



Designation: E 487 – 99

## Standard Test Method for Constant-Temperature Stability Of Chemical Materials<sup>1</sup>

This standard is issued under the fixed designation E 487; 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 covers the assessment of constant-temperature stability of chemical materials that undergo exothermic reactions. The techniques and apparatus described may be used on solids, liquids, or slurries of chemical substances.

1.2 When a series of materials is tested by this method, the results permit ordering the materials relative to each other with respect to their thermal stability.

#### 1.3 Limitations of Test:

1.3.1 This test method is limited to ambient temperatures and above.

1.3.2 This test method determines neither a safe storage temperature nor a safe processing temperature.

NOTE 1—A safe storage or processing temperature requires that any heat produced by a reaction be removed as fast as generated and that proper consideration be given to hazards associated with reaction products.

1.3.3 When this test method is used to order the relative thermal stability of materials, the tests must be run under the same confinement condition (see 8.3).

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

1.5 *This standard should be used to measure and describe the properties of materials, products, or assemblies in response to heat and flame under controlled laboratory conditions and should not be used to describe or appraise the fire hazard or fire risk of materials, products, or assemblies under actual fire conditions. However, results of this test may be used as elements of a fire risk assessment which takes into account all of the factors which are pertinent to an assessment of the fire hazard of a particular end use.*

1.6 *This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety problems associated with its use. It is the responsibility of whoever uses this standard to consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee E-27 on Hazard Potential of Chemicals and is the direct responsibility of E27.02 on Thermal Stability and Condensed Phases.

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### 2. Referenced Documents

#### 2.1 ASTM Standards:

E 473 Terminology Relating to Thermal Analysis<sup>2</sup>

E 537 Test Method for Assessing the Thermal Stability of Chemicals by Methods of Thermal Analysis<sup>2</sup>

E 967 Practice for Temperature Calibration of Differential Scanning Calorimeters and Differential Thermal Analyzers<sup>2</sup>

E 968 Practice for Heat Flow Calibration of Differential Scanning Calorimeters<sup>2</sup>

E 1445 Terminology Relating to Hazardous Potential of Chemicals<sup>2</sup>

E 1860 Test Method for Elapsed Time Calibration of Thermal Analyzers<sup>2</sup>

### 3. Terminology

#### 3.1 Definitions:

3.2 *constant-temperature stability (CTS) value*—the maximum temperature at which a chemical compound or mixture may be held for a 2-h period under the conditions imposed in this test without exhibiting a measurable exothermic reaction.

3.3 The specialized terms in this standard are described in Terminologies E 473 and E1445.

### 4. Summary of Test Method

4.1 A sample of the chemical compound or mixture is placed in a glass or metal tube which is heated to a test temperature of interest. The sample temperature and heat flow or the difference between the sample temperature and the temperature of an inert reference material, are monitored over a 2-h period or until an exothermic reaction is recorded. Test temperatures are decreased in 10°C intervals until no exothermic reaction is observed in the 2-h test period.

NOTE 2—Test periods other than two 2 h may be used but shall be reported

NOTE 3—The processing times in many industrial scale unit operations (for example, drying, distillations, and the like) normally significantly exceed the 2 h time period in this CTS test procedure. Therefore, for the effective application of the CTS data for industrial scale operations, the CTS time must be extended to be greater than the processing time in the actual operation.

<sup>2</sup> Annual Book of ASTM Standards, Vol 14.02.