmosphere (mm)	1725
Control module dimensions H x W x D (mm)	850 x 560 x 500
Control module weight (kg)	90
Uniform length ±5°C (mm)	750
Power (kW)	12.0
Power supply	d

## Tube furnace up to 1350 °C - FHA / FHC

### FHC 13/110/1250

Max outer diameter accessory tube (mm)	110
Heated length (mm)	1250
Max temp (°C)	1350
Furnace dimensions H x W x D (mm)	590 x 1450 x 520
Furnace weight (kg)	130
Tube length for use in air (mm)	1440
Tube length for use with modified atmosphere (mm)	1975
Control module dimensions H x W x D (mm)	1100 x 560 x 500
Control module weight (kg)	90
Uniform length ±5 °C (mm)	950
Three zone version available	yes
Power (kW)	20.0
Power supply	d

#### Please note:

- Heat up rate when using a ceramic work tube must be limited to 5 °C/min
- Further to the depth of the control module 150 mm for the power plugs and other plugs need to be added
- Minimum uniform length in horizontal furnace with insulation plugs fitted at 100 °C below max. temperature
- Power supply: a = 1 phase (16A)+N / b = 3 phase (16A)+N / c = 3 phase (32A)+N / d = 3 phase (63A)+N