



TORONTECH

MATERIAL SMOKE TOXICITY HAZARD CLASSIFICATION TESTER



Material Smoke Toxicity Hazard Classification Tester — ToronFT™ STH-M

ToronFT™ STH-M Material Smoke Toxicity Hazard Classification Tester is a precision analytical instrument designed for the smoke toxicity hazard classification of materials that produce stable smoke during combustion. Based on the ISO 19700 international standard methodology — which uses gas analyzers to determine the smoke toxicity hazard classification of combustion products — the ToronFT™ STH-M measures the concentrations of toxic gas species in the smoke produced by materials under controlled burning conditions and classifies the material's smoke toxicity hazard accordingly.

The smoke toxicity hazard classification tester operates across a wide temperature range of 300–1000°C, with adjustable air flow (1–20 L/min), and integrates an annular furnace, quartz tube, quartz boat, flue gas collection and distribution components, and an air supply system into a complete, automated testing platform.

APPLICATIONS

Material Smoke Toxicity Hazard Classification Tester — ToronFT™ STH-M Applications

- Building and construction material manufacturers: smoke toxicity hazard classification for product certification and building code compliance
- Transportation material manufacturers: smoke toxicity qualification of rail vehicle, aircraft, and marine interior materials
- Cable and wire manufacturers: smoke toxicity evaluation of insulation and jacketing materials for tunnel and building installations
- Third-party fire testing and certification laboratories: smoke toxicity hazard classification per ISO 19700
- R&D departments: evaluation of new material formulations for reduced smoke toxicity in fire conditions

- Polymer and composite material manufacturers: characterization of combustion product toxicity across material types



Standards

The ToronFT™ STH-M supports smoke toxicity hazard classification in compliance with internationally recognized standards, including:

- ISO 19700: Controlled equivalence ratio method for the determination of hazardous components of fire effluents
- ISO 5659-2: Plastics — Smoke generation — Part 2: Determination of optical density by a single-chamber test
- EN 45545-2: Railway applications — Fire protection on railway vehicles — Requirements for fire behaviour of materials and components
- IEC 60754-2: Test on gases evolved during combustion of materials from cables — Part 2: Determination of degree of acidity
- NFPA 269: Standard test method for developing toxic potency data for use in fire hazard modeling

FEATURES

Material Smoke Toxicity Hazard Classification Tester — ToronFT™ STH-M

Key Features

- Based on the ISO 19700 international standard gas analyzer methodology — providing internationally recognized smoke toxicity hazard classification data
- Applicable to all materials that produce stable smoke — covering building materials, polymers, cables, composites, and transport interior materials
- Integrated instrument composition: annular furnace, quartz tube, quartz boat, flue gas collection and distribution components, air supply system
- Wide temperature control range: 300–1000°C — covering all standard smoke toxicity test temperature protocols
- Adjustable air flow: 1–20 L/min — providing precise control of combustion equivalence ratio for standard-specified conditions

- Automation for repeatable, accurate test execution and data acquisition
- Compliant with ISO 19700 — the primary international standard for gas analyzer-based smoke toxicity hazard classification

THEORY & METHOD

Theory and Method

Smoke toxicity hazard classification determines the potential lethality or incapacitation hazard of combustion products generated by a burning material. The ISO 19700 method uses a tube furnace to combust a defined mass of the test material at a controlled equivalence ratio (the ratio of fuel to oxygen relative to stoichiometric combustion), generating a steady-state smoke flow that is analyzed by gas analyzers for CO, CO₂, HCN, HCl, HBr, SO₂, NO_x, and other toxic species.

The ToronFT™ STH-M places the specimen in a quartz boat within the quartz tube of the annular furnace, which is heated to the specified test temperature (300–1000°C) under controlled air flow (1–20 L/min). The combustion gases are captured by the flue gas collection and distribution system and directed to the gas analyzer array, which continuously measures species concentrations throughout the burning event. The toxicity hazard classification is determined by comparing the measured toxic gas concentrations to the lethality concentration thresholds defined by ISO 19700, assigning the material to the appropriate hazard class.

TECHNICAL SPECIFICATIONS

Material Smoke Toxicity Hazard Classification Tester — ToronFT™ STH-M Technical Specifications

Component / Parameter	Specification Details
General Information	
Model	ToronFT™ STH-M
Test Method	Gas analyzer smoke toxicity hazard classification
Standard Compliance	ISO 19700
Applicable Materials	All stable smoke-producing materials
System Composition	
Core Components	• Annular (Ring) furnace • Quartz tube & quartz boat • Flue gas collection and distribution system • Temperature control & displacement systems • Air supply system
Safety Features	Fully enclosed flue gas system (safety design)
Temperature Control System	
Control Range	300°C to 1000°C
Control Accuracy	±1°C (static)
Temperature Fluctuation	±2°C (dynamic)
Motion & Displacement System	
Displacement Rate	10 ±0.01 mm/min (adjustable)
Return Speed	50 mm/min
Stroke Range	≥600 mm
Control Accuracy	0.01 mm/min
Air Flow & Exhaust System	

Component / Parameter	Specification Details
Air Flow Range	Configurable from 0–15 L/min up to 1–20 L/min (adjustable)
Smoke Extraction	Includes smoke extraction system (Note: smoke purification device is excluded)
Material Specifications	
Quartz Tube	Temperature resistant up to 1600°C; designed for easy disassembly and cleaning
Electrical Parameters	
Voltage	AC 220V ±10% / 50Hz (110V is also available)
Current	≤10A
Maximum Power	1.5 kW
Heating Power	800–1000 W
Configuration & Accessories	
Included Accessories	• Rat cages: 10 units • Calibration device: 1 set
Dimensions & Weight	
Equipment Dimensions	1900 mm × 650 mm × 1800 mm (L × W × H)
Equipment Weight	Approx. 425 kg



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