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Designation: D 3895 – 03

Standard Test Method for Oxidative-Induction Time of Polyolefins by Differential Scanning Calorimetry¹

This standard is issued under the fixed designation D 3895; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last approval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or approval.

1. Scope^a

1.1 This test method outlines a procedure for the determination of oxidative-induction time (OIT) of polymeric materials by differential scanning calorimetry (DSC). It is applicable to polyolefin resins that are in a fully stabilized/compounded form.

1.2 The values stated in SI units are to be regarded as the standard.

1.3 This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use. Specific hazards information is given in Section 8.

Note 1—This test method is similar to ISO 11357-6, but not equivalent. ISO procedure provides additional information not supplied by this test method.

2. Referenced Documents

2.1 ASTM Standards:²

- D 4703 Practice for Compression Molding Thermoplastic Materials into Test Specimens, Plaques, or Sheets
- E 473 Terminology Relating to Thermal Analysis
- E 691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method
- E 967 Practice for Temperature Calibration of Differential Scanning Calorimeters and Differential Thermal Analyzers

3. Terminology

3.1 Definitions—Definitions of terms applying to thermal analysis appear in Terminology E 473.

3.2 Description of Term Specific to This Standard:

3.2.1 *oxidative induction time*—a relative measure of a material's resistance to oxidative decomposition; it is determined by the thermoanalytical measurement of the time interval to onset of exothermic oxidation of a material at a specified temperature in an oxygen atmosphere.

3.2.2 Abbreviations:

- 3.2.3 HDPE—high-density polyethylene.
- 3.2.4 LDPE—low-density polyethylene.
- 3.2.5 LLDPE—linear low-density polyethylene.
- 3.2.6 OIT—oxidative induction time.

4. Summary of Test Method

4.1 The sample to be tested and the reference material are heated at a constant rate in an inert gaseous environment (nitrogen). When the specified temperature has been reached, the atmosphere is changed to oxygen maintained at the same flow rate. The specimen is then held at constant temperature until the oxidative reaction is displayed on the thermal curve. The time interval from when the oxygen flow is first initiated to the oxidative reaction is referred to as the induction period.

4.1.1 The end of the induction period is signaled by an abrupt increase in the specimen's evolved heat or temperature and may be observed by a differential scanning calorimeter (DSC). The OIT is determined from the data recorded during the isothermal test.

4.2 The type of containment system used depends on the intended application use of the material being tested. Polyolefins used in the wire and cable industry typically require copper or aluminum pans, whereas polyolefins used in geomembrane and vapor-barrier film applications exclusively use aluminum pans.

4.3 Unless otherwise specified, the analysis temperature used in this test has been set arbitrarily at 200.0°C. For samples that have relatively low or high stabilization levels, a different temperature may be selected (typically between 180 and 220°C) to yield a thermal curve that can be interpreted and analyzed easily.

¹ This test method is under the jurisdiction of ASTM Committee D20 on Plastics and is the direct responsibility of Subcommittee D20.30 on Thermal Properties (Section D 20.30.07).

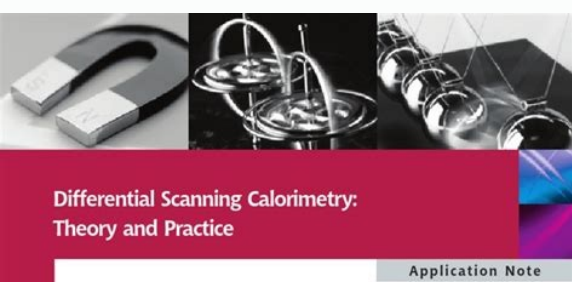
Current edition approved November 1, 2003. Published January 2004. Originally approved in 1980. Last previous edition approved in 2002 as D 3895 – 02.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For Annual Book of ASTM Standards volume information, refer to the standard's Document Summary page on the ASTM website.

^aA Summary of Changes section appears at the end of this standard.

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Differential Scanning Calorimetry:
Theory and Practice

Application Note

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Differential Scanning Calorimetry for the Life Sciences™

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Differential Scanning Calorimetry

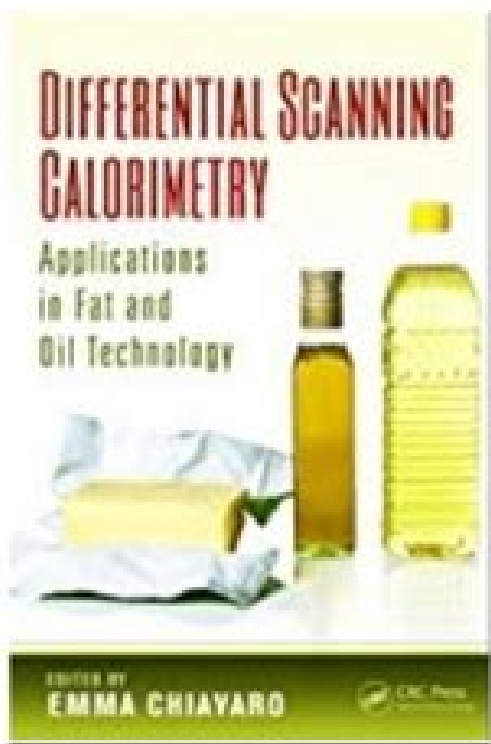
Second Edition



Christoph Schick - Vincent Mathot
Editors

Fast Scanning Calorimetry

Springer



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The last chapter deals with specific applications of DSC. Flammersheim G. L. This well-arranged book will help to further an understanding of the various facets of the technique and should promote its application to new problems." This useful book provides a review of most aspects of DSC in the one volume. Analyse Calorimetry Dynamische Differenzkalorimetrie Kalorimetrie Thermal Analysis Thermische Analyse calorimeter calorimetry information "Overall, this is a carefully written book which I would recommend to both the novice and the experienced practitioner, whether in research or industry." The Analyst From the reviews of the second edition: "In this updated and fully revised second edition, the authors provide the newcomer and the experienced practitioner with a balanced and comprehensive insight into all important methods and aspects of Differential Scanning Calorimetry. These chapters are worthy of attention by both present and potential users of DSC. Prerequisites for reliable measurement results, optimum evaluation of the measurement curves and estimation of the uncertainties of measurement are, however, the knowledge of the theoretical bases of DSC, a precise calibration of the calorimeter and the correct analysis of the measurement curve. Share on Pinterest Researchers have shown that empathic care and empathic distress present distinct emotional maps. Writing in Neuron, researchers from the University of Colorado Boulder and colleagues describe how they developed brain markers that could predict the intensity of the two forms of empathy in volunteers as they listened to true accounts of human suffering. Wager's group, says, "There is a personal element to when a person might feel empathic care or distress, but when you're feeling them, the brain regions and brain systems as someone else might. The team also carried out an experiment to find out. The researchers found that empathic care and empathic distress are equally associated with donating to charity. The group also conducted a separate series of experiments involving another group of 200 adult volunteers, 60 (11-12), December 2004) Using brain scans, researchers found that empathic care and empathic stress have distinct patterns of activity, remain remarkably consistent between individuals. In this second edition, the authors present an in-depth discussion of the DSC for the specialist. emphasis" placed on modern techniques of evaluation, instrumentation Most of the book deals with these fundamental aspects: DSC theory is discussed for both thermal flow and power compensation instruments; temperature calibration and calorie calibration are described based on thermodynamic principles. This book" welcome addition to the available DSC theory and practice library." (R. The measured values obtained DSC allows you to determine the capacity heat, transition heat, kinetic data, purity and glass transition. glass.

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