

HIGH TEMPERATURE LIMITING OXYGEN INDEX (LOI) TESTER



High Temperature Limiting Oxygen Index (LOI) Tester - ToronFT™ HT-LOI

ToronFT™ HT-LOI High-Temperature Limiting Oxygen Index Tester determines the limiting oxygen index of plastics and other solid materials at temperatures from ambient up to 150°C. The instrument holds a vertical specimen in a quartz chimney, feeds a controlled oxygen and nitrogen mixture around it, and reports the oxygen concentration at which the material just sustains flaming combustion. Torontech supplies the ToronFT™ HT-LOI for laboratories that test burning behavior to ISO 4589-3, the elevated-temperature part of the oxygen index method. A digital oxygen sensor reads the index directly to 0.1% resolution, so operators get the result without calculating it from flow settings.

Many polymers behave differently once they are warm, so an oxygen index measured at room temperature can overstate real performance at service temperature. The HT-LOI conditions the specimen and gas stream up to 150°C, letting laboratories map the index against temperature. Oxygen and nitrogen pressure gauges, flow meters, and needle valves set the mixture, and the heated chimney reaches the target temperature before ignition. Operators adjust the mixture between trials until burning just meets the standard's time or length criterion.

Manufacturers and material laboratories use the ToronFT™ HT-LOI to rank flame-retardant formulations, qualify polymers for high-temperature service, and support classification and quality control. The quartz chimney, imported oxygen sensor, and precise gas control give repeatable results across operators and test sessions.

APPLICATIONS

High-Temperature Limiting Oxygen Index (LOI) Tester - ToronFT™ HT-LOI Applications

The ToronFT™ HT-LOI serves laboratories that measure and compare the flammability of solid materials at elevated temperatures.

- Flame-Retardant Development: ranking of polymer formulations by limiting oxygen index to compare additive performance
- High-Temperature Material Qualification: evaluation of plastics, composites, and cable compounds intended for service at elevated temperatures
- Plastics and Polymer Testing: oxygen index measurement of homogeneous solids, laminates, foams, sheets, and films
- Quality Control and Batch Release: confirmation that production material meets a specified oxygen index before shipment
- Research and Material Selection: mapping of oxygen index against temperature to guide material choice for demanding environments
- Wire and Cable Compounds: assessment of jacket and insulation compounds for flame resistance



FEATURES

High Temperature Limiting Oxygen Index (LOI) Tester - ToronFT™ HT-LOI

Key Features

The ToronFT™ HT-LOI pairs accurate gas control with a heated quartz chimney and a direct-reading oxygen sensor.

- Elevated-Temperature Testing: continuous set point from room temperature to 150°C for ISO 4589-3 burning-behavior tests
- Direct Oxygen-Index Readout: imported oxygen sensor displays the index to 0.1% resolution, removing manual calculation
- Wide Measurement Range: oxygen reading across 0 to 100% covers materials from easily ignited to highly flame-retardant
- Precise Gas Control: separate oxygen and nitrogen pressure gauges, flow meters, and needle valves set and hold the test mixture
- Quartz Combustion Chimney: 75 mm inside diameter and 450 mm height give a clear view of the flame and a stable burn column
- Stable Temperature Control: temperature deviation held within $\pm 1\%$ for repeatable elevated-temperature trials
- Class 2.5 Flow Accuracy: calibrated flow measurement supports consistent oxygen-nitrogen ratios between tests
- Operator-Adjustable Mixture: regulating valves let the operator step oxygen up or down to bracket the index quickly

THEORY & METHOD

Theory and Method

The limiting oxygen index, or LOI, is the smallest percentage of oxygen in a flowing oxygen-nitrogen mixture that still supports flaming combustion of a material. A test starts with a vertical specimen clamped in the chimney and a chosen oxygen concentration. The operator ignites the top of the specimen and watches whether it keeps burning. If the flame goes out before reaching the standard's time or length limit, the oxygen level was too low; if it burns past the limit, the level was too high.

The operator repeats the trial, raising or lowering oxygen, until two concentrations bracket the pass/fail boundary, and the LOI is taken at that boundary. The instrument reports the value as a percentage by volume, $LOI = O_2 / (O_2 + N_2) \times 100$, read directly from the oxygen sensor rather than calculated from flow rates. Flow meters, pressure gauges, and needle valves hold the mixture steady through each burn so the reading reflects a stable atmosphere. A digital display shows the oxygen index to 0.1% resolution.

Temperature is the variable that sets this instrument apart from an ambient oxygen index tester. The ToronFT™ HT-LOI heats the chimney and the gas passing through it to a set point between room temperature and 150°C, then holds that temperature while the specimen burns. Because a warmer polymer releases volatile fuel more readily, its oxygen index usually falls as temperature rises, and ISO 4589-3 captures that relationship. Running the test at the material's expected service temperature gives a result that reflects real fire behavior more closely than a room-temperature figure.

TECHNICAL SPECIFICATIONS

High-Temperature Limiting Oxygen Index (LOI) Tester - ToronFT™ HT-LOI
Technical Specifications

Parameter	Specification
Materials Tested	Homogeneous solids, laminates, foams, sheets, films
Test Temperature Range	Room temperature to 150°C, continuously adjustable

Parameter	Specification
Temperature Deviation	$\pm 1\%$
Oxygen Index Readout	Digital direct reading
Oxygen Index Resolution	0.1%
Oxygen Measurement Range	0 to 100% O ₂
Flow Resolution	0.1% L/min
Measurement Accuracy	Class 2.5
Gas Supply Line	Flow meter, pressure gauge, needle valve
Pressure Gauges	Two (oxygen output and nitrogen output), valve-adjustable
Combustion Chimney	Quartz glass, 75 mm inside diameter × 450 mm height



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