



Standard Test Method for Reaction Induction Time by Thermal Analysis¹

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1. Scope

1.1 This test method describes the measurement of Reaction Induction Time (RIT) of chemical materials that undergo exothermic reactions with an induction period. The techniques and apparatus described may be used for solids, liquids, or slurries of chemical substances. The temperature range covered by this test method is typically from ambient to 400°C. This range may be extended depending upon the apparatus used.

1.2 The RIT is a relative index value, not an absolute thermodynamic property. As an index value, the RIT value may change depending upon experimental conditions. A comparison of RIT values may be made only for materials tested under similar conditions of apparatus, specimen size, and so forth. Furthermore, the RIT value may not predict behavior of large quantities of material.

1.3 The RIT shall not be used by itself to establish a safe operating temperature. It may be used in conjunction with other test methods (for example, [E487](#), [E537](#), and [E1981](#)) as part of a hazard analysis of a particular operation.

1.4 This test method may be used for RIT values greater than 15 min (as relative imprecision increases at shorter periods).

1.5 This test method is used to study catalytic, autocatalytic, and accelerating reactions. These reactions depend upon time as well as temperature. Such reactions are often studied by fixing one experimental parameter (that is, time or temperature) and then measuring the other parameter (that is, temperature or time). This test method measures time to reaction onset detection under isothermal conditions. It is related to Test Method [E487](#) that measures detected reaction onset temperature under constant time conditions

1.6 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.7 There is no ISO standard equivalent to this test method.

1.8 *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 consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:²

- [D3350](#) Specification for Polyethylene Plastics Pipe and Fittings Materials
- [D3895](#) Test Method for Oxidative-Induction Time of Polyolefins by Differential Scanning Calorimetry
- [D4565](#) Test Methods for Physical and Environmental Performance Properties of Insulations and Jackets for Telecommunications Wire and Cable
- [D5483](#) Test Method for Oxidation Induction Time of Lubricating Greases by Pressure Differential Scanning Calorimetry
- [D6186](#) Test Method for Oxidation Induction Time of Lubricating Oils by Pressure Differential Scanning Calorimetry (PDSC)
- [E473](#) Terminology Relating to Thermal Analysis and Rheology
- [E487](#) Test Method for Constant-Temperature Stability of Chemical Materials
- [E537](#) Test Method for The Thermal Stability of Chemicals by Differential Scanning Calorimetry
- [E967](#) Test Method for Temperature Calibration of Differential Scanning Calorimeters and Differential Thermal Analyzers
- [E968](#) Practice for Heat Flow Calibration of Differential Scanning Calorimeters
- [E1445](#) Terminology Relating to Hazard Potential of Chemicals
- [E1858](#) Test Method for Determining Oxidation Induction Time of Hydrocarbons by Differential Scanning Calorimetry
- [E1860](#) Test Method for Elapsed Time Calibration of Thermal Analyzers

¹ This test method is under the jurisdiction of ASTM Committee [E27](#) on Hazard Potential of Chemicals and is the direct responsibility of Subcommittee [E27.02](#) on Thermal Stability and Condensed Phases.

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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.