

# Roofing Tests for European Roofing Products

firetesting  
technology

(ENV 1187 Test 1, 2, 3 and 4)



This **ENV 1187** describes four methods for determining the performance of roofs to external fire exposure. The four methods assess the performance of roofs under the following condition

Test 1 – with burning brands

Test 2 – with burning brands and wind

Test 3 – with burning brands, wind and supplementary radiant heat.

Test 4 – with two stages incorporating burning brands, wind and supplementary radiant heat.

The tests assess the fire spread across the external surface of the roof, the fire spread within the roof (Tests 1, 2 and 3), the fire penetration (tests 1, 3 and 4) and the production of flaming droplets or debris falling from the underside of the roof or from the exposed surface (tests 1, 3 and 4). Tests 2 and 3 are not applicable to geometrically irregular roofs or roof mounted appliances e.g. ventilators and roof lights.

The four tests listed above do not imply any ranking order. Each test stands on its own without the possibility to substitute or exchange one for another. This document provides information on instrumentation of all four Tests that are available from **FTT**.

**ENV 1187 Test 3 – with burning brands, wind and supplementary radiant heat.**

The ENV 1187 Test 3 Roofing Test is an instrument used to determine the performance of roofs to

external fire exposure. The test method incorporates burning brands, wind and supplementary radiant heat.

**Main Frame**

In the ENV 1187 Test 3 Roofing Test, the test sample is placed on the Specimen Holder which lays on the Lifting Bed as part of the Sample Assembly. The Specimen Holder can be tilted and supported on stands in a 5° or 30° position depending on the type of roof sample being tested. The Sample Assembly is used to move the Sample into the correct position for testing. The height of the Sample Assembly can be adjusted by the electrically powered lift table and it can be wheeled into position between the Guide Rails. The Sample Alignment Jig and a system of Stops are provided to ensure the correct position of the assembly.

The Air Nozzle Blower Assembly is positioned behind the Sample Assembly so that a uniform airflow is applied over the surface of the test sample. The air velocity is established using the anemometer according to the requirements

The Main Frame on the left includes Radiant Panel Assembly, 4 Flexible Gas Burner Hoses, Sparker Box, Guide Rails and Guide Rails Extensions. On the right is a Dual Diverter Stand and Control Box Assembly.



detailed in the standard. The volume flow rate of the blower is controlled via the Touch Screen interface on the Diverter Stand.

The Radiant Panel Assembly (mounted on the Main Frame) provides the supplementary radiant heat source directed onto the surface of the test sample. The Radiant Panel can be tilted to provide the 5° or 30° position and consists of four surface combustion heaters which are independently controlled from the Dual Diverter Assembly and Control Box. The air and gas flow to each burner can be adjusted to provide an incident radiant heat flux distribution in accordance with the standard (such that the heat flux meters each measure  $12 \pm 0.5 \text{ kW/m}^2$  at the centre and  $10 \pm 0.5 \text{ kW/m}^2$  at the four locations on the major axes).

The Calibration Assembly Trolley contains the Calibration Element holding the five Heat Flux Meters. The Calibration Element is tilted to the 5° or 30° position and supported on the arms of the trolley. The Assembly is wheeled into position between the calibration guide rails. The Heat Flux Meters are supplied with water via a manifold mounted on the assembly.

### **ENV 1187 Test 4 – with two stages incorporating burning brands, wind and supplementary radiant heat.**

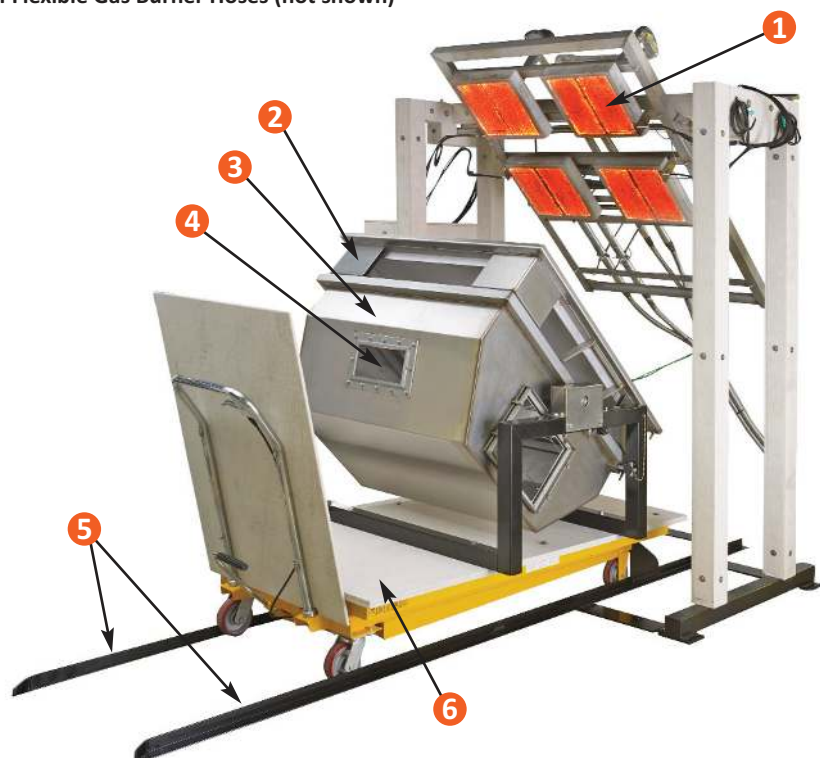
The ENV 1187 Test 4 Roofing Test is a two stage test method incorporates burning brands, wind

and supplementary radiant heat. Similar to ENV 1187 Test 3 it is also used to determine the performance of roofs to external fire exposure.

In the ENV 1187 Test 4 Roofing Test, the test sample is placed in a Sample Holder which is placed on the Specimen Cover and an air seal is created. The Specimen Cover can be tilted and supported at an angle of 45° or horizontal depending on the type of roof sample being tested. The underside of the sample can be viewed during the test through the viewing window in the Specimen Cover which is mounted on the Sample Trolley Assembly to move the Sample into the correct position for testing. The height of

**The Main Frame includes:**

1. Radiant Panel
2. Sample Holder with Calibration Assembly
3. Specimen Cover with Suction Box Assembly
4. Viewing Window
5. Guide Rails
6. Sample Trolley
7. Sparker Box (not shown)
8. 4 Flexible Gas Burner Hoses (not shown)



the Sample Trolley can be adjusted. The Sample Alignment Jig and a system of Stops are provided to reach the correct position.

The Burner Wand Assembly is used as the 'burning brand'. The brand comprises a simulated town gas flame.

The Suction Box Assembly is connected to the Specimen Cover with a Suction Hose to simulate the effect of 'wind'. A pressure reduction on the underside of the sample is established and controlled using the Inclined Tube Manometer and Speed Controller Assembly mounted on the Dual Diverter Stand. There is also a blow-out panel on the other side of the Specimen Cover.

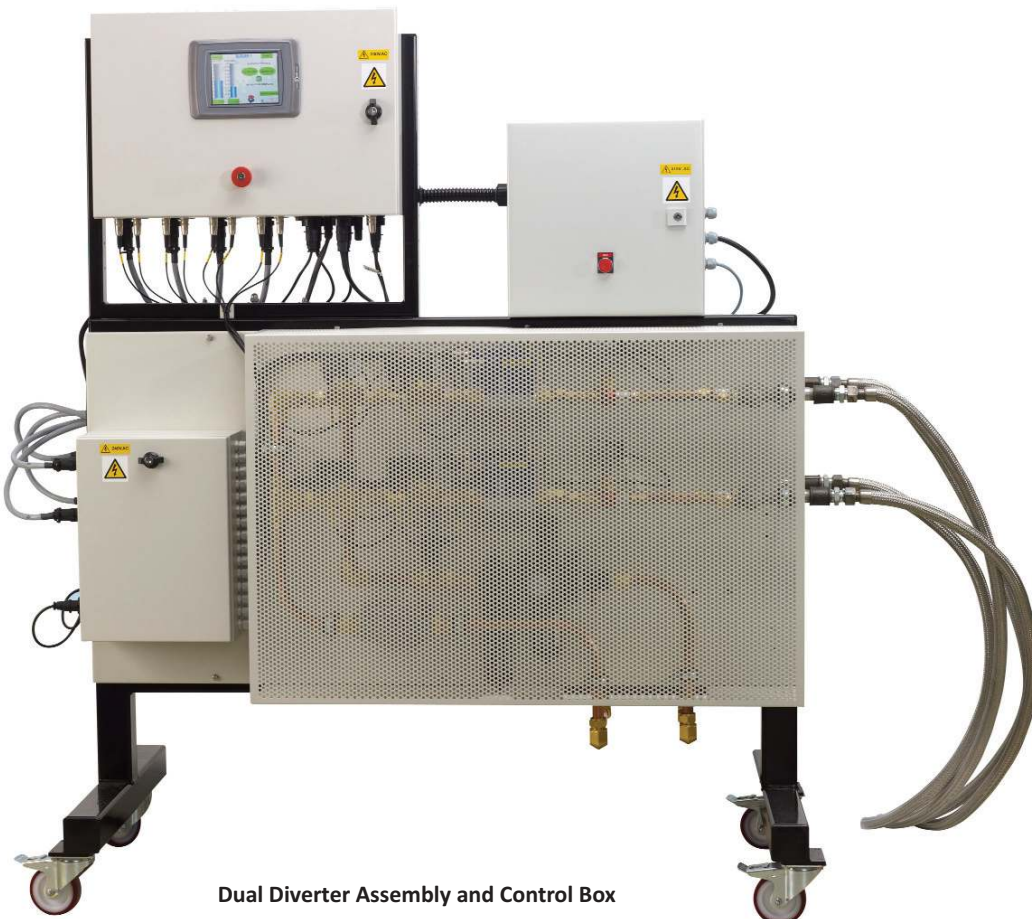
The Radiant Panel Assembly (mounted on the Main Frame)

provides the 'supplementary radiant heat' source directed onto the surface of the test sample. The Radiant Panel can be tilted and supported at an angle of 45° or horizontal. The Radiant Panel consists of four surface combustion heaters which are individually controlled from the Dual Diverter Assembly and Control Box. The air and gas flow to each burner can be adjusted to provide an incident radiant heat flux distribution such that the heat flux meters each measure  $12 \pm 1.5 \text{ kW/m}^2$ .

The Calibration Assembly contains the Calibration Element holding the four Heat Flux Meters. The Assembly is contained on a Sample Holder which rests on the Specimen Cover. The Heat Flux Meters are supplied with water via a Manifold mounted on the assembly.

### Touch Screen Interface and Control System for Test 3 and Test 4

The instrument is controlled using the supplied Touch Screen interface and Control System. This system provides safety interlocking to ensure the four gas burners which form the Radiant Panel can be operated in a safe and controlled manner. All operations are conducted through the Touch Screen with the exception of the Blower Motor Reset and the 2 Emergency Stops.



Dual Diverter Assembly and Control Box

## The FTT ENV 1187 Roofing Tests consist of:

### TEST 1

300 mm × 300 mm × 200 mm open basket made from 3 mm diameter mild steel wire mesh

Balance

Timing Device

### TEST 2

Steel Air Channels with Fans and Dampers

Crib Ignition Stand with Flow meter

Balance

Stopwatch

Air Velocity Anemometer

### TEST 3

Main Frame incl. Radiant Panel Assembly, 4 Flexible Gas Burner Hoses, Sparker Box, Guide Rails and Guide Rails Extensions

Sample Holder Trolley Assembly

Calibration Assembly

Dual Diverter Stand and Control Box Assembly with full colour touchscreen control

30° and 5° Support Assemblies

Air Nozzle Assembly and Blower Frame Assembly

Calibration Guide Rails

Sample Alignment Jig

Buffer Stop Assembly and 2 Buffer Locking Plates

### TEST 4

Main Frame incl. Radiant Panel Assembly, 4 Flexible Gas Burner Hoses, Sparker Box and Guide Rails

Sample Trolley Assembly including Specimen Cover and Sample Holder

Calibration Assembly

Dual Diverter Stand and Control Box Assembly with full colour touchscreen control

Sample Holders (each is supplied with 4 Sample Holder Edge Boards)

Suction Fan Assembly

Suction Hose

Burner Wand Assembly

Sample Alignment Jig

Buffer Stop and 2 Buffer Locking Plates

**SERVICES**

**Electrical Power**

Control Box	230 VAC at 50/60 Hz 6 Amp
Fan	Test 2: Consult FTT for details Test 3: 3PH 380-480 VAC at 50/60 Hz 16 Amp Test 4: 230 VAC at 50/60 Hz 6 Amp
Scissor Lift Table	Test 3: 230 VAC at 50/60 Hz 13 Amp

**Extraction System**

Test 1 & 2: Suitable extraction system is required, consult **FTT** for details.

Test 3 & 4: An exhaust system of 3.5 m<sup>3</sup>/sec with a duct diameter of 400mm and adjustable flow is recommended.

Hood Size (recommended)	Test 3: 3m × 8m, stainless steel Test 4: 3m × 3m, stainless steel
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**Gas Supply**

Test 2, 3 & 4: Commercial propane 95% minimum purity is used to supply the four radiant panels.

Test 3 & 4: The required supply pressure is 3-4 bar (43.5-58 psi) with a suitable pressure regulator.

**Compressed Air Supply**

Test 2: Suitable air supply is required, consult **FTT** for details.

Test 3 & 4: The air supply is used to supply the four radiant panels. The required supply pressure is 6-7 bar (87-101 psi) with a suitable pressure regulator.

**Water Supply**

Water at 15-25°C is required for cooling the heat flux meters.  
A pressure of approximately 2.4 bar (35 psi) is recommended at a low flow rate 200-300 ml/min.

Interface Cables	Please refer to instrument instruction manual for detailed requirement.
Brand	<b>FTT</b> do not supply any brands, please refer to standard ENV 1187 for detailed requirement.



## 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