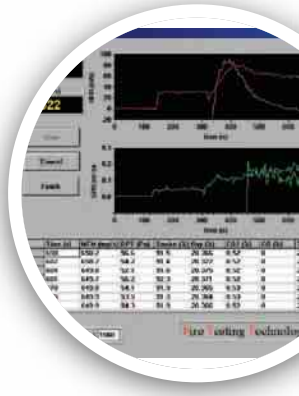
SBI

Single Burning Item - EN 13823



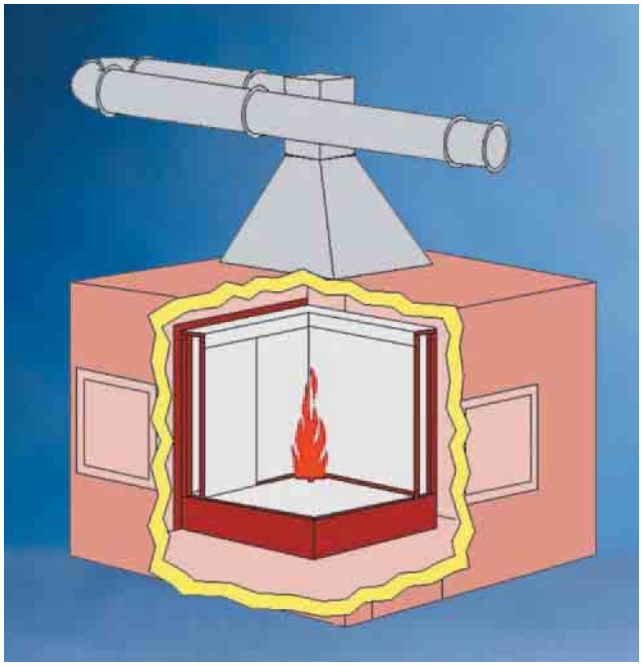
THE BENCHMARK IN FIRE TESTING

FTT Single Burning Item (SBI)

The importance of the SBI

The European Construction Products Directive requires that all European Member states use this test method to evaluate reaction to fire performance for all construction products excluding flooring. These test methods will eventually take precedence over national regulatory methods to classify most building products and will be required by all suppliers of building materials into the EU and neighbouring states adopting these regulations.

EN 13823: Reaction to fire tests for building products excluding floorings exposed to thermal attack by a single burning item, the SBI.



The SBI Test

The Single Burning Item (SBI), is a method of test for determining the reaction to fire behaviour of building products (excluding floorings) when exposed to the thermal attack from a single burning item (modelled by a propane fuelled sand-box burner). The specimen is mounted on a trolley that is positioned in a frame beneath an exhaust system. The reaction of the specimen to the burner is monitored instrumentally and visually. Heat and smoke release rates are calculated and physical characteristics are assessed by observation. The parameters that are quantified in this test and used within the classification criteria are Total Heat Release (THR), Fire Growth Rate Index (FIGRA) and Smoke Growth Rate index (SMOGRA).

How the SBI is used to classify products

The European Commission recently defined the classification criteria for building products. These performance classes range from A to F. Although other test methods are required for assessment, SBI testing is needed to classify all non flooring products qualifying for classes A2, B, C and D, which are the major classes inhabited by most products other than those that are principally inorganic and classified as non-combustible (A1).

CLASS	CLASSIFICATION CRITERIA	ADDITIONAL CLASSIFICATION	OTHER TEST METHOD(S)
A2	FIGRA ≤ 120 W/s; and LFS < edge of specimen; and THR_{600s} ≤ 7.5 MJ	Smoke production; and Flaming droplets/particles	EN ISO 1716
B	FIGRA ≤ 120 W/s; and LFS < edge of specimen; and THR_{600s} ≤ 7.5 MJ	Smoke production; and Flaming droplets/particles	EN ISO 11925-2
C	FIGRA ≤ 250 W/s; and LFS < edge of specimen; and THR_{600s} ≤ 15 MJ	Smoke production; and Flaming droplets/particles	EN ISO 11925-2
D	FIGRA ≤ 750 W/s	Smoke production; and Flaming droplets/particles	EN ISO 11925-2

The FTT SBI

FTT supplies and install the apparatus and train clients in its use. FTT can also supply any of the components to clients wishing to part design and build their own equipment.

The main components of the FTT SBI are: -

- Frame, trolley, hood and ducting.
- Gas analysis instrumentation for heat release measurement.
- Smoke measurement system.
- Burner, gas train and controls.
- Data acquisition and analysis software.

Test apparatus includes:

- Trolley, which holds the specimen and which docks into the frame.
- Primary and secondary burners.
- Frame, which is built into the test room.
- Hood fitted to the top of the frame.
- Collector with baffles, fitted to the hood.
- Ducting with guide vanes.
- Duct section containing gas sampling probe, bi-directional probe and thermocouples for mass flow measurement and smoke measuring ports.

Gas Analysis Instrumentation

Housed in a 19" rack containing: -

- Oxygen Analyser (paramagnetic) supplied with temperature and pressure compensation. Used for primary heat release measurement.
- Carbon Dioxide Analyser (infrared) for use in heat release measurement.
- Soot filter, refrigerant cold trap, drying column(s), pump and waste regulators for conditioning the sampled gases prior to analysis.
- Controls for the smoke measurement system (if purchased).
- Data Logger (if purchased).

Clients owning an FTT Dual Cone Calorimeter can use the instrument rack from the cone for this function. Similarly clients purchasing this equipment will own a substantial section of a FTT Dual Cone Calorimeter and later be able to purchase a Cone Calorimeter with significant savings.

Smoke Measurement System

Includes: -

- White light source and lens built in accordance with DIN 50055.
- Silicon photodiode detector and voltage output of transmission
- SBI support cradle
- Full set of calibration filters.
- Analysis is via software.

Burner, Gas Train and Controls

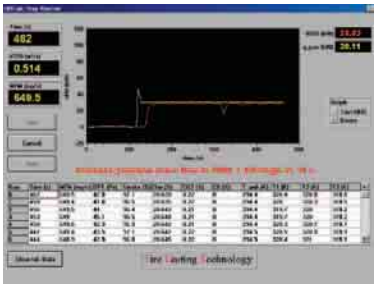
Includes: -

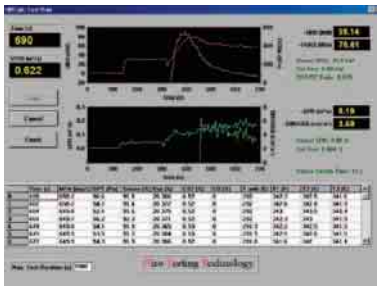
- Two non-aerated sandbox burners and an ignition system.
- UV burner flame detector units for safe gas supply monitoring.
- 'Gas Control Box', housed next to the test room observation window so the operator can simultaneously see the test specimen and digital propane mass flow rate (mg/s). This unit includes three flow level controllers, warning lights and override facilities.
- 'Gas Diverter' consisting of a mass flow controller to control the propane gas flow. Solenoid valves and flash back arrestors in both gas supply lines for automated safe operation of the gas flow to the burners. These are housed close to the test frame to improve the response time of the burners by reducing the pipe length between the solenoids and burners. The propane mass flow rate and the corresponding heat release (kW) are additionally displayed via software.

Gas Control Box

Gas Diverter

Data aquisition and analysis





Includes: -

- A Windows based software package enabling simple data collection and manipulation to determine the various parameters needed for heat release determination. The software generates files that integrate with the current spreadsheets, (which are also supplied) for the calculation of the Fire Growth Rate Index (FIGRA) and Smoke Growth Rate Index (SMOGRA).
- Data logger, which features a 3-slot cardcage with 6 1/2 digit (22 bit) internal DMM enabling up to 120 single-ended or 48 double-ended measurements, collects signals from the instrumentation. Scan rates up to 250 channels/s are available with a 115kbaud RS232 interface as standard. Also supplied with GPIB interface.

Services required for complete instalation of an SBI

FTT supplies all instrumentation and ducting for the SBI and can help with laboratory design, supplying of additional items or supervision of local building works or installation of essential services. The test may produce large quantities of combustion products so smoke handling facilities and suitable extinguishing agents are recommended.

You will also need: -

- Minimum height of 4.5m to house full apparatus
- Minimum floor space required (3m x 3m)
- Extraction (0.5m^3/s to 0.65m^3/s)
- Air supply
- Oxygen-free nitrogen
- Drying agents
- Calibration gas of CO_2/nitrogen (and CO if this option is purchased)
- Commercial propane supply
- Electrical power providing 230VAC 50/60 Hz 16A at the instrument rack must be available

Technical Specification

Measuring Principle	Paramagnetic oxygen analysis. Infrared carbon dioxide analysis.
System Dimensions (mm)	
Trolley	1500 (W) x 1620 mm (D) x 2200mm (H)
Frame	1500(W) x 1700 mm (D) x 2500mm (H)
Ducting	315 internal diameter (to length and specification as per Standard)
Gas flow rate (for burner)	647 mg/s and 2000 mg/s
Smoke detector	Silicon photodiode detector
Software	Windows based data acquisition and analysis

Due to the continuous development policy of FTT technical changes could be made without prior notice.

fire testing technology limited

Other Euroclass test methods

To classify the reaction to fire of the full range of wall lining and flooring construction products, the SBI and up to 4 other European Standard test methods may be required. FTT supplies instrumentation complying with all these European Standard test methods.

The test methods are: -

- Single-Flame Source Test

  EN ISO 11925-2. Reaction to fire tests for building products – Ignitability of building products subjected to direct impingement of flame.

- Oxygen Bomb Calorimeter

  EN ISO 1716. Reaction to fire tests for building products – Determination of the heat of combustion.

- Non Combustibility Apparatus

  EN ISO 1182. Reaction to fire tests for building products – Non combustibility test.

- Flooring Radiant Panel

  EN ISO 9239-1. Reaction to fire tests for building products – Horizontal surface spread of flame for floor coverings.

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