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SMOKE DENSITY TESTER

Smoke Density Tester for Building Materials – ToronFT™ BMT-DS

ToronFT™ BMT-DS Density of Smoke from Burning or Decomposition of Building Materials Tester is a precision static smoke density measurement instrument designed for evaluating the quantity of smoke produced when building materials and their products are burned or thermally decomposed. Smoke density is a critical fire safety parameter — excessive smoke generation during a building fire can impair evacuation, hamper fire-fighting operations, and contribute to toxic exposure hazards.

The ToronFT™ BMT-DS measures static smoke density using a Bunsen burner heat source, a high-sensitivity silicon photovoltaic receiver system, and a computerized data acquisition platform, providing accurate and reproducible smoke density results for building material fire safety qualification. It complies with ASTM D2843, the primary international standard for smoke density measurement from burning or decomposition of plastics and building materials.

APPLICATIONS

Smoke Density Tester – ToronFT™ BMT-DS Applications

The ToronFT™ BMT-DS is applicable for smoke density testing of the following building material and product categories:

- Building materials and their products for static smoke density determination during burning — supporting fire safety classification and product certification
- Solid building materials including boards, panels, and composites for smoke production characterization during combustion
- Insulation materials and foam products for smoke density evaluation during burning or thermal decomposition
- Interior finish materials: wall panels, ceiling tiles, and floor coverings — requiring smoke density data for building code compliance

- Fire-retardant treated building materials: before-and-after smoke density comparison for treatment effectiveness evaluation
- Research and development of new low-smoke building materials for fire safety optimization

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Standards

The ToronFT™ BMT-DS is designed to comply with the following international standards for building material smoke density testing:

- ASTM D2843: Standard Test Method for Density of Smoke from the Burning or Decomposition of Plastics
- ISO 5659-2: Plastics: Smoke generation — Part 2: Determination of optical density by a single-chamber test
- ASTM E662: Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials
- EN ISO 5659-2: Smoke generation from plastics and rubber materials

FEATURES

Smoke Density Tester – ToronFT™ BMT-DS Key Features

- Propane gas (95% purity) or equivalent-purity coal gas burning lamp provides the standardized ignition and heat source for reproducible smoke density measurements — gas supply is prepared by the customer to the specified purity
- Precision Bunsen burner with length 260 mm and nozzle diameter 0.13 mm, positioned at a 45° angle to the smoke box, ensures standardized specimen ignition geometry for consistent smoke density results
- High-sensitivity photoelectric system: 15W light bulb light source at 6V working voltage delivers stable, consistent optical input for smoke density measurement
- Silicon photovoltaic receiver cell with full transmittance range — 0% (complete obstruction) to 100% (no obstruction) — provides a wide, linear response for accurate smoke density measurement across the full range of building materials
- Processed focal length of 60–65 mm ensures correct optical alignment and beam geometry between light source and receiver for accurate, repeatable smoke density readings
- Smoke density measurement range of 0–100% with measurement accuracy of ±3% covers the full smoke production range from near-zero-smoke to heavily-smoking building materials

- Integrated powerful exhaust system rapidly purges combustion gases after each test, minimizing inter-test contamination and reducing reset time between smoke density measurements
- Computer-based data acquisition and processing platform enables automated smoke density data logging, analysis, and reporting for building material fire safety documentation
- Complies with ASTM D2843 and ISO 5659-2, providing smoke density test results recognized by North American and international building product certification bodies

THEORY & METHOD

Theory and Method

Static smoke density testing measures the optical attenuation caused by smoke accumulating in a closed test chamber after a specimen is subjected to a controlled heat source. As smoke particles scatter and absorb light, they reduce the transmittance of a light beam between a lamp source and a photovoltaic receiver — the greater the smoke density, the lower the measured light transmittance.

In the ToronFT™ BMT-DS, the specimen is ignited by a Bunsen burner (length 260 mm, nozzle diameter 0.13 mm, positioned at a 45° angle to the smoke box) and the combustion gases accumulate within the enclosed smoke box. The photoelectric system uses a 15W light bulb operating at 6V as the light source, and a silicon photovoltaic receiver cell (transmittance range: 0% when no light passes through, to 100% when light passes without obstruction) continuously measures the optical density of the accumulating smoke. The processed focal length of 60–65 mm ensures proper beam geometry for accurate smoke density measurement. A powerful exhaust fan purges the smoke box between tests.

TECHNICAL SPECIFICATIONS

Smoke Density Tester – ToronFT™ BMT-DS Technical Specifications

Component / Parameter	Specification Details
General Information	
Product Name	Density of Smoke from Burning or Decomposition of Building Materials Tester — ToronFT™ BMT-DS
Model	ToronFT™ BMT-DS
Compliance Standards	ASTM D2843; ISO 5659-2
Test Chamber & Construction	
System Composition	Combustion chamber + computer control system
Chamber Dimensions	300 × 300 × 790 mm
Construction Material	Internal stainless steel (corrosion-resistant); external painted finish
Combustion & Gas System	
Burner Type & Dimensions	Bunsen burner; Length: 260 mm; Nozzle diameter: 0.13 mm
Burner Angle	45° to the smoke box
Gas Source	Propane (purity ≥95%) or equivalent coal gas (customer-supplied)
Main Burner Pressure	276 kPa (adjustable)
Auxiliary Burner Pressure	138 kPa (adjustable)
Optical & Measurement System	
Smoke Density Range	0 to 100%
Measurement Accuracy	±3%

Component / Parameter	Specification Details
Light Source	15 W light bulb (6 V working voltage)
Receiver Type	Silicon photovoltaic cell (Range: 0% [no light] to 100% [full light transmittance])
Processed Focal Length	60–65 mm
Automation & Data System	
Key Functions	Automatic timing, automatic smoke extraction, automatic luminous flux correction
Data & Control System	Computer-based control, data acquisition, processing, and report output
Exhaust System	Powerful exhaust fan for automatic smoke extraction
Operating Conditions	
Environmental Requirements	Temperature: 23±2°C; Humidity: 50±5%; Well-ventilated environment
Voltage	AC 220V / 50Hz (±10%) (110V is also available)

For more information, pricing, or to request a quotation, please contact ToronFT. Specifications are subject to change without prior notice.

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