

SMOKE DENSITY TESTER — TORONFT™ SDT



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ToronFT™ SDT Smoke Density Tester is a large-scale smoke concentration measurement instrument designed to evaluate the concentration of smoke released when materials are burned in bus and coach vehicle applications. Compliant with BS 6853 standard requirements, the ToronFT™ SDT provides the standardized large-volume combustion chamber environment and horizontal photometric measurement infrastructure required for bus interior material smoke density qualification and classification.

The Smoke Density Tester is constructed from 1.5 mm thick SUS304 stainless steel fixed to a square bracket framework, forming a complete 3000 mm × 3000 mm × 3000 mm (L×W×H) cubic combustion chamber. The front face and both side walls feature transparent sealed 100 mm × 100 mm glass observation windows (centered at 2150 mm from the ground) allowing a horizontal light beam to pass through for photometric measurement. Multiple ventilation holes (100 mm × 500 mm, total 50 cm²) at the bottom and a top-mounted exhaust fan complete the airflow management system.

APPLICATIONS

Smoke Density Tester — ToronFT™ SDT Applications

- Bus and coach interior material manufacturers: smoke concentration qualification for seat upholstery, wall panels, flooring, and ceiling materials
- Third-party transportation vehicle testing laboratories: BS 6853 smoke density testing for bus material certification
- Public transportation procurement authorities: smoke performance verification of interior materials for transit bus and coach fleets
- R&D departments: smoke production characterization of new bus and coach interior material candidates

- Quality assurance departments — incoming inspection and production-lot smoke testing for bus vehicle interior material compliance



Standards

The ToronFT™ SDT supports smoke concentration testing in compliance with internationally recognized transportation vehicle fire safety standards, including:

- BS 6853 — Code of practice for fire precautions in the design and construction of passenger-carrying trains (smoke density testing requirements applicable to bus and coach applications)
- EN 45545-2 — Railway applications — Fire protection on railway vehicles — Requirements for fire behaviour of materials and components
- 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

FEATURES

Smoke Density Tester — ToronFT™ SDT Key Features

- Purpose-built for BS 6853 smoke concentration measurement of bus and coach interior materials
- Chamber construction: SUS304 stainless steel, 1.5 mm thickness; fixed to square bracket framework — complete cubic combustion enclosure
- Internal dimensions: 3000 mm (L) × 3000 mm (W) × 3000 mm (H) — large volume accommodating full-size bus interior material specimens
- Transparent sealed observation windows: 100 mm × 100 mm each; located on front face and both side walls; center 2150 mm from ground — providing the horizontal photometric measurement beam path
- Bottom ventilation holes: 100 mm × 500 mm each; total area 50 cm² — standardized controlled natural airflow
- Top-mounted exhaust fan — rapid post-test smoke removal for efficient inter-test turnaround
- Horizontal photometric measurement system: measures transmitted light intensity reduction for specific optical density calculation

THEORY & METHOD

Theory and Method

The standard smoke test measures the specific optical density of smoke generated by burning a material specimen under controlled conditions within the large-volume cubic combustion chamber. A horizontal light beam from a photometric light source on one observation window passes through the smoke-filled enclosure to a receiver on the opposite window. As smoke accumulates in the chamber during burning, the transmitted light intensity decreases. The reduction in transmitted intensity is used to calculate the specific optical density according to the photometric measurement method specified by BS 6853.

The 3000 mm × 3000 mm × 3000 mm internal volume accommodates large bus interior material specimens — including whole seat sections or representative panel assemblies — that generate sufficient smoke for accurate optical density measurement. The sealed observation windows (100 mm × 100 mm, centered 2150 mm from the ground) on the front face and both side walls maintain the test chamber atmosphere around the measurement beam path. Ventilation holes at the bottom (100 mm × 500 mm each, 50 cm² total) provide controlled natural airflow, while the top-mounted exhaust fan rapidly removes smoke between tests to restore the chamber to the ambient reference condition.

TECHNICAL SPECIFICATIONS

Smoke Density Tester — ToronFT™ SDT Technical Specifications

Parameter	Specification
Chamber Material / Thickness	SUS304 stainless steel, 1.5 mm
Internal Dimensions (L×W×H)	3000 mm × 3000 mm × 3000 mm

Parameter	Specification
Support Structure	Fixed on square bracket framework
Observation Window Size	100 mm × 100 mm (transparent sealed)
Window Locations	Front face + both side walls
Window Center Height from Ground	2150 mm
Bottom Ventilation Holes	100 mm × 500 mm each; total 50 cm²
Exhaust Fan	Top-mounted
Measurement Method	Horizontal photometric beam (optical density)
Standard Compliance	BS 6853



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