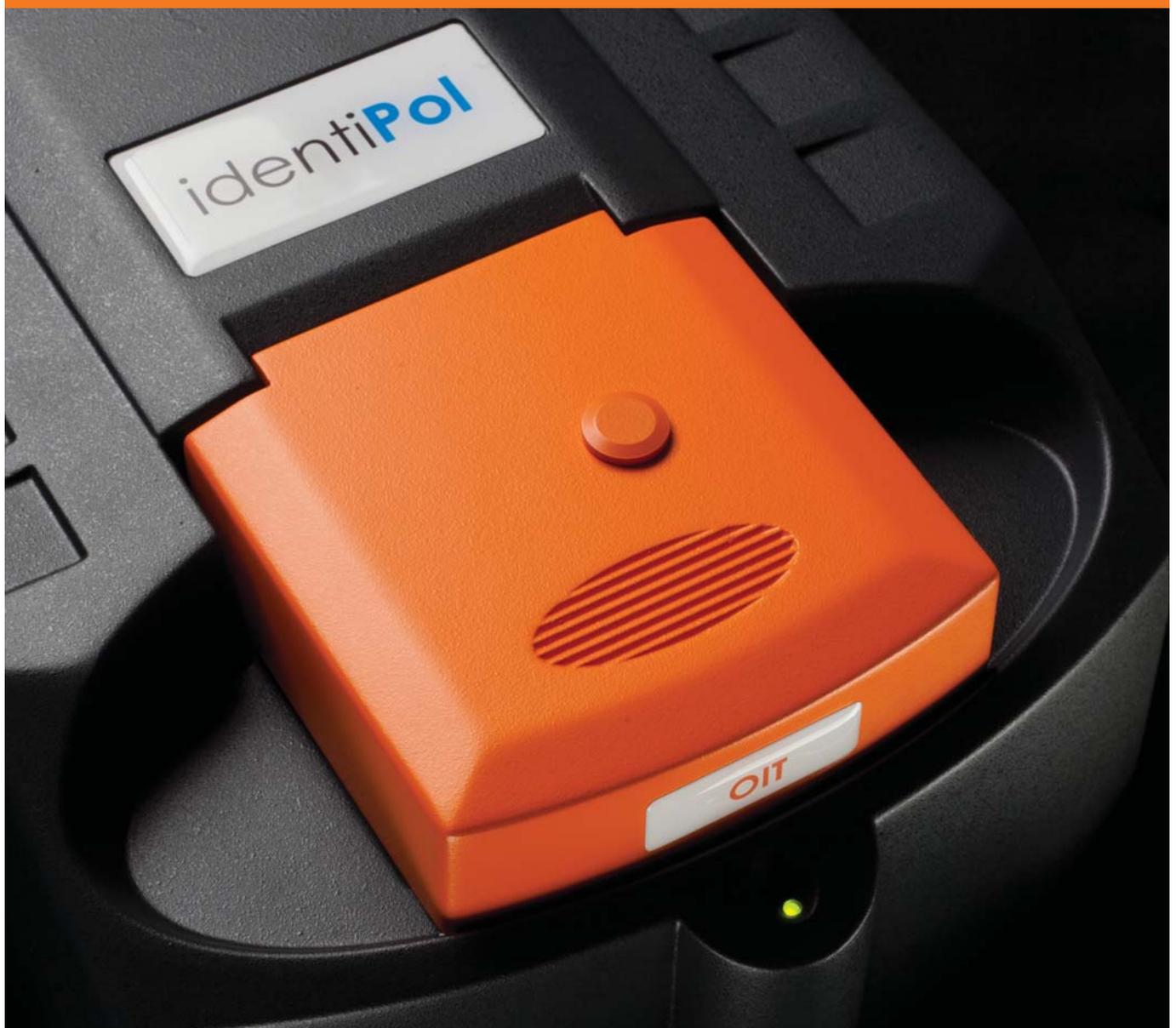


identiPol

OIT

Plastic Oxidative Induction Time

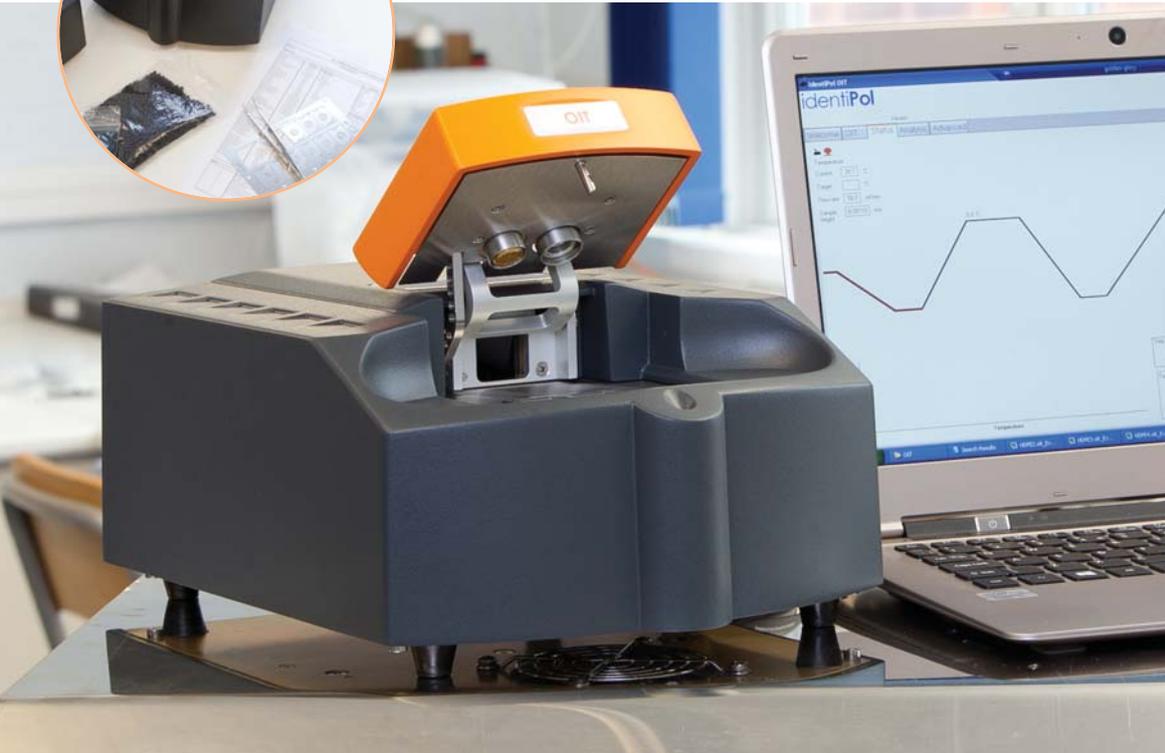


What is it?

The lifetime of a plastic component is mainly governed by its ability to withstand oxidation and degradation. When exposed to the oxygen in the air that we breathe, plastics age and degrade over time, losing mechanical strength and leading eventually to component failure.

The lifetime of a plastic can be increased by appropriate polymer chemistry or by adding additives (anti-oxidants) to the plastic during processing. Generally, the lifetime is greater for materials having a higher molecular weight, although performance of lower specification plastics can be enhanced with anti-oxidants.

However, as these additives are more expensive than the plastic granules, a balance is sought between cost and performance. The OIT test is frequently used as an indication of sufficient molecular weight, but in such cases it must be clear whether materials are tested with or without anti-oxidants.

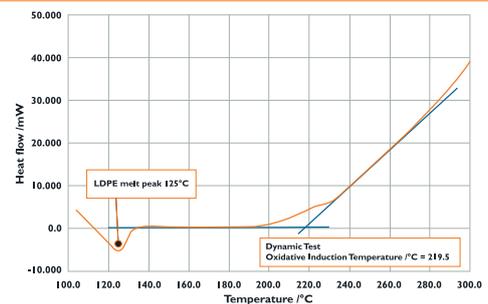


The identiPol OIT is designed to provide unskilled staff with a simple tool to measure the oxidative stability of a plastic using the internationally recognised Oxidative Induction Time/Oxidative Induction Temperature (OIT) method. The system has been specifically designed to conform to approved standards (ASTM D3350, D3895-07, DIN EN 728, ISO 11357-6)¹ and be operated alongside the production line by semi-skilled staff.

ENHANCED CAPABILITIES

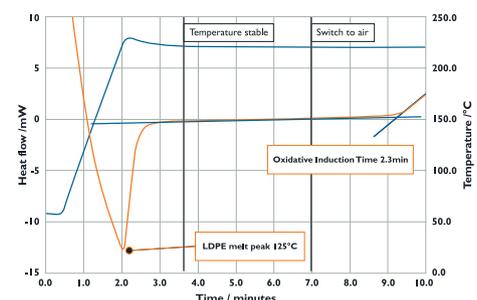
Dynamic OIT

The result on the upper right shows the onset of oxidation (Oxidative Induction Temperature) for a sample of LDPE measured in a dynamic test at 20°C/min. The OIT is measured as 219.5°C.



Static OIT

Different international standards call for the Oxidative Induction Time to be measured at different isothermal temperatures. The identiPol OIT is a versatile system and can operate from room temperature up to 350°C. The result on the lower right shows the onset of oxidation (Oxidative Induction Time) at 2.3 minutes as measured at 220°C.



¹ Although these methods call for either oxygen or air to be used as an oxidising gas, the identiPol OIT has been designed to work exclusively with air. This reduces the running costs of the system and ensures the safety of users in a production environment.

What does it do?

There are two modes of operation for the identiPol OIT:



Oxidative Induction Time

In this mode a sample of plastic is heated in an inert atmosphere (typically nitrogen), to a given temperature appropriate for the type of plastic. (For example, PE would be heated to 210°C). The temperature is held constant and when the temperature reaches a stable value, the gas is switched automatically from nitrogen to air. The time elapsed from the switch in gases to the moment the plastic starts to oxidise and decompose defines the Oxidative Induction Time.



Oxidative Induction Temperature

In this mode a sample of plastic is heated in an atmosphere of air, at a constant heating rate, until the plastic starts to oxidise and decompose. The onset of this decomposition reaction defines the Oxidative Induction Temperature.

How does it work?

When a plastic material undergoes oxidative degradation, heat is evolved. By measuring the temperature of the plastic and comparing it to the temperature of its nearby surroundings, a temperature difference can be measured when the plastic starts to oxidise.

Test samples are first moulded within the identiPol OIT to produce a consistent sample for measurement. The test sample is then heated up while the temperature difference of the sample is compared to an inert reference temperature. The temperature difference is then measured as the plastic is heated or held at a constant temperature.

Either the heating stops at a given temperature to measure Oxidative Induction Time, or continues to measure the Oxidative Induction Temperature. A rapid increase in the temperature difference between the plastic sample and the reference is used to indicate the onset of oxidation and decomposition.



At the end of the measurement the plastic sample is discarded and the built-in software calculates and stores all relevant information. A certificate of OIT conformance can be printed and used as part of your, or your customer's, quality control process.

Optional accessories

Camera compatibility

For many, seeing is believing. The identiPol OIT has an optional camera capability that allows the operator to observe the sample area whilst under test.

This greatly aids the assessment of good sample preparation and can be used to observe the plastic oxidising during the test measurement.

The images from the camera are temperature/time stamped and can be viewed post-sample test.



Key identiPol benefits



Save time

- Prevent incorrect material entering production
- Reduce scrap and wastage
- Both Oxidative Induction Time and Oxidative Induction Temperature determined automatically
- Simpler to use than a Differential Scanning Calorimetry (DSC) for unskilled operators



Save money

- Eliminate the need for expensive DSC equipment
- Reduce expensive additives whilst maintaining product quality
- Air is used avoiding the risk and cost involved with using oxygen



Secure your reputation

- Provide material that conforms to international standards
- Confirm formulation prior to moulding or dispatch
- Provide 'Certificate of Conformance' to your customers

Specifications

Sample size	20-30mg (one or two plastic granules, plastic film, or a piece from a moulded part)
Temperature range	Ambient to 350°C
Heating rate	10 - 100°C/min
Standard output	OIT time/temperature
Optional output	Summary for all samples tested
Printed outputs	'Certificate of Conformance' for OIT specification
Optional accessories	Sample viewing camera system

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