

Oxygen Index

(ISO 4589-2; ASTM D2863)

firetesting
technology

Elevated-Temperature Oxygen Index

(ISO 4589-3)



ASTM D2863:

Standard test method for measuring the minimum oxygen concentration to support candle-like combustion of plastics (oxygen index)

ISO 4589-2:

Plastics

- Determination of burning behaviour by oxygen index
 - Part 2: Ambient-temperature test
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ISO 4589-3:

Plastics

- Determination of burning behaviour by oxygen index
 - Part 3: Elevated-temperature test
-

NES 714 and NES 715:

UK naval engineering standards

Determination of Flammability by Oxygen Index

The **FTT** Oxygen Index (OI) measures the minimum percentage of oxygen in a test atmosphere that is required to marginally support combustion. The OI is an economical and precise quality control test of combustible materials. Its ease of use together with high levels of precision has made this technique a primary characterising and quality control tool to the plastic and electric cable industries and it has been specified by several military and transport groups.

The **FTT** apparatus enables the oxygen index to be determined in accordance with ASTM D2863, ISO 4589 Part 2 or the UK Naval Engineering Standard NES 714.

The OI features:

- New Paramagnetic Oxygen Cell for assessing accurate oxygen (< 0.1%) levels
- Compact unit for efficient use inside a laboratory hood, with ventilation
- Automatic flow control gives oxygen level adjustment by turning one single valve
- Quick loading of test specimen into chimney
- Digital display of oxygen percentage in atmosphere during test (no calculations needed)
- Digital display of temperature of gas mixture entering the test chimney
- Sample holders for both rigid and flexible samples supplied
- Shortened gas path for rapid response
- Compact design

The Elevated-Temperature Oxygen Index module (TOI) is used alongside the OI to determine the oxygen index at temperatures up to 125°C. Research shows that the elevated temperature at which the materials will burn in air is a better determinant of combustibility than is the conventional oxygen index. Oxygen Index values fall when the gas temperatures are increased.

Elevated test temperatures are set by adjustment of the pre-heated gas temperature levels and setting the heated glass furnace wall temperature. The temperatures of both heated sections are continuously displayed on the TOI control unit. When experiments are being carried out using different oxygen levels, gas conservation is achieved by using air from an integral quiet running pump between tests. Bottled nitrogen and oxygen supplies are only switched into the system for testing.

The **FTT** apparatus enables the oxygen index at elevated temperature to be determined in accordance with ISO 4589 Part 3 or the UK Naval Engineering Standard NES 715.

The TOI features:

- Test temperature to 400°C
- Digital display of sample temperature
- Digital display of column and pre-heater temperatures
- Transparent radiant heated test column
- Highly efficient gas pre-heater
- Air pump to conserve oxygen and nitrogen supply during standby period
- Propane ignition source

The **FTT** OI and TOI have been designed to be compact for efficient use in a standard fume cupboard (or under a simple ventilation hood that can be supplied if required). The instruments give continuous digital readout of oxygen concentration in the test atmosphere to facilitate quick settings of test concentration. Stabilised oxygen percentages are automatically read from the digital readout and no additional flow adjustments are required.

This is a considerable improvement over systems that use analogue gauges or require flow matching and the use of graphs or tables to calculate oxygen concentration.



TECHNICAL SPECIFICATIONS

Oxygen Index

Measuring principle	Paramagnetic cell (accurate to <0.1% concentration by volume)
Digital readout for oxygen concentration	0.1% resolution
Dimensions (mm)	350 (W) × 370 (D) × 280 (H)
Column size (mm)	75 or 100 (dia) × 450(H)
Weight	17 kg (approx)

SERVICES

Power	230V 50/60Hz 1A or 110V 60Hz 2A
Gas supply	Bottled O ₂ , N ₂ and Propane or methane (depending on the Standard)
Extraction hood	Extraction rate of at least 50l/s

Elevated-Temperature Oxygen Index

Measuring principle	Radiant heated glass furnace tube
Dimensions (mm)	350 (W) × 370 (D) × 280 (H)
Column size (mm)	160 max (dia) × 570 (H)
Weight	20 kg (approx)
Power	230V 50/60Hz 10A

SERVICES

Gas supply	Bottled O ₂ , N ₂ and Propane
Extraction hood	Extraction rate of at least 50l/s

A standard Oxygen Index is required to operate alongside the TOI
 Due to **FTT**'s continuous development policy, specification is liable to change without prior notice

Unrivalled Experience in Design and Manufacturing

FTT's site in East Grinstead, is home to the largest group of fire scientists and instrumentation design engineers working on fire testing instrumentation, and is at the heart of our design and manufacturing. For almost 30 years FTT has provided the highest quality instruments and service for fire testing and research professionals worldwide, directly and through its extensive global sales and support network.



Quality

- World-class manufacturing in accordance with multiple international and national standards, including: EN, ISO & ASTM
- ISO 14001, ISO 9001 certified

Integrity

- A dedicated team passionate about fire testing instrumentation and continuous product improvement
- Delivering reliable, robust and easy-to-use instruments for the past 30 years

Excellence

- A world-class team made up of qualified fire scientists, mechanical, electrical and electronic fire instrument design engineers and production, installation and maintenance engineers

Global

- World-wide distribution network for global sales, installations, training, maintenance and technical support
- Leading global supplier of the Cone Calorimeter, Large Scale Calorimeter, NBS Smoke Chamber and Oxygen Index