



## Model 653 High-Temperature Furnaces

The right choice for easy, accurate high-temperature testing

- » Capable of achieving temperatures up to 1400°C (2550°F) (non-testing environment)
- » Multiple furnace heights accommodate diverse test requirements
- » Up to three independently controlled temperature zones
- » Stainless steel exterior with convenient clamshell design

To design products and components that perform reliably at the temperatures found in actual operating environments, engineers need to develop a detailed understanding of how material properties and behaviors change as temperatures rise and fall. MTS Model 653 High-Temperature Furnaces are a vital component of these test configurations. They offer the functionality operators need to generate accurate data, and a convenient design that optimizes productivity in the lab.

Model 653 furnaces are ideal for a wide variety of high-temperature tests, including tension, compression, bend and fatigue testing of metals, composites, ceramics

and many other materials. The alumina and zirconia fiber insulation system minimizes heat loss and prolongs the life of the furnace. A center-split design enables easy access to both fixturing and specimens. Pivot bearings built into the mounting bracket ensure smooth opening and closing.

Each furnace includes the MTS digital PID Temperature Control System and a mounting bracket for load frames from MTS and other providers. These furnaces can be configured for one, two or three heating zones which can be independently controlled. In addition, all Model 653 furnaces can accommodate MTS high-temperature axial extensometers.

be certain.

## Easy Setup, Intuitive Operation

Model 653 high-temperature furnaces have a user-friendly design that helps operators perform setup tasks more quickly – without compromising test quality or accuracy. Features include:

**Pre-cut insulation.** Durable, low-maintenance insulation for Model 653.03 and 653.04 furnaces comes pre-cut, so there is no need to handle the material in the lab. The insulation works well with different styles of extension rods, so it fits tighter and lasts longer. It is also more effective, reducing heat loss and eliminating the need for wool.

**Safety interlocks.** The grip water cooling circuit has flow switches that are integrated with the Model 409 temperature controller. These switches shut down the furnace to protect equipment and specimens in the event of a water supply failure.

**Clamshell design.** Model 653 furnaces streamline test setup and specimen changeover with a clamshell design that allows operators to work from the front of the furnace at all times. This design also improves furnace alignment, which is critical to achieving proper gradients.

**Thermal gradient verification kit.** Model 653 furnaces are compatible with optional accessories that make it easy to analyze specimen thermal gradients before testing. These include Type K thermocouples, thermocoupled specimens and a thermal data acquisition tool that links directly to a PC.



### MODEL 409.83 TEMPERATURE CONTROLLER

- » Ergonomic design
- » Multiple mounting options
- » Compact design
- » Multiple level, self-tuning PID control
- » Includes SCR power relays
- » Digital communications available

## Superior Capabilities for High-Temperature Testing

### Model 653.01

With a height of just 55 mm (2.2 in.), Model 653.01 is designed for tension, compression and fatigue testing of specimens as short as 100 mm (4 in.). The furnace incorporates a pair of silicon carbide heating elements arranged in a single zone. The nominal temperature for this furnace ranges from 100°C to 1400°C (212°F to 2550°F)\*.

### Model 653.02

Model 653.02 has a height of 86 mm (3.4 in.) and is ideal for tension, compression and fatigue testing of specimens 150 mm (6 in.) or longer. The furnace uses two pairs of silicon carbide heating elements, which can be used to maintain one or two zones of control. An insulation plate between the upper and lower heating elements ensures reliable zone separation. The nominal temperature for this model ranges from 100°C to 1400°C (212°F to 2550°F)\*.

### Model 653.03

Designed for tension, compression and fatigue testing of specimens 200 mm (8 in.) or longer, the Model 653.03 furnace has a height of 126 mm (5 in.). It features two pairs of silicon carbide heating elements, which can be used to maintain one or two zones of control. An insulation plate situated between the upper and lower elements helps ensure reliable zone separation. Pre-cut insulation reduces heat loss. This furnace is particularly well-suited for applications that require a lower thermal gradient on a tensile or fatigue specimen. The nominal temperature for this furnace ranges from 100°C to 1400°C (212°F to 2550°F)\*.

### Model 653.04

Specify the Model 653.04 furnace for tension, compression, bend and fatigue testing of specimens that require hot grips or fixtures. Three pairs of silicon carbide heating elements are arranged in three zones of control. Insulation plates between the elements offer reliable zone separation, and pre-cut insulation helps reduce heat loss. This furnace is an ideal choice when test engineers need a very low thermal gradient on a tensile or fatigue specimen. The furnace is capable of achieving 1000°C (1832°F) in validated testing conditions with MTS' standard high-temperature low-cycle and high-cycle fatigue solutions. Its height is 220 mm (8.7 in.) and its nominal temperature ranges from 100°C to 1400°C (212°F to 2550°F)\*.

*\*Nominal temperatures may vary depending on specimen geometry and material. 1400°C (2552°F) is achieved in a non-testing environment.*



## Specifications

Model	Maximum Temperature*	Minimum Temperature	Control Point Stability	Total Height
653.01	1400°C (2552°F)	100°C (212°F)	±1°C = ±2°F	55 mm (2.2 in)
653.02	1400°C (2552°F)	100°C (212°F)	±1°C = ±2°F	86 mm (3.4 in)
653.03	1400°C (2552°F)	100°C (212°F)	±1°C = ±2°F	126 mm (5 in)
653.04**	1400°C (2552°F)	100°C (212°F)	±1°C = ±2°F	220 mm (8.7 in)

\*Nominal temperatures may vary depending on specimen geometry and material. 1400°C is achieved in a non-testing environment.

\*\* Supports testing to ASTM E606-04e1, BSI 7270, JIS Z2279, AFNOR A03-403 or ISO 12106 requirements.

Model	Hot Zone Height	Hot Zone Width x Depth	Number of Zones
653.01	19 mm (.75 in)	50 x 50 mm (2 x 2 in)	1
653.02	50 mm (2 in)	50 x 50 mm (2 x 2 in)	1 or 2
653.03	90 mm (3.6 in)	62.5 x 62.5 mm (2.46 x 2.46 in)	1 or 2
653.04	185 mm (7.3 in)	62.5 x 62.5 mm (2.46 x 2.46 in)	1 or 3

## Temperature Gradient Verification Kit Components

Model	Part Number
Thermocouple Data Acquisition Kit	100-255-716
Type K Thermocouple Connector Kit	100-255-714
Thermocouple Specimen	057-743-803
Thermocouple Welding Kit	100-256-698

## Utility Requirements

3 KVA @ 100-125 or 200-240 VAC, 50-60 Hz.

Voltage must be selected at time of order.



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