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**Reaffirmed by ANSI August 15, 2019**

AMERICAN NATIONAL STANDARD

# **Shock Test Requirements for Equipment in a Rugged Shock Environment**

**Secretariat:**

**Acoustical Society of America**

**Approved on June 9, 2009:**

**American National Standards Institute, Inc.**

## **Abstract**

This American National Standard is to be used for testing equipment that will be subjected to shock. It defines test requirements and severity thresholds for a large range of shock environments, including but not limited to shipping, transport, and rugged operational environments. This standard will allow vendors to better market and users to more easily identify equipment that will operate or simply survive in rugged shock environments.

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June 24, 2014

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## **Shock Test Requirements for Equipment in a Rugged Shock Environment**

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ANSI/ASA S2.62-2009

Accredited Standards Committee S2, Mechanical Vibration and Shock

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Standards Secretariat  
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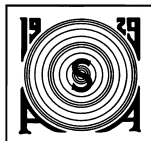
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## Foreword

[This Foreword is for information only, and is not a part of the American National Standard ANSI/ASA S2.62-2009 American National Standard Shock Test Requirements for Equipment in a Rugged Shock Environment.]

This standard comprises a part of a group of definitions, standards, and specifications for use in mechanical vibration and shock. It was developed and approved by Accredited Standards Committee S2 Mechanical Vibration and Shock, under its approved operating procedures. Those procedures have been accredited by the American National Standards Institute (ANSI). The Scope of Accredited Standards Committee S2 is as follows:

*Standards, specifications, methods of measurement and test, and terminology in the field of mechanical vibration and shock, and condition monitoring and diagnostics of machines, including the effects of exposure to mechanical vibration and shock on humans, including those aspects which pertain to biological safety, tolerance and comfort.*

This standard includes four Annexes. Annexes A and B are normative and considered to be a part of this standard. Annexes C and D are informative and not considered part of this standard.

Accompanying this standard are two ZIP files which contain graphs in ASCII format. These graphs are electronic versions of the ones included in this standard. The standard asks the user to present his/her test data overlaid against the severity thresholds, to make sure the test meets the specified threshold. Having electronic versions of the threshold graphs makes it much easier for the user to present his/her data in the shock test report. These files are provided for the convenience of the user. Use of these graphs is not required for conformance with the Standard.

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Working Group S2/WG 13, Shock Test Requirements for Shelf-Mounted and Other Commercial Electronic Systems, which assisted Accredited Standards Committee S2, Mechanical Vibration and Shock, in the development of this standard, had the following membership.

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Suggestions for improvements of this standard will be welcomed. They should be sent to Accredited Standards Committee S2, Mechanical Vibration and Shock, in care of the Standards Secretariat of the

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## **Introduction**

This standard provides shock test parameters for testing a broad range of equipment, which will ensure inherent levels of shock resistance. The severity thresholds herein can be associated with specific shock environments and should be chosen for a given application on a case-by-case basis. The intent of the standard's requirements is to outline those elements necessary for verification of a successful and accurate shock test, but not the specific method. This standard will allow vendors to better market and users to more easily identify equipment that will operate or simply survive in rugged shock environments.

## American National Standard

# Shock Test Requirements for Equipment in a Rugged Shock Environment

## 1 Scope

This American National Standard defines graduated thresholds of shock severity for equipment whose normal use subjects it to some amount of shock. The shock severity thresholds are defined by drop height and shock pulse (type and width) or, alternatively, by velocity change and pseudo velocity shock response spectra. This standard requires that data be measured during a test to verify that a test shock is intense enough to meet a given shock severity threshold. This standard includes test requirements and guidelines to ensure adequate and accurate test results.

## 2 Terms and Definitions

For the purposes of this standard, the terms and definitions given in ANSI S2.1-2000 and the following apply:

**2.1 damage.** Failure criterion characterized by permanent degradation in physical appearance that is unrelated to operational performance [*i.e.*, damaged structural joint(s) resulting in snap-fit fractures, but not impairing system/component operation].

**2.2 drop shock machine.** A shock machine that “include[s] a carriage (or table) on which the item under test is mounted; the carriage can be hoisted up to some required height and dropped onto an anvil. Guides are provided to keep the carriage properly oriented...Programming devices, placed upon the point of impact of the anvil, can be used to control the acceleration vs. time characteristic and the shape of the acceleration pulse”[1].

There are many variants of drop shock machines, two of which are shown in Figure 1 and Figure 2. Figure 1 shows a vertical drop-table shock machine, which is more common and described in the definition above. Figure 2 shows an arc drop shock machine, which accomplishes the drop by swinging the equipment through an arc in the vertical plane. The drop height for this type of drop machine is defined as the vertical component of the arc before it is dropped, which is labeled as “h” in Figure 2.

**2.3 four coordinate paper (4CP).** Also known as tripartite paper. A more in-depth explanation can be found in Annex D.