

2019

MICROTEST

HT-IR1-900

High Temperature Infrared Furnace



MICROTTEST, S.A.
Instruments and Equipment for Materials Testing
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INFRARED (IR) FURNACE

- **MODEL:** MICROTTEST HT-IR1-900
- **CONSTRUCTION:** single zone, vertical tubular IR furnace
- **APPLICATIONS:** high temperature testing of different materials and applications
- **TEMPERATURE RANGE:** working temperature range from **200 °C** up to **800 °C**, Max. attainable temperature is **900 °C**
- **TEMPERATURE CONTROL:** fully automatic temperature control by means of a modern programmable temperature controller, typically Eurotherm or Watlow
- **COMPATIBILITY:** fully compatible with Microtest servo electromechanical and servo hydraulic testing machines
- **SUPPLY:** includes all the necessary attachments, fittings, mounting brackets, heat shield, stainless steel shell and other necessary elements

PRINCIPLES

- **RADIATION HEATING:** the infrared furnace is a radiation heating furnace that uses infrared lamps with high energy density as heating source.
- **INFRARED LAMP:** the tungsten filament is sealed in a quartz glass made tube, which the peak of the spectrum is approximately **1.15µm** in the near infrared region. The infrared lamp provides the energy density 10 to 15 times as high as the conventional heating element.

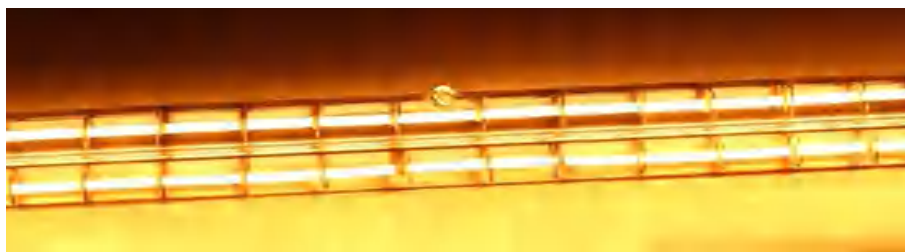
MAIN FEATURES

- **High speed heating up to high temperature:** The infrared lamp with high energy density and suitable reflector permit high speed heating up to a high temperature.
- **High precision temperature control of the sample:** The temperature of the sample can be controlled with high accuracy by combining the infrared furnace and the temperature controller for precise temperature control.
- **Clean heating:** The heating element of the infrared lamp is sealed in the quartz glass and is free from the gas from the heating element.
- **Heating/cooling under controlled atmosphere:** The heating/cooling is available in high purity inert gas static or flowing with simple operation using a quartz muffle made heating/cooling chamber which the infrared ray can be transmitted.

DETAILED SPECIFICATIONS

- **CONSTRUCTION:** single zone tubular IR furnace with rigid structure, concentrically placed along the test axis with proper low thermal conducting (low 'K' factor) insulation for minimum heat loss. The rear-hinged part of the furnace is typically mounted on the guide columns of the testing frame such that the position of the furnace is vertically adjustable. The power supply terminals to the furnace are kept near the hinges. The sides of the furnace are protected with suitable protective covers in stainless steel
- **QUARTZ MUFFLE:** a high-quality Quartz Muffle is placed in the IR furnace to surround the heating zone for better heating efficiency and protection of IR lamps during Nitrogen gas flushing for cooling purposes. The Quartz muffle is perfectly suitable to undergo thermal shocks without experiencing any damage (suitable for thermal shocks from 900 °C to room temperature)
- **EXTERNAL SHELL:** stainless steel with good surface finish
- **TEMPERATURE RANGE FOR NORMAL USE:** 200 - 800 °C
- **MAXIMUM ATTAINABLE TEMPERATURE:** 900 °C
- **TEMPERATURE DISPLAY RESOLUTION:** 0.1°C
- **ACCURACY OF TEMPERATURE CONTROL:** ± 3 °C from 200 °C to 800 °C
- **HEATING:** through infra-red heater lamps with suitable reflector, Make: Philips, Osram or other high-quality brands
- **HEATING ZONE LENGTH:** ≥ 100 mm long
- **POWER OF EACH IR LAMP:** 750 - 2000 W
- **EMITTING LENGTH OF IR LAMPS:** ≥ 100 mm
- **NUMBER OF IR LAMPS:** 10 - 12 Nos., depending on the required heating power for individual testing applications
- **HEATING RATE:** up to 5 °C/s. The typical heating rate for the IR furnace varies between 1 – 3 °C/s
- **HEATING POWER:** 10 – 15 kW based on the required heating rate and maximum temperature to be achieved. Heating power of the IR furnace is customizable to accommodate individual testing applications. The required heating power for the IR furnace is precisely calculated to be enough for heating up the test specimen and heated testing accessories up to a maximum temperature of 900 °C within a reasonably fast heating time

- **RAPID COOLING:** the IR furnace can be supplied with air or nitrogen flushing provision within the high temperature furnace during a portion of the operation to achieve rapid cooling rates
- **SPECIMEN THERMOCOUPLES:** 1 or 2 number(s), type K or type N with standard colour coded connectors and cables (at least 1 meter length). Specimen thermocouples are placed as close as possible to the test specimen
- **PROTECTION THERMOCOUPLES:** another set of thermocouples is used to protect the IR furnace from accidental overheating (limiting over-temperature control). The system typically includes additional individual controllers for these limiters, with a first limit to set the power down to zero for the heating zone and a second one to stop the whole system for security
- **TEMPERATURE CONTROL UNIT:** the temperature control unit provide fully automatic, high precision temperature control for the IR furnace. The temperature controller unit includes a state-of-the-art Eurotherm or Watlow digital temperature controller, temperature limiters, the power unit and communication to the machine control unit by USB communication port
- **PROTECTION:** the control unit system includes fuse holders, fuses and over temperature shutdown relay and contactors for maximum protection during heating and testing at high temperature
- **CALIBRATION:** thermocouples of the IR furnace are calibrated and supplied with calibration certificate
- **DIMENSIONS:** dimensions of the IR furnace are customizable to accommodate individual testing applications. Typical dimensions of the IR furnace are ≥ 150 mm inner diameter and ≥ 250 mm high
- **POWER SUPPLY:** three phase, 380/415 VAC, 50/60 Hz, power for the heating zone is driven by Eurotherm Thyristor(s)



Quartz infrared heater lamps