



Standard Test Method for Drop Weight Impact Sensitivity of Solid-Phase Hazardous Materials¹

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^{ε1} NOTE—Editorial corrections were made to the format of the Warning notes in August 2011.

INTRODUCTION

This test method is one of several test methods being developed by ASTM Committee E27 on Hazard Potential of Chemicals. This test method is to be used in conjunction with other tests to characterize the hazard potential of chemicals.

1. Scope

1.1 This test method^{2, 3} is designed to determine the relative sensitivities of solid-phase hazardous materials to drop weight impact stimulus. For liquid-phase materials refer to Test Method D2540.

1.2 *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.*

2. Referenced Documents

2.1 *ASTM Standards*:⁴

D2540 Test Method for Drop-Weight Sensitivity of Liquid Monopropellants (Withdrawn 2003)⁵

3. Summary of Test Method

3.1 Restrictions are placed upon the ranges of impact tool masses and striking surface diameters that may be used, and a

standard sample thickness is prescribed for all tests.⁶ In addition, procedures for sample preparation and treatment, as well as procedures for detecting reactions through the use of the human senses, are outlined.

3.2 Drop-weight impact tests are to be performed using the well-known Bruceton up-and-down method.^{7, 8}

3.3 Outlined is a method for normalizing data generated on different impact apparatus.

4. Significance and Use

4.1 This test method does not require an overall rigid standardization of the apparatus. Samples are tested either unconfined or confined in confinement cups. For confined tests, some of the important cup parameters, such as cup material, cup wall thickness, and fit between the cup and the striking pin, are standardized. Data generated from unconfined and confined tests will not, in general, exhibit the same relative scale of sensitivities, and must be identified as confined or unconfined data and compared separately.

4.2 This test method applies to all testing where the intent is to establish a relative sensitivity scale for hazardous materials. It is not intended to prohibit testing process-thickness samples nor prohibit the use of other than standard tool masses and striking diameters to generate data for special purposes or for

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 This test method is a modification of and contains concepts proposed by Hercules, Inc. personnel at Allegheny Ballistics Laboratory. The method was outlined by personnel of Pittsburgh Mining and Safety Research Center, Bureau of Mines, Pittsburgh, Pa. For additional information see Footnote 3.

³ Smith, D., and Richardson, R.H., "Interpretation of Impact Sensitivity Test Data," *Pyrodynamics*, PYDYA, Vol 6, 1968, pp. 159–178.

⁴ 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.

⁵ The last approved version of this historical standard is referenced on www.astm.org.

⁶ Becker, K.R., and Watson, R.W., "A Critique for Drop Weight Impact Testing," Proceedings of the Conference on the Standardization of Safety and Performance Tests for Energetic Materials, Vol 1, September 1977, pp. 415–430. Publication ARLCD-SP-77004, U. S. Army Armament Research and Development Command, Dover, N.J.

⁷ Dixon, W. J., and Massey, F. J. Jr., *Introduction to Statistical Analysis*, McGraw-Hill Book Co., Inc., 1957, pp. 319–327.

⁸ Statistical Research Group, Princeton University, "Statistical Analysis for a New Procedure in Sensitivity Experiments," AMP Report No. 101.1R, SRG-P, No. 40, Submitted to Applied Mathematics Panel, National Defense Research Committee, July 1944, p. 58.