UL 2416

STANDARD FOR SAFETY

Audio/Video, Information and Communication Technology Equipment Cabinet, Enclosure and Rack Systems

UL Standard for Safety for Audio/Video, Information and Communication Technology Equipment Cabinet, Enclosure and Rack Systems, UL 2416

First Edition, Dated March 11, 2015

Summary of Topics

This revision of ANSI/UL 2416 dated October 2, 2020 includes the following:

- ***Modified definition of Enclosure; 4.5***
- ***Updated references for spacings; 6.10.1***
- ***Refinement of effectively grounded marking requirement; 7.4.3, 7.4.4***
- ***Revision of Functional Earthing (Grounding) marking; Section 7.5***
- ***Clarification on reference to UL 62368-1 for Indoor Locations; 9.1.3.1***
- ***Additional UL 62368-1 alternative for Outdoor Enclosures; 9.1.4.1***
- ***Clarification on condensation and drain holes; 10.2.3.5***
- ***Editorial revision of ITE (Computer) Room application requirement; 12.3.1***
- ***Refinement of Openings in Vertical Surfaces Requirements to promote consistent application; Section 12.5.2***
- ***Clarification on treatment of pryout holes; 12.5.3.4***
- ***Clarification on allowed application of Bottom Opening requirements to promote consistent application; 12.5.4.1, 12.5.4.3, 12.5.4.4, 12.5.4.5***
- ***Clarification on Overcurrent Protection; 13.4.1***
- ***Clarification on application of Temperature Test; 15.3.1, 15.3.2***
- ***Clarification on Installation Markings; 16.4.4***
- ***Clarification on Installation Instructions; 16.7.8***
- ***Miscellaneous Updates to UL 2416 to address areas needing further refinement; 3.56***
- ***Additional option for enclosure venting of battery compartments; 13.5.2.1A***
- ***Clarification on Battery Supply Performance; 13.7.2, 13.7.3***

Text that has been changed in any manner or impacted by UL's electronic publishing system is marked with a vertical line in the margin.

The new and revised requirements are substantially in accordance with Proposal(s) on this subject dated June 12, 2020, July 31, 2020, and August 21,2020.

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Standard for Audio/Video, Information and Communication Technology Equipment Cabinet, Enclosure and Rack Systems

First Edition

March 11, 2015

This ANSI/UL Standard for Safety consists of the First Edition including revisions through October 2, 2020.

The most recent designation of ANSI/UL 2416 as an American National Standard (ANSI) occurred on September 28, 2020. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, and Title Page.

Comments or proposals for revisions on any part of the Standard may be submitted to UL at any time. Proposals should be submitted via a Proposal Request in UL's On-Line Collaborative Standards Development System (CSDS) at https://csds.ul.com.

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INTRODUCTION

1 Scope

1.1 This Standard covers requirements for Audio/Video, Information and Communication Technology Equipment Cabinet, Enclosure and Rack Systems. For the purpose of this Standard cabinet, enclosure and rack systems are all referred to as “enclosure systems.”

1.2 Enclosure systems are not complete equipment but include components and sub-assemblies that are intended to power, protect, heat, cool or otherwise support information technology (IT), telecommunications, audio/video (A/V) and similar equipment that will be installed at a later time. They usually include mounting hardware, shelves or space for the installation of the additional equipment. These enclosure systems are intended to be used by manufacturers in the construction of complete A/V, IT and communications equipment, or by service providers and other qualified installers for the installation of network infrastructure equipment or communications and multi-media systems equipment.

1.3 This Standard assumes that the final installation of equipment into the enclosure system will be performed by qualified service personnel in accordance with the applicable installation instructions, installation practices and national installation codes. As appropriate, this equipment should be installed in accordance with ANSI/NFPA 70, National Electrical Code (NEC), and/or the applicable sections of ANSI/IEEE C2, National Electrical Safety Code (NESC). Equipment intended for installation in information technology equipment (computer) rooms should be installed in accordance with NFPA 75, Standard for the Protection of Information Technology Equipment.

1.4 Enclosure systems by their very nature are intended to house equipment that is not specified by the enclosure system manufacturer and whose construction and characteristics are largely unknown. As such, in some cases these requirements include additional or supplementary safeguards beyond those normally required by general equipment standards where the final configuration is well defined and risks can be reduced to an acceptable level by a thorough evaluation of the design and testing.

1.5 These requirements do not cover enclosures for modular data centers. Equipment of this type shall be investigated under the requirements in the Outline of Investigation for Modular Data Centers, UL 2755.

1.6 These requirements do not cover exhaust chimneys and other air management systems that connect to environmental air systems in buildings. Equipment of this type shall be investigated under the requirements in the Standard for Heating and Cooling Equipment, UL 1995, and the Outline of Investigation for Drop-Out Ceilings Installed Beneath Automatic Sprinklers, UL 723S.

Note: Environmental air systems include ducts specifically designed for environmental air and other spaces used for environmental air (plenums) that may not be specifically fabricated for environmental air-handling purposes but are used for air-handling purposes as a plenum. The space over a hung ceiling used for environmental air-handling purposes is an example of this type of other space.

1.7 It is the responsibility of the Authority Having Jurisdiction over the final installation to determine if the final configuration meets the necessary criteria for installation and use.

2 Units of Measurement

2.1 Values stated without parentheses are the requirement. Values in parentheses are explanatory or approximate information.

3 References

3.1 Any undated reference to a code or standard appearing in the requirements of this standard shall be interpreted as referring to the latest edition of that code or standard.

3.2 The standards specified in 3.3 – 3.56 contain provisions, which, through referenced in this Standard, constitute provisions of this Standard.

3.3 The National Electrical Safety Code, ANSI/IEEE C2. See 6.2.8.

3.4 Safety glazing materials used in buildings – safety performance specifications and methods of test, ANSI Z97.1. See 9.3.3.

3.5 The Standard Test Method for Surface Burning Characteristics of Building Materials, ASTM E84. See 12.2.1.

3.6 The Standard Test Method for Weight [Mass] of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings, ASTM A90/A90M. See B1.4 and B1.5.

3.7 The Standard Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source, ASTM E162. See 12.2.1.

3.8 The Standard Specification for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for, ASTM A568/A568M. See B1.4 and B1.5.

3.9 Mechanical Structural Issues, ATIS 0600006. See 11.1.7.2.

3.10 Temperature, Humidity, and Altitude Requirements for Network Telecommunications Equipment Utilized in Outside Plant Environments, ATIS 0600010.01. See 15.3.1.

3.11 Network Equipment – Earthquake Resistance, ATIS 0600329. See 11.1.7.2.

3.12 The Code of Federal Regulations (CFR), Title 21. See 16.6.1, 16.6.3, 16.6.6, and 16.6.7.

3.13 Telcordia Generic Requirements for Electronic Equipment Cabinets, GR-487-CORE. See 10.2.4.1 and 10.2.5.3.

3.14 Generic Requirements for Fiber Optic Splice Closures, GR-771-CORE. See 12.6.1.

3.15 Telcordia Generic Requirements for Optical Network Unit (ONU) Closures and ONU Systems, GR-950-CORE. See 10.2.5.3.

3.16 Graphical symbols for use on equipment, IEC 60417. See 7.5.1 and Figure 7.1.

3.17 Safety of laser products – Part 1: Equipment classification and requirements, IEC 60825-1. See 16.6.3, 16.6.4, 16.6.6, and 16.6.7.

3.18 The National Electrical Code (NEC), ANSI/NFPA 70. See 6.3.1, 6.5.4, 6.8.1, 6.8.3, 6.9.1, 7.1.3, 7.2.1, 8.1.1, 8.1.4, and 12.4.3.2.

3.19 The Standard for the Fire Protection of Information Technology Equipment, NFPA 75. See 12.3.1 – 12.3.3.

3.20 The Standard for Surface Raceways and Fittings for Use with Data, Signal, and Control Circuits, UL 5C. See 12.1.8.

3.21 The Standard for Enclosures for Electrical Equipment, Non-Environmental Considerations, UL 50. See 6.4.3, 9.1.3.1, 9.1.3.2, 9.1.4.1, 9.2.5, and 9.3.3.