



Designation: E1860 – 07

## Standard Test Method for Elapsed Time Calibration of Thermal Analyzers<sup>1</sup>

This standard is issued under the fixed designation E1860; 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 reappraisal. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reappraisal.

### 1. Scope

1.1 This test method describes the calibration or performance confirmation of the elapsed-time signal from thermal analyzers.

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

1.3 There is no ISO standard equivalent to this method.

1.4 *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.*

### 2. Referenced Documents

2.1 *ASTM Standards:*<sup>2</sup>

[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

[E473](#) Terminology Relating to Thermal Analysis and Rheology

[E487](#) Test Method for Constant-Temperature Stability of Chemical Materials

[E691](#) Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

[E1142](#) Terminology Relating to Thermophysical Properties

[E1858](#) Test Method for Determining Oxidation Induction Time of Hydrocarbons by Differential Scanning Calorimetry

[E1868](#) Test Method for Loss-On-Drying by Thermogravimetry

[E2161](#) Terminology Relating to Performance Validation in Thermal Analysis

### 3. Terminology

3.1 *Definitions:*

3.1.1 The technical terms used in this test method are defined in Terminologies [E473](#), [E1142](#), and [E2161](#), including calibration, conformance, relative standard deviation, and thermal analysis.

### 4. Summary of Test Method

4.1 The elapsed time signal generated by a thermal analyzer is compared to a clock (or timer) whose performance is known and traceable to a national metrology institute. The thermal analyzer may be said to be in conformance, if the performance of the thermal analyzer is within established limits. Alternatively, the elapsed time signal may be calibrated using a two point calibration method.

### 5. Significance and Use

5.1 Most thermal analysis experiments are carried out under temperature ramp conditions where temperature is the independent parameter. Some experiments, however, are carried out under isothermal temperature conditions where the elapsed time to an event is measured as the independent parameter. Isothermal Kinetics (Test Methods [E2070](#)), Thermal Stability (Test Method [E487](#)), Oxidative Induction Time (OIT) (Test Methods [D3895](#), [D4565](#), [D5483](#), [E1858](#), and Specification [D3350](#) and Loss-on-Drying (Test Method [E1868](#)) are common examples of these kinds of experiments.

5.2 Modern scientific instruments, including thermal analyzers, usually measure elapsed time with excellent precision and accuracy. In such cases, it may only be necessary to confirm the performance of the instrument by comparison to a suitable reference. Only rarely will it may be required to correct the calibration of an instrument's elapsed time signal through the use of a calibration factor.

5.3 It is necessary to obtain elapsed time signal conformity only to 0.1 times the repeatability relative standard deviation

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee [E37](#) on Thermal Measurements and is the direct responsibility of Subcommittee [E37.10](#) on Fundamental, Statistical and Mechanical Properties.

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.