

# CTA Bulletin

**Recommended Loudspeaker Safety  
Practices – An Industry Guideline**

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**September 2014**



**Consumer  
Technology  
Association**

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(Formulated under the cognizance of the CTA **R3 Audio Systems Committee**.)

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## FOREWORD

The current version of this bulletin was developed under the auspices of the Consumer Electronics Association (CEA) R1 Product Safety & Compliance Committee.

This document is intended to provide a guide to manufacturers wishing to test their loudspeaker products and components for the existence of specific safety concerns. Loudspeaker specifications and tests that relate to specific safety issues are provided for consideration but may not be inclusive. Accordingly, this document cannot be used as the ultimate standard for loudspeaker safety. These guidelines should be used in conjunction with the manufacturer's own safety specifications and testing program or may form the basis of a safety specifications and testing program if none is actively in place.

In addition to the guidelines themselves, this document contains background information on loudspeaker safety. For example, the reasons for some of the test conditions are given.

Loudspeaker performance is not covered in this document since this is covered in; EIA-426, Loudspeaker Optimum Amplifier Standard, the international standard IEC-60268-5, Sound System Equipment – Part 5: Loudspeakers, and in other documents.

The general approach used in this document is a systems approach. That is, the function of the entire system is the primary concern rather than the hazard potential of individual components or materials. However, some specifications and testing recommendations for individual components are included as a matter of course, as they relate to safety and quality control issues.

Many tests given in this document may be inherently hazardous and thus adequate safeguards for testing personnel and property should be employed while conducting such tests.

In using this document as a guide for determining the potential hazard of loudspeaker products, please note that all sections are interrelated and thus the whole document should be used in concert. For Example: Section 5 indicates that goods in shipment are exposed to temperatures between +65°C (150°F) and -30 °C (-22°F) and relative humidity as high as 95%. These extremes should be considered when choosing materials that are given the flammability tests described in Section 6.1.

The first draft of this document was written by the EIA/CEG/R-1 Product Safety Committee in 1987. The second draft was revised and expanded by the combined efforts of the EIA/CEG/R-1 Product Safety Committee and the National Sound & Communications Association (NSCA) Product Safety Group in 1994 and published as an EIA standard. These groups no longer exist in their previous forms, and NSCA was not involved in the latest revision of this bulletin.

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# Recommended Loudspeaker Safety Practices

## An Industry Guideline

### 1 Scope

This document applies to any loudspeaker assembly that is:

- a) Designed to produce acoustic energy for any communications or entertainment purpose. The acoustic energy is radiated into an *air* medium, indoors or outdoors.
- b) For consumer, commercial, or professional use.
- c) For use with internal or external sources of amplification. For internal amplification, see Section 14.

Tests described within this document are to be performed on products that have the same physical properties of materials and the same mechanical characteristics as the product to be marketed.

This document applies to a loudspeaker assembly designed to handle 15 watts continuous and over, however a manufacturer may use this document for testing a speaker(s) rated less than 15 watts.

The units of measure used in this document are primarily ISO metric and generally followed with parenthetical approximate equivalents in U.S. units. This document deviates from this format where the referenced source for the measurement is specified in U.S. units only.

### 2 References

#### 2.1 References

The following documents contain information that is useful in understanding this bulletin. Some of the standards listed contain provisions that, through reference in this text, constitute provisions of this bulletin. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this bulletin are encouraged to investigate the possibility of applying the most recent editions of the reference standards listed. Regional or national deviations of the standards listed below may exist and should be consulted if the product is to target a particular foreign market.

- ANSI Z535.4-2002 Product Safety Signs and Labels
- ANSI/UL 1419-2005, Standard for Professional Video and Audio Equipment.
- ANSI/UL 1480-2005, Standard for Speakers for Fire Alarm, Emergency, and Commercial and Professional Use.
- ANSI/UL 60065-2003, Standard for Audio, Video and Similar Electronic Apparatus – Safety Requirements
- ANSI/UL 723-96 (ASTM E-84-2001) Test for Surface Burning Characteristics of Building Materials

- ANSI/UL 746A- 2000, Standard for Polymeric Materials - Short Term Property Evaluations
- ANSI/UL 746C-2004, Standard for Polymeric Materials – Use in Electrical Equipment Evaluations.
- ANSI/UL 813-1999, Standard for Commercial Audio Equipment <sup>1</sup>
- ANSI/UL 94-2003, Standard for Tests for Flammability of Plastic Materials for Parts in Devices and Appliances.
- ASTM E119-98 Fire Tests of Building Construction and Materials
- CAN/CSA C22.2 60065-03 Standard for Audio, Video and Similar Electronic Apparatus – Safety Requirements
- IEC-417-2002 (ISO/IEC 60417) Graphical symbols for use on equipment
- IEC-60065-2002 Standard for Audio, Video and Similar Electronic Apparatus – Safety Requirements
- ISO 7000; 2004 Graphical Symbols for use in Equipment Index and Synopsis – 3<sup>rd</sup> Edition
- NFPA-90A- 2002, Installation of Air Conditioning and Ventilating Systems
- NFPA 251, Standard Methods of Tests of Fire Endurance of Building Construction and Materials
- NFPA 255 Standard Method of Test of Surface Burning Characteristics of Building Materials
- NFPA 70, National Electrical Code 2005, Article 640, “Audio Signal Processing, Amplification and Reproduction Equipment”
- UL 263 Fire Tests of Building Construction and Materials, a test standard for fire-rated ceiling systems.
- UL 1492-1996, Audio-Video Products and Accessories <sup>1</sup>
- UL 2043-1996, 2<sup>nd</sup> Edition, Fire Test for Heat and Visible Smoke Release for Discrete Products and Their Accessories Installed in Air-Handling Spaces
- UL-60950 Safety of Information Technology Equipment
- UL 1694-2004, Standard for Tests for Flammability of Small Polymeric Component Materials
- CEA-426-B, Loudspeakers, Optimum Amplifier Power, July 1998.
- IEC 61032, Ed. 2-1997 Protection of persons and equipment by enclosures - Probes for verification

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<sup>1</sup> These referenced standards are expected to be made obsolete in the year 2010 and replaced by UL 60065.

## 2.2 Acquisition of Referenced Documents

### ANSI Standards:

Global Engineering Documents<sup>2</sup>, World Headquarters, 15 Inverness Way East, Englewood, CO USA 80112-5776; Phone 303-397-7956 or 800-854-7179; Fax 303-397-2740; URL: <http://global.ihs.com>; Email: [global@ihs.com](mailto:global@ihs.com)

### ASTM Standards:

ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA, 19428-2959 USA Phone: (610) 832-9585 Fax: (610) 832-9555 <http://www.astm.org/>

### CEA Standards:

Global Engineering Documents, World Headquarters, 15 Inverness ay East, Englewood, CO USA 80112-5776; Phone 303-397-7956 or 800-854-7179; Fax 303-397-2740; Internet URL: <http://global.ihs.com>; Email: [global@ihs.com](mailto:global@ihs.com)

### CSA Standards:

Canadian Standards Association, 5060 Spectrum Way, Suite 100, Mississauga, Ontario L4W 5N6 Canada; Phone: 800-463-6727 or 416-747-4000; Fax: 416-747-2473; URL: <http://www.csa.ca>; Email: [sales@csa.ca](mailto:sales@csa.ca)

### IEC Standards:

International Electrotechnical Commission, 3 rue de Varembe, P.O. Bo x 131, CH-1211 Geneva 20, Switzerland; Phone: +41 22 919 02 11; Fax: +41 22 919 03 00; URL: <http://www.iec.ch>; Email: [info@iec.ch](mailto:info@iec.ch)

### ISO Standards:

International Organization for Standardization, 1 rue de Varembe, P.O. Box 56, CH-1211 Geneva 20, Switzerland; Phone: +41 22 749 0111; Fax: +41 22 733 34 30; URL: <http://www.iso.org>; Email: [central@iso.org](mailto:central@iso.org)

### NFPA Standards:

National Fire Protection Association, 1 Batterymarch Park, Quincy, Massachusetts, USA 02169-7471; Phone: +1 617 770-3000; Fax: +1 617 770-0700; URL: <http://www.nfpa.org>; Email: [custserv@nfpa.org](mailto:custserv@nfpa.org)

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<sup>2</sup> Many standards listed by other standards developing organizations are also available from Global Engineering Documents

## UL Standards:

COMM 2000, 1414 Brook Drive, Downers Grove, IL 60515, USA; Phone: 888-853-3503; Fax +1 630-932-7312; URL: <http://www.comm-2000.com/>; Email: [orders@comm-2000.com](mailto:orders@comm-2000.com);

**3 Glossary****3.1 Acronyms**

5V	a vertical burn rating defined in UL94
AHJ	Authority Having Jurisdiction
ANSI	American National Standards Institute
AS	Australian Standard
ASTM	American Society for Testing and Materials
BS	British Standard
CD	Committee Draft
CEA	Consumer Electronics Association
CEG	Consensus Electrical Group
CSA	Canadian Standards Association
DS	Danish Standards
EIA	Electronics Industries Alliance
EN	European Norm
HB	a horizontal burn rating, defined in UL 94
HBF	a horizontal burn rating, defined in UL 94
HF-0	Horizontal Flammability - used in ratings for foam, defined in UL 94
HF-1	Horizontal Flammability - used in ratings for foam, defined in UL 94
HF-2	Horizontal Flammability - used in ratings for foam, defined in UL 94
IEC	International Electrotechnical Commission
ISO	International Organization for Standardization
LOPD	Loudspeaker Overload Protective Device
NFPA	National Fire Protection Association
NSCA	National Systems Contractors Association (formerly National Sound & Communications Association)
PLC	Performance Level Class
R.H.	Relative Humidity
SC-0	a small components rating defined in UL 1694
SC-1	a small components rating defined in UL 1694
SC-TC0	a small components rating defined in UL 1694
SC-TC1	a small components rating defined in UL 1694
SP-2	a stranded pair construction type, defined in UL 1694
SPT-1	a stranded pair thermoplastic type, defined in UL 1694
SPT-2	a stranded pair thermoplastic type, defined in UL 1694
UL	Underwriters Laboratories Inc.
V RMS	Volts Root Mean Square
V-0	a vertical burn rating defined in UL94
V-1	a vertical burn rating defined in UL94
V-2	a vertical burn rating defined in UL94