

IEEE Standard for Environmental Specifications for Computer Systems

Sponsor

**Microprocessor and Microcomputer Standards Subcommittee
of the
IEEE Computer Society**

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Abstract: This standard is designed for use in conjunction with other documents such as the IEEE 1101 group of standards, the IEEE 896 group of standards, the IEEE 1596 group of standards, the IEEE 1014 group of standards, and ISO/IEC 10861: 1994. This standard is one of the IEEE P1156.x series for environmental specifications. It is intended to be used as a core specification. It contains minimum environmental withstand conditions applicable to computer systems and all of their associated components. It has been created to provide general environmental withstand conditions for one or more of the above listed computer busses or interconnect standards, and electronic equipment in general.

Keywords: atmospheric stress, computer systems, conducted immunity, corrosion, drop heights, earthquake protection, electrical stress, electromagnetic induction (EMI), electrostatic discharge (ESD), environmental specifications, environmental testing, environmental withstand, fire resistance, flammability, humidity, mechanical stress, performance level qualification, shock, sinusoidal vibration, thermal shock, thermal testing, vibration

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Introduction

(This introduction is not part of IEEE Std 1156.2-1996, IEEE Standard for Environmental Specifications for Computer Systems.)

With the introduction of numerous standards for computer hardware, components, circuit packs, backplanes, systems, etc., the Microprocessor and Microcomputer Standards Subcommittee of the IEEE Computer Society found it appropriate to write a separate standard for core environmental withstand conditions for computers.

This standard provides design engineers and system engineers with requirements for core environmental conditions that computer systems should be able to withstand, depending upon their environment. These include (but are not limited to) thermal, atmospheric, shock, vibration, flammability, and corrosion stresses during storage and operation.

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IEEE Standard for Environmental Specifications for Computer Systems

1. Overview

This standard contains fundamental information on minimum environmental withstand conditions. It is intended to be used in those cases where a generic or detailed specification for a certain system has been prepared. This standard is intended to achieve uniformity and reproducibility in the test conditions for all systems that are purported to have a rated environmental performance level.

The terms *environmental withstand* and *environmental testing* cover the natural and artificial environments to which systems may be exposed so that an assessment of their performance can be made under conditions of use, transport, and storage to which they may be exposed in practice. These conditions include (but are not limited to) thermal, mechanical, electrical, flammability, corrosion, and atmospheric stresses.

The requirements for the performance of the systems are not listed in this standard. The relevant specification for the system under test defines its minimum permissible performance limits.

A list of suggested tests for electronic equipment is given in Appendix A of IEC 512-1 (1994).¹ Particular test sequences shall be specified in the relevant system document detailed specification.

1.1 Scope

This standard is designed for use in conjunction with other standards such as the IEEE 1101 group of standards (Mechanical Specification for Microconnectors and Eurocard Form Factors), the IEEE 896 group of standards (Futurebus+®), the IEEE 1596 group of standards (Scalable Coherent Interface), the IEEE 1014 group of standards (VMEBus), and ISO/IEC 10861: 1994 (MULTIBUS II).

This standard is one of the IEEE P1156.x series for environmental specifications. It is intended to be used as a core specification. It contains minimum environmental withstand conditions applicable to computer systems and all of their associated components. It has been created to provide general environmental withstand conditions for one or more of the above listed computer busses or interconnect standards, and electronic equipment in general.

¹Information on references can be found in clause 2.

While this standard was specifically created for use with IEEE Computer Society bus standards, nothing herein is intended to restrict its use for other applications, where applicable. A supplier and user may agree to more or less restrictive environmental specifications than those listed below. However, if their specifications are less restrictive than those listed herein, neither supplier nor user may claim conformance to this standard.

1.2 Purpose

It is the purpose of this standard to provide a core specification for physical integrity and environmental performance levels for computer systems.

It is the responsibility of the system designer to evaluate the relationship between module- and component-level environmental specification and the system-level environmental specification for the enclosure that contains the modules. For example, the modules are conduction or convection cooled and a system-level thermal “model” is required to determine the relationship and compatibility between the module’s heat sink and the system-level cooling medium.

2. References

This standard shall be used in conjunction with the following list of documents, which form a part of this standard to the extent specified herein. In all cases, the most recent edition of the listed standard shall be used. The following standards shall be used in conjunction with the detailed specification of the system to be tested. The detailed specification prescribes the tests to be used to ensure that the tested system conforms to the performance levels listed herein.

ANSI T1.307-1990, Telecommunications—Fire Resistance Criteria—Part I: Ignitability Requirements for Equipment Assemblies, and Fire Spread Requirements for Interconnection Wire and Cable Distribution Assemblies.²

ANSI T1.319-1995, Telecommunications—Fire Resistance Criteria—Part II: Fire Propagation Hazard Testing Procedure for Equipment Assemblies.

ANSI T1.329-1995, Telecommunications—Network Equipment—Earthquake Resistance.

ASTM B-827-92, Practice for Conducting Mixed Flowing Gas (MFG) Environmental Tests.³

Federal Communications Commission (FCC) Rules, Part 15.⁴

IEC 68-2-1 (1990), Environmental Testing, Part 2: Test A: Cold.⁵

IEC 68-2-2 (1974), Environmental Testing, Part 2: Test B: Dry heat.

IEC 68-2-6 (1995), Environmental Testing, Part 2: Test Fc: Vibration (sinusoidal).

²ANSI publications are available from the Sales Department, American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY 10036, USA.

³ASTM publications are available from the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, USA.

⁴This publication is available from the Superintendent of Documents, U.S. Government Printing Office, P.O. Box 37082, Washington, DC 20013-7082, USA.

⁵IEC publications are available from IEC Sales Department, Case Postale 131, 3, rue de Varembe, CH-1211, Genève 20, Switzerland/Suisse. IEC publications are also available in the United States from the Sales Department, American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY 10036, USA.