

# **LIMITING OXYGEN INDEX CHAMBER (LOI)**



## Limiting Oxygen Index Chamber (LOI) - ToronFT™ LOI

ToronFT™ LOI Limiting Oxygen Index Chamber (LOI) is a precision laboratory instrument for determining the oxygen index (limiting oxygen concentration) of a wide range of solid and sheet materials. The oxygen index is one of the most widely used parameters for characterizing the flammability of plastics, polymers, textiles, and composite materials — providing a quantitative measure of the minimum oxygen concentration in an oxygen/nitrogen mixture required to sustain combustion of a material under defined test conditions.

The ToronFT™ LOI features a UK-imported oxygen concentration sensor with direct digital readout and a resolution of 0.1%, ensuring fast, precise oxygen index determination without the need for manual interpolation. It complies with JIS 7201, BS 2782, ANSI/ASTM D2863, and ISO 4589-2, making it suitable for international material qualification, quality control, and research programs.

### APPLICATIONS

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## Limiting Oxygen Index Chamber (LOI) - ToronFT™ LOI Applications

The ToronFT™ LOI Limiting Oxygen Index Chamber (LOI) is applicable for oxygen index determination of the following material types:

- Strip or sheet materials with thickness up to 10.5 mm that can stand upright and support themselves for standard oxygen index testing
- Homogeneous solid materials, laminated materials, foam materials, soft sheets, and film materials with apparent density greater than 100 kg/m<sup>3</sup>
- Foam materials with apparent density less than 100 kg/m<sup>3</sup> — oxygen index test method supported

- Sheet materials and films that can be supported upright, using oxygen index testing to determine ease of combustion when in contact with flame in air
- Plastics, rubbers, and polymeric composites requiring flammability classification by oxygen index for product development or certification
- Textiles, nonwovens, and fiber-reinforced materials for oxygen index-based flammability characterization



# Standards

The ToronFT™ LOI is designed to comply with the following international oxygen index test standards:

- ISO 4589-2: Plastics: Determination of burning behaviour by oxygen index — Part 2: Ambient-temperature test
- ASTM D2863: Standard Test Method for Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics (Oxygen Index)
- BS 2782-1: Method 141A — Determination of the flammability of plastic film
- JIS K 7201-2: Plastics: Determination of burning behaviour by oxygen index

## FEATURES

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### Limiting Oxygen Index Chamber (LOI) - ToronFT™ LOI Key Features

- Direct digital readout oxygen index display with 0.1% resolution — UK-imported oxygen concentration (oxygen index) sensor provides immediate, accurate measurement without manual interpolation or calculation
- Dual-pressure-gauge system independently displays oxygen output pressure and nitrogen output pressure, enabling precise and independent adjustment of each gas supply for accurate oxygen index mixture preparation
- Wide flow measurement range of 0–100% O<sub>2</sub> / N<sub>2</sub> with a resolution of 0.1 L/min and measurement accuracy of Level 2.5 — meeting the precision requirements of ISO 4589-2 and ASTM D2863
- Quartz glass combustion tube with inner diameter 75 mm and height 450 mm provides the standard geometry and thermal resistance needed for reliable oxygen index combustion tests
- Standardized gas flow conditions: 90 mm/s  $\pm$  10 mm/s at the top of the combustion tube and 40 mm/s  $\pm$  2 mm/s within the tube — fully compliant with ISO 4589-2 and ASTM D2863 flow requirements
- Mixed-gas rotameter (can display oxygen or nitrogen separately) provides visual flow rate confirmation alongside the digital oxygen index readout

- Input pressure adjustable from 0.25 to 0.5 MPa via the needle valve and regulating valve, accommodating a range of laboratory gas supply pressures
- Suitable for a broad range of specimen types including strips, sheets, foams, laminates, and films — covering nearly all material categories addressed by ISO 4589-2 and ASTM D2863
- Complies with JIS 7201, BS 2782, ASTM D2863, and ISO 4589-2, providing internationally recognized oxygen index test results for North American and global markets

## THEORY & METHOD

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### Theory and Method

The oxygen index test determines the minimum concentration of oxygen (expressed as a percentage of an oxygen/nitrogen mixture by volume) required to support continued downward combustion of a material specimen under standardized conditions. A specimen is mounted vertically in the combustion tube, and a precisely controlled oxygen/nitrogen gas mixture is flowed upward through the tube. The top of the specimen is ignited, and the oxygen concentration is progressively adjusted until the minimum concentration sustaining a candle-like flame for a defined burn time or length is found — this is the oxygen index value.

The ToronFT™ LOI uses a UK-imported oxygen concentration sensor to provide real-time digital readout of the oxygen index concentration directly, with a resolution of 0.1%. The quartz glass combustion tube (inner diameter 75 mm, height 450 mm) provides a thermally stable and optically clear test environment. Gas flow rate at the top of the combustion tube is 90 mm/s  $\pm$  10 mm/s, and within the tube 40 mm/s  $\pm$  2 mm/s, ensuring the standardized flow conditions required by ISO 4589-2 and ASTM D2863. Input pressure is adjustable from 0.25 to 0.5 MPa via the regulating valve.

## TECHNICAL SPECIFICATIONS

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# Limiting Oxygen Index Chamber (LOI) - ToronFT™ LOI Technical Specifications

| Component / Parameter            | Specification Details                                                                           |
|----------------------------------|-------------------------------------------------------------------------------------------------|
| General Information              |                                                                                                 |
| Product Name                     | Limiting Oxygen Index Chamber (LOI) — ToronFT™ LOI                                              |
| Model                            | ToronFT™ LOI                                                                                    |
| Compliance Standards             | ISO 4589-2; ASTM D2863; BS 2782; JIS K7201                                                      |
| Measurement & Gas Control System |                                                                                                 |
| Oxygen Concentration (Index)     | Range: 0–100%; Resolution: 0.1%                                                                 |
| Display                          | Digital readout, direct reading                                                                 |
| Oxygen Index Sensor              | Imported from the UK                                                                            |
| Flow Measuring Range             | 0–100% O <sub>2</sub> /N <sub>2</sub>                                                           |
| Flow Measurement Accuracy        | Level 2.5                                                                                       |
| Flow Resolution                  | 0.1 L/min                                                                                       |
| Rotameter                        | Mixed gas (oxygen or nitrogen displayed separately); Range: 2.5–25 L/min; Resolution: 0.5 L/min |
| Input Pressure Range             | 0.25–0.5 MPa (adjustable)                                                                       |
| Pressure Gauges                  | Two (oxygen output pressure and nitrogen output pressure)                                       |
| Gas Source Requirements          | Oxygen (purity ≥98%) and Nitrogen (supplied by the buyer)                                       |
| Combustion Chamber & Test System |                                                                                                 |

| Component / Parameter                        | Specification Details                                                 |
|----------------------------------------------|-----------------------------------------------------------------------|
| Combustion Tube Material                     | Quartz glass                                                          |
| Combustion Tube Dimensions                   | Inner Diameter: 75 mm; Height: 450 mm                                 |
| Gas Flow Rate (Tube Top)                     | 90 mm/s $\pm$ 10 mm/s                                                 |
| Gas Flow Rate (Inside Tube)                  | 40 mm/s $\pm$ 2 mm/s                                                  |
| Igniter                                      | Propane electronic igniter; Flame height adjustment: 16 mm $\pm$ 4 mm |
| Sample Clamps                                | One set each of rigid self-supporting clamps and soft material clamps |
| Timer Accuracy                               | $\pm$ 0.1 s/h                                                         |
| <b>Operating Conditions &amp; Dimensions</b> |                                                                       |
| Ambient Temperature                          | -10°C to 45°C                                                         |
| Relative Humidity                            | <85%                                                                  |
| Voltage                                      | 220V, 50Hz, 150W (110V is also available)                             |
| Equipment Dimensions                         | 550 mm $\times$ 350 mm $\times$ 680 mm (L $\times$ W $\times$ H)      |

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



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