



SINGLE BURNING ITEM (SBI) TESTER

Single Burning Item (SBI) Tester — ToronFT™ SBI

ToronFT™ SBI Single Burning Item Tester is a large-scale fire performance testing instrument designed for the determination of fire response properties of building materials and products (excluding flooring materials) using the Single Burning Item (SBI) test method specified by the European Construction Products Regulation (EC Decision 2000/147/EC). The SBI test subjects full-scale specimens of building materials or products to thermal attack from a single burning item in a corner-geometry combustion chamber, evaluating heat release rate, smoke production, and lateral flame spread — the three key fire parameters used to classify building products under EN 13501-1.

The SBI test is a cornerstone of the European fire classification system for construction products, and the ToronFT™ SBI provides the precisely controlled combustion chamber geometry, gas collection hood, and measurement systems required for accurate, repeatable, and standard-compliant SBI test results.

APPLICATIONS

Single Burning Item (SBI) Tester — ToronFT™ SBI Applications

- Building and construction material manufacturers: SBI fire classification testing for CE marking and European market access under the Construction Products Regulation
- Third-party fire testing and notified body laboratories: SBI test for EN 13501-1 Euroclass A2, B, C, D, E, and F classification
- Facade, wall panel, and ceiling material manufacturers: fire response property determination for external and internal building envelope products
- Insulation material manufacturers: fire performance qualification for thermal and acoustic insulation products in building applications

- R&D departments: evaluation of fire response properties of new building materials and product constructions



Standards

The ToronFT™ SBI supports single burning item testing in compliance with internationally recognized fire performance standards, including:

- EN 13823: Reaction to fire tests for building products — Building products excluding floorings exposed to the thermal attack by a single burning item
- EN 13501-1: Fire classification of construction products and building elements — Classification using data from reaction to fire tests
- ISO 9705: Fire tests — Full-scale room test for surface products (reference method for SBI calibration)
- EC Decision 2000/147/EC: Implementing Council Directive 89/106/EEC (Construction Products Directive — fire classification system)

FEATURES

Single Burning Item (SBI) Tester — ToronFT™ SBI Key Features

- Full-scale SBI test: the EN 13823 standard method required for European Euroclass A2 through F fire classification of building products
- Combustion chamber dimensions: (3.0 ± 0.2) m (L) $\times$ (3.0 ± 0.2) m (W) $\times$ (2.4 ± 0.1) m (H): standard corner geometry for SBI test
- Brick-wall combustion chamber construction: providing the thermal mass and non-combustible background required by the standard
- Gas collection hood and smoke exhaust duct connected to sampling pipe at room top: capturing all combustion products for accurate heat and smoke measurement
- Opening (frame) on one side for trolley access: width 1470 mm $\times$ height 2450 mm: allows easy specimen loading and positioning on the trolley

- Observation windows on both long wing and short wing faces: real-time specimen monitoring without chamber access
- Closable door on one side for post-test combustion chamber cleaning
- Long wing-to-chamber wall vertical distance: (2.1 ± 0.1) m: standard-compliant specimen positioning geometry
- Combustion chamber opening area (excluding trolley bottom air inlet and collection hood exhaust): 0.05 m^2 : controlled air supply per standard requirements

THEORY & METHOD

Theory and Method

The SBI test mounts the test specimens as two perpendicular wings (long wing and short wing) forming a corner in the combustion chamber. A propane burner (the single burning item) applies a defined heat exposure at the base of the corner junction. The heat released by the specimen combustion, together with smoke produced, rises through the combustion chamber and exits through the gas collection hood and smoke exhaust pipe at the top of the room. Thermocouples, oxygen, CO, and CO₂ analyzers in the exhaust duct measure the heat release rate, total heat release, and smoke production rate throughout the test.

The combustion chamber dimensions — $(3.0 \pm 0.2) \text{ m} \times (3.0 \pm 0.2) \text{ m} \times (2.4 \pm 0.1) \text{ m}$ — provide the standardized corner-exposure geometry. The long wing test surface in contact with the U-shaped slot and the quality inspection surface of the chamber wall must be $(2.1 \pm 0.1) \text{ m}$ apart (vertical distance). The chamber has one opening for air intake (0.05 m^2 total — the combined areas of the air inlet at the trolley bottom and the smoke exhaust of the air collection hood), and observation windows on both the long wing and short wing walls for specimen monitoring. A closable door on one side facilitates post-test chamber cleaning.

TECHNICAL SPECIFICATIONS

Single Burning Item (SBI) Tester — ToronFT™ SBI Technical Specifications

Component / Parameter	Specification Details
General Information	
Model	ToronFT™ SBI
Test Method	Single Burning Item (SBI) — EN 13823
Standard Compliance	EN 13823; EN 13501-1; EC Decision 2000/147/EC
Combustion Chamber & Footprint	
Chamber Dimensions (L×W×H)	(3.0±0.2) m × (3.0±0.2) m × (2.4±0.1) m
Overall System Footprint	Approx. 6 × 7 × 6 m
Chamber Wall Construction	Brick walls
Chamber Opening Area	0.05 m² (excluding trolley bottom air inlet and hood exhaust)
Observation Windows	Located on the long wing wall and short wing wall
Access Openings	Trolley Access: 1470 mm × 2450 mm (W×H) Post-Test Access: Closable door on one side
Specimen Configuration	
Geometry	Long wing + short wing (corner geometry, L-type installation)
Specimen Dimensions	Long wing: 1.5 m; Short wing: 1.0 m
Clearance	Long wing to wall vertical distance: (2.1±0.1) m
Fuel & Exhaust System	
Fuel	Propane (≥95%)

Component / Parameter	Specification Details
Heat Release	30.7±2.0 kW
Mass Flow Control	Range: 0–2.5 g/s; Accuracy: ±1%
Exhaust System	Flow rate: 0.50–0.65 m³/s; Pipe: J-type pipe Ø315 mm
Gas Analysis & Measurement	
O ₂ Gas Analysis	Range: 0–25%; Accuracy: ±0.1%
CO ₂ Gas Analysis	Range: 0–10%; Accuracy: ±2% FS (Full Scale)
Temperature Measurement	Range: 0–400°C; Accuracy: ±0.5°C
Smoke Density Measurement	Transmittance: 0–100%; Accuracy: ±1%
Data Acquisition & Results	
Data Acquisition Rate	Recording every 3 seconds; Time accuracy: 0.1s
Key Results Generated	THR600s, FIGRA, heat release rate, smoke density, etc.



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