



Standard Guide for Assessing Thermal Stability of Materials by Methods of Accelerating Rate Calorimetry¹

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^{ε1} NOTE—Editorial corrections were made to source and reference information in December 2012.

^{ε2} NOTE—Editorial corrections were made throughout in June 2013.

INTRODUCTION

This guide is one of several standards being developed by ASTM Committee E27 for determining the physicochemical hazards of chemicals and chemical mixtures. This guide should be used in conjunction with other test methods, as a complete assessment of the hazard potential of chemicals must take into account a number of realistic factors not necessarily considered in this guide. The expression *hazard potential* as used by this committee is defined as the degree of susceptibility of material to ignition or release of energy under varying environmental conditions.

It is the intent of this guide to include any calorimetric device consistent with the principles of adiabatic calorimetry. Device-specific information and specifications are located in appendices to the guide. Any reference to specific devices in the guide are for purposes of illustration or clarity only.

1. Scope

1.1 This guide covers suggested procedures for the operation of a calorimetric device designed to obtain temperature and pressure data as a function of time for systems undergoing a physicochemical change under nearly adiabatic conditions.

1.2 This guide outlines the calculation of thermodynamic parameters from the time, temperature, and pressure data recorded by a calorimetric device.

1.3 The assessment outlined in this guide may be used over a pressure range from full vacuum to the rated pressure of the reaction container and pressure transducer. The temperature range of the calorimeter typically varies from ambient to 500°C, but also may be user specified (see 6.6).

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

1.5 *This statement 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 practices and to determine the applicability of*

regulatory limitations prior to use. Specific safety precautions are outlined in Section 7.

2. Referenced Documents

2.1 *ASTM Standards:*²

E476 Test Method for Thermal Instability of Confined Condensed Phase Systems (Confinement Test) (Withdrawn 2008)³

E487 Test Method for Constant-Temperature Stability of Chemical Materials

E537 Test Method for The Thermal Stability of Chemicals by Differential Scanning Calorimetry

E680 Test Method for Drop Weight Impact Sensitivity of Solid-Phase Hazardous Materials

E698 Test Method for Arrhenius Kinetic Constants for Thermally Unstable Materials Using Differential Scanning Calorimetry and the Flynn/Wall/Ozawa Method

E1231 Practice for Calculation of Hazard Potential Figures-of-Merit for Thermally Unstable Materials

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

¹ This guide 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.

³ The last approved version of this historical standard is referenced on www.astm.org.