



Roofing Tests for European Roofing Products

ENV 1187 Test 1, 2, 3 and 4



THE BENCHMARK IN FIRE TESTING



ENV 1187 Tests for European Roofing Products

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 conditions:

- 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 ENV1187 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



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.

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 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).



Dual Diverter Assembly and Control Box

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.



Main Frame



In the ENV1187 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 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.



The FTT ENV 1187 Roofing Tests consist of:

Test 1	<ul style="list-style-type: none"> ▪ 300 mm x 300 mm x 200 mm open basket made from 3 mm diameter mild steel wire mesh ▪ Balance ▪ Timing Device
Test 2	<ul style="list-style-type: none"> ▪ Steel Air Channels with Fans and Dampers ▪ Crib Ignition Stand with Flow meter ▪ Balance ▪ Stopwatch ▪ Air Velocity Anemometer
Test 3	<ul style="list-style-type: none"> ▪ 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	<ul style="list-style-type: none"> ▪ 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



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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 m³/sec with a duct diameter of 400mm and adjustable flow is recommended.

- Hood Size Test 3: 3m x 8m, stainless steel
(recommended) Test 4: 3m x 3m, stainless steel

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

FTT do not supply any brands, please refer to standard ENV 1187 for detailed requirement.

