Fire Resistance Test Furnaces

firetesting technology

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A Judges Scientific plc company

FTT Fire Resistance Test Furnaces will enable test houses and manufacturers to meet the regulatory testing requirements of fire resistance testing. The range provides vertical, horizontal and indicative testing, fully complementing our reaction-to-fire testing equipment used in manufacturing facilities and laboratories worldwide.

The FTT Horizontal Fire Resistance Test Furnace

The performance of walls, columns, floors and other building elements when exposed to fire conditions is of extreme importance in ensuring safety to both the public and neighbouring structures. In order to acquire information on this performance, it is necessary to measure the fire-resistive properties of the materials and assemblies in question. Building elements commonly tested include:

- Fire doors
- Walls
- Columns
- Partitions
- Load bearing panel and walls
- Ventilation ducts
- Cable barriers
- Dampers

The regulatory requirement for fire resistance testing for these types of product is set out in many international standards.The standards are outlined for each furnace type below. Our fire resistance test furnaces are built to or exceed the existing requirements of all of these tests.

Large Scale Horizontal Fire Resistance Test Furnace

ISO 834 (1, 5-7, 9); BS 476 (20-24); BS EN 1363 (1-2); BS EN 1364 (2); BS EN 1365 (2-4); BS EN 1366 (1-3); ASTM E119; ASTM E814; ASTM E1966; UL 263; UL 1709; UL 1479; UL 2079; UL10 (B-C); ISO 6944 (1-2); ISO 3008.

The **FTT** Horizontal Fire Resistance Test Furnace is needed to evaluate the fire resistance of a horizontal construction assembly, column, or support, and provides a method of quantifying the ability of a material, in a horizontal orientation, to withstand exposure to high temperatures. This is done by evaluating a number of performance elements such as the load-bearing capacity, the ability to provide fire containment and the thermal transmittance of the materials and systems.

System Description

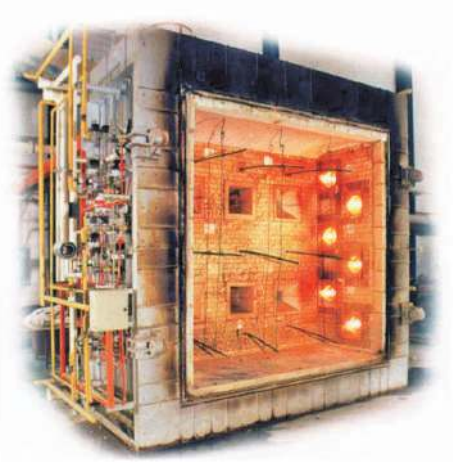
- The capability to carry out both load-bearing and non-load bearing tests on Horizontal Test Specimens and beams that are mounted in customised restraint frames.
- Superior and safe construction – furnace walls comprising a lining of insulating fire bricks, refractory castables and mineral fibre board on the cold face and refractory insulating bricks anchored to the back wall with high temperature cast in-situ blocks, on the hot face.
- A removable roof lined with profiled bricks and anchored with refractories cast in-situ.
- A furnace casing made of mild steel plates reinforced with steel C-Channels, I-beams and steel sections to counter structural distortion due to heat.
- A specimen restraint frame secured by a minimum of 4 sets of clamps.
- 4 viewing ports made of heat resistant quartz glass to enable the operator to view the complete test specimen during a fire test.
- A sliding door made of lightweight alumina is enclosed within an insulated, air-cooled frame. This will shield off the furnace heat when the viewing ports are not in use.

- 20 sets of Refractory Nozzle Mix Burners (2 groups of 10). Each burner is designed to use liquefied petroleum gas and has a flame supervision unit to ensure that all combustion units operate on a fail safe mode at all times. All necessary flame safety systems, intermittent pilot systems, and temperature sensors are incorporated.
- A Furnace Combustion Control Panel is designed to operate on both fully automatic and manual control modes. Automatic ignition of the burners is through the use of one push button switch. This fires up the burners based on a preset heating curve, such as that described in BS 476 Parts 20-24, EN 1363 and the IMO Hydrocarbon Curve. Manual burner control enables individual burners to be ignited at will.
- Test area dimensions: 3000mm (W) × 4000mm (H) × 1000mm (D)

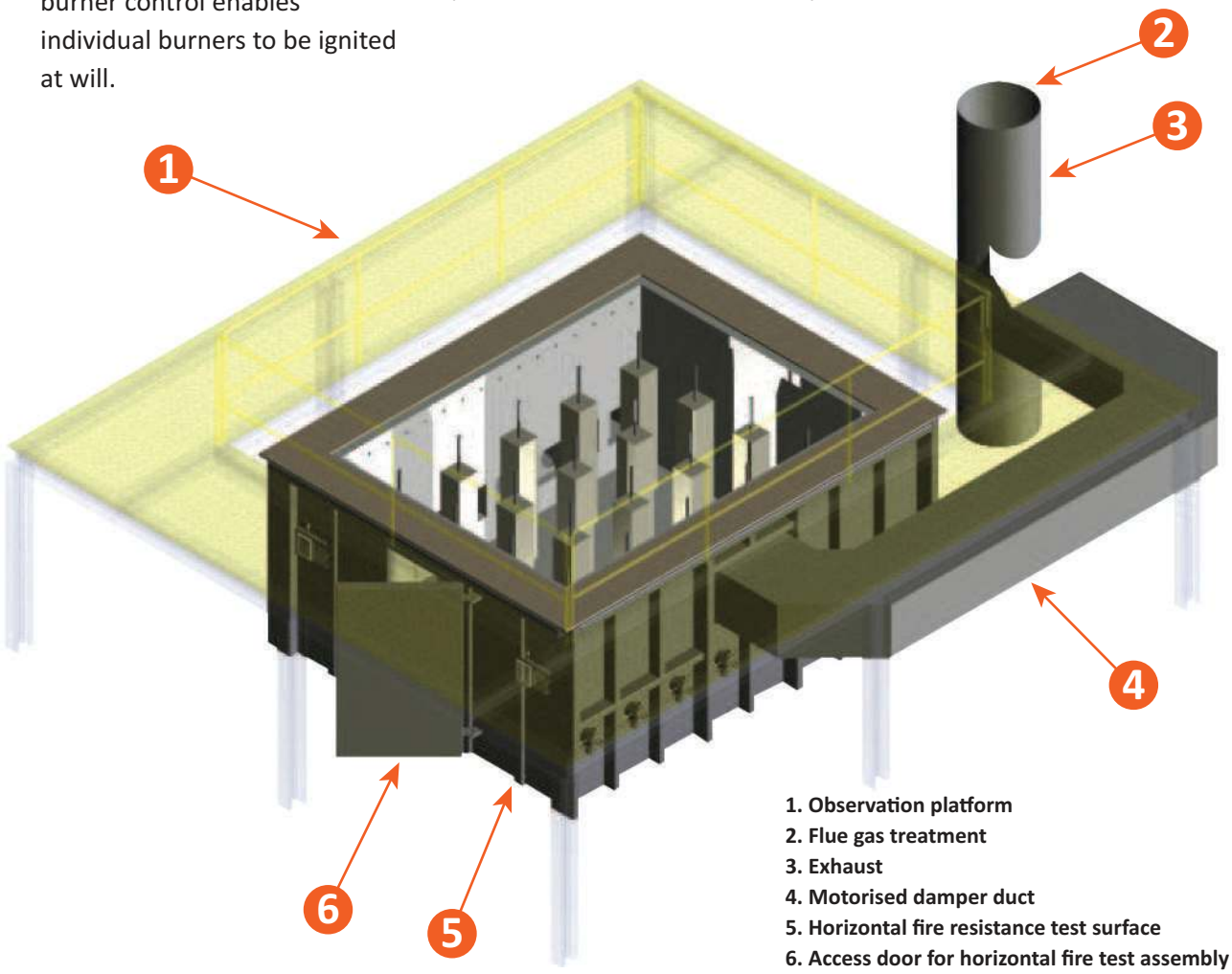
Large Scale Vertical Fire Resistance Test Furnace

ISO 834 (1, 4, 8); BS 476 (20-23); BS EN 1363 (1-2); BS EN 1364 (1); BS EN 1365 (1); BS EN 1366 (1-3); BS EN 1634-1; ASTM E119; ASTM E814; UL10 (B-C); UL 263; UL 1709; UL10 (B-C); UL 1479; UL 2079; ISO 3008; ISO 3009.

The FTT Vertical Fire Resistance Test Furnace provides a method of quantifying the ability of products and materials, in a vertical orientation, to withstand exposure to high temperatures. The furnace can be used for evaluating the fire resistance of products such as walls, doors, dampers, joints, and penetration seals. This is done by



The FTT Vertical Fire Resistance Test Furnace

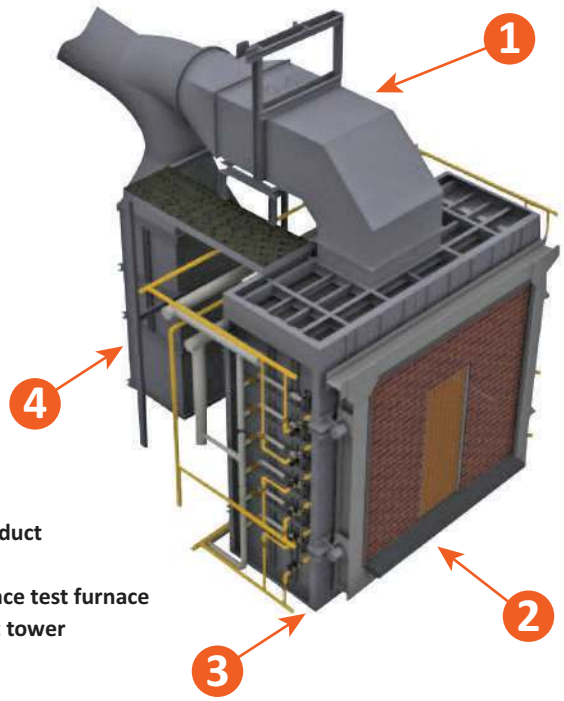


1. **Observation platform**
2. **Flue gas treatment**
3. **Exhaust**
4. **Motorised damper duct**
5. **Horizontal fire resistance test surface**
6. **Access door for horizontal fire test assembly**

evaluating a number of functions including the load-bearing capacity, the fire containment and the thermal transmittance of the assemblies being tested.

System Description

- The capability to carry out tests on Vertical Test Specimens that are mounted on custom made restraint frames.
- A refractory lining comprising of insulating fire bricks, refractory castables and mineral boards. The roof is lined with profiled bricks and anchored with refractories cast in situ.
- Mild steel casing plates reinforced with steel C-Channels, I-beams and steel sections to counter structural distortion due to heat.The casing is lined with mineral fibreboard on the cold face and refractory insulating bricks anchored back to the wall with high temperature cast in-situ blocks, on the hot face.
- A specimen restraint frame mounted on the front end of the furnace and secured by a minimum of 4 sets of door clamps.
- 4 viewing ports made of heat resistant quartz glass to enable the operator to view the complete test specimen during a fire test. A sliding door made of lightweight alumina, with an air cooled frame, is used to shield off the furnace heat when the viewing ports are not in use.
- 12 sets of Special Luminous Flame Burners. Each burner has a flame supervision unit to ensure fail safe operation at all times.
- A Furnace Combustion Control Panel. This is designed to operate on both fully automatic and manual control modes.Automatic ignition fires up the burners based on a preset heating curve, as described in BS 476 Parts 20-24, EN 1363 and the IMO Hydrocarbon Curve. Manual burner control enables individual burners to be ignited at will.



1. Motorised damper duct
2. Restraint frame
3. Vertical fire resistance test furnace
4. Centralised exhaust tower

- Test area dimensions: 3000mm (W) × 3000mm (H) × 1300mm (D)

Hydraulic Tilting Fire Resistance Test Furnace

BS 476 (20-24); BS EN 1363 (1-2); BS EN 1364 (1-2); BS EN 1365 (1-4); BS EN 1366 (1-3); BS EN 1634-1; ASTM E 119; ASTM E814; ASTM E 1966; UL 263; UL 1709; UL10 (B-C); UL 1479; UL 2079; ISO 834 (1, 4-9); ISO 6944 (1-2); ISO 3008; ISO 3009.

The **FTT** Hydraulic Tilting Fire Resistance Test Furnace for Vertical & Horizontal Test Specimens is needed to evaluate the fire resistance of a horizontal or vertical construction assembly, column, or support, and provides a method of quantifying the ability of products such as doors and dampers, and building materials to withstand exposure to high temperatures.

System Description

- A number of performance elements such as the load-bearing capacity, the ability to provide fire containment and the thermal transmittance of the materials and systems are evaluated.
- This system offers the customer the versatility of meeting the requirements of both Vertical and Horizontal tests with one instrument.
- The hydraulic tilting system enables the Furnace to be positioned either upright for testing items such as walls and doors, or on a horizontal plane for testing floors and ceilings that mount on custom made restraint frames.

- Test area dimensions: 3000mm (W) × 3000mm (H) × 1300mm (D)

Other System Components for the Vertical, Horizontal and Hydraulic Tilting Fire Resistance Test Furnaces

Lifting Frame for Test Specimens

A customised lifting frame with two side hooks is provided to lift the specimen restraint frame to the furnace. This allows easy placement of the vertical or horizontal restraint frame into the furnace. The restraint frame is non-load bearing.

Refractory Lined Connecting Duct and Exhaust Stack

The Chimney/Stack is constructed of 9mm thick mild steel and is refractory lined for the first 6m. The Stack extends to a minimum of 3m above the factory roof level or in accordance to the local code requirements.

Combustion Air Blower to Furnace Burners

The combustion air system is pre-piped and tested before dispatch.

PLC System

The PLC controller incorporates a built-in operator interface and is programmed to provide real time heating curves and display all furnace control information on the computer screen. The fire resistance data management software is custom written to accept and save data collected during the tests and is configured to meet the heating requirements of BS 476 Parts 20-22, EN 1363 and IMO Hydrocarbon test curve. Other standard Temperature-Time curves can also be pre-programmed into the system.

Indicative Fire Resistance Test Furnace

Prior to full-scale testing the customer may wish to establish fire resistant properties on material samples. The **FTT** Indicative Fire Resistance Test Furnaces provide a method of quantifying the ability of a material or assembly to withstand exposure to high temperatures using only a fraction of the material required by large full scale furnaces.

This furnace is also ideal for evaluating the fire performance of dampers and penetration seals for building services.

FTT supply two Indicative Fire Resistance Test Furnaces used to test dampers, penetration seals, and for pilot testing windows, walls, door samples and ceilings.

1. Small Scale Indicative Furnace Type 1 has an internal chamber measuring 1500mm (W) × 1500mm (H) × 1500mm (D).

2. Small Scale Indicative Furnace Type 2 has an internal chamber measuring 1000mm (W) × 1000mm (H) × 1000mm (D).

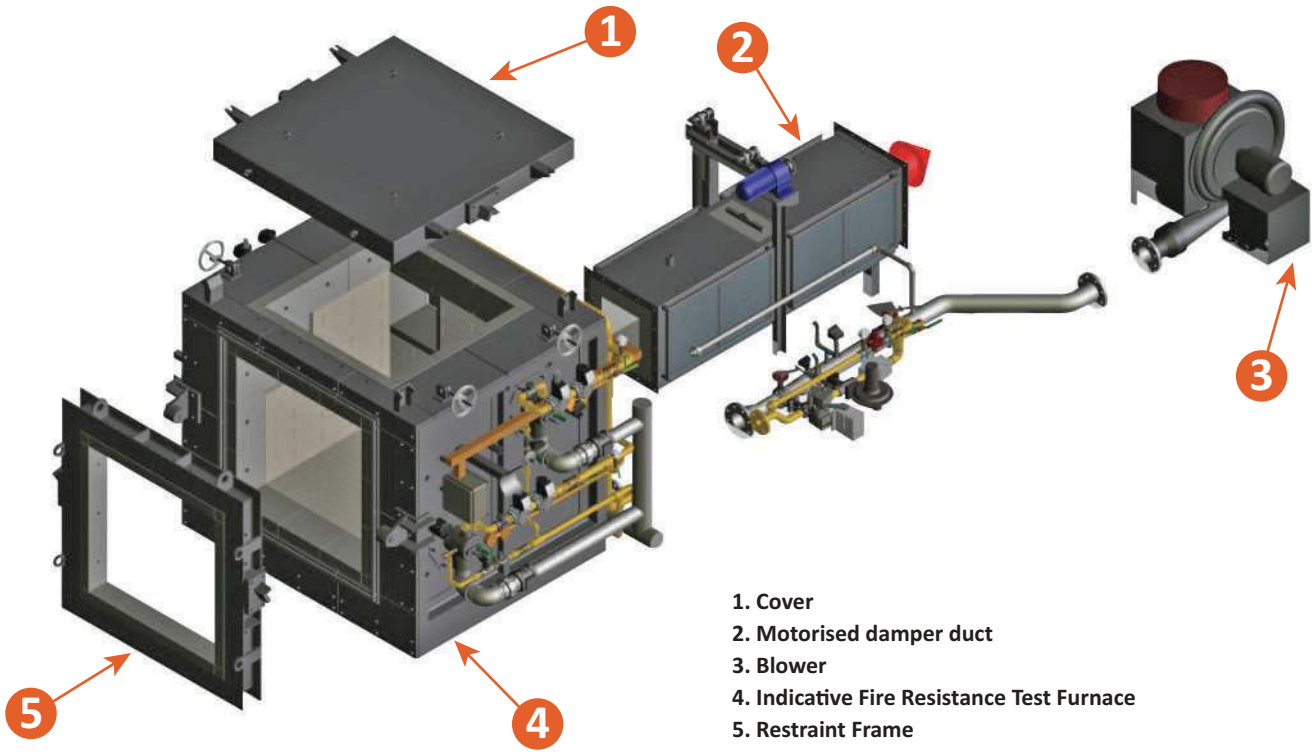
System Description

- Four sides of the walls are lined with special high temperature insulating fire bricks on the hot face and pre-cast refractory castables at the edges exposed to the specimen restraint frame as well as mineral boards on the cold face.
- A refractory lined Blank-Out Wall with lifting hooks is also supplied.This enables the user to close one side of the furnace wall when either a vertical or a horizontal test specimen is mounted for testing.
- A set of two self-locking clamps are used to secure the test specimen restraint frame to the furnace. An air cooled viewing port made of heat resistant quartz glass is installed in the rear wall to enable the operator to see the behaviour of the entire test specimen during a fire test.
- A sliding shutter door made of lightweight alumina fibreboard is supplied to shield off the furnace heat when the viewing port is not in use.

Other system components for the Indicative Fire Resistance Test Furnace

LP Gas Fuel Burners

For the 1.5m × 1.5m × 1.5m Furnace, 5 burners are supplied. At any one time, 3 out of these 5 burners can be fired. For the 1m ×



1. Cover
2. Motorised damper duct
3. Blower
4. Indicative Fire Resistance Test Furnace
5. Restraint Frame

1m × 1m Furnace, 2 burners, based on an upright furnace position are installed on the opposite side of the furnace wall. A third burner is installed near the top of the furnace. Each burner is designed to use liquefied petroleum gas and all necessary flame safety systems, intermittent pilot systems, and temperature sensors are incorporated.

Lifting and Restraint Frames for Test Specimens

A Non Load Bearing Restraint Frame for mounting a vertical or horizontal test specimen is supplied. A customised lifting frame with two side hooks is provided for lifting the specimen restraint frame into the furnace.

Combustion Air Blower to Furnace Burners

The combustion air system is pre-piped and tested before dispatch.

PLC System

The PLC controller comprises a built-in operator interface, contains the required recording and programming capabilities and includes all necessary motor starters for all motors in the system. The system can communicate with a SCADA system programmed to provide real-time heating curves and display all furnace control information on the computer screen.

The software supplied is configured to meet the heating requirements of BS 476 Part 20-24, EN 1363 and IMO Hydrocarbon test curve. Other standard Temperature-Time curves can also be pre-programmed into the system.

Services

Please check with us or your local **FTT** representatives for the recommended minimum floor space, ceiling height and other services for the use of these fire resistance furnaces.

Due to **FTT**'s continuous development policy specifications can change without prior notice.

Unrivalled Experience in Design and Manufacturing

FTT's site in East Grinstead, is home to the largest group of fire scientists and instrumentation design engineers working on fire testing instrumentation, and is at the heart of our design and manufacturing. For almost 30 years **FTT** has provided the highest quality instruments and service for fire testing and research professionals worldwide, directly and through its extensive global sales and support network.

Quality

- World-class manufacturing in accordance with multiple international and national standards, including: EN, ISO & ASTM
- ISO 14001, ISO 9001 certified

Integrity

- A dedicated team passionate about fire testing instrumentation and continuous product improvement
- Delivering reliable, robust and easy-to-use instruments for the past 30 years

Excellence

- A world-class team made up of qualified fire scientists, mechanical, electrical and electronic fire instrument design engineers and production, installation and maintenance engineers

Global

- World-wide distribution network for global sales, installations, training, maintenance and technical support
- Leading global supplier of the Cone Calorimeter, Large Scale Calorimeter, NBS Smoke Chamber and Oxygen Index