National Differences For

UL 62368-1

Audio/video, information and communication technology equipment - Part 1: Safety requirements

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Edition: 1

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This revision of ANSI/UL 62368-1 is being issued correct an error in the IEC copyright information for UL in the Preface. No changes in requirements are involved.

As noted in the Commitment for Amendments statement located on the back side of the title page, UL and CSA are committed to updating this harmonized standard jointly. However, the revision pages dated March 8, 2012 will not be jointly issued by UL and CSA as these revision pages only address updating an error in the IEC copyright information for UL in the Preface.

UL 62368-1 is an adoption of IEC 62368-1, Audio/video, information and communication technology equipment – Part 1: Safety requirements (First Edition, issued January 2010).

This document provides a single listing of the National Differences included in the UL adoption of the corresponding IEC standard.

Preface

This document provides a single listing of the technical National Differences included in the UL adoption of the corresponding IEC standard.

In its IEC-based standards, UL uses the notations indicated below to identify national difference type, and these types are additionally noted in this document. The standard may not use all types of these deviations.

D1 - These are deviations which are based on basic safety principles and requirements, elimination of which would compromise safety for U.S. consumers and users of products.

D2 - These are deviations based on safety practices. These are deviations for IEC requirements that may be acceptable, but adopting the IEC requirements would require considerable retesting or redesign on the manufacturer's part.

DC - These are deviations based on the component standards and will not be deleted until a particular component standard is harmonized with the IEC component standard.

DE - These are deviations based on editorial comments or corrections.

DR - These are deviations based on the national regulatory requirements.

Each national difference contains a description of what the national difference entails. Typically one of the following words is used to explain how the text of the national difference is to be applied to the base IEC text:

Addition / Add - An addition entails adding a complete new numbered clause, subclause, table, figure, or annex. Addition is not meant to include adding select words to the base IEC text.

Deletion / Delete - A deletion entails complete deletion of an entire numbered clause, subclause, table, figure, or annex without any replacement text.

Modification / Modify - A modification is an altering of the existing base IEC text such as the addition, replacement or deletion of certain words or the replacement of an entire clause, subclause, table, figure, or annex of the base IEC text.

National Differences

1DV.1 DR *Modify Clause 1 by adding the following text:*

1DV.1.1 This standard also is applicable to equipment designed to be installed in accordance with the Canadian Electrical Code, Part I, C22.1-09; Canadian Electrical Code, Part II, General Requirements, CAN/CSA C22.2 No. 0-10; the National Electrical Code, NFPA 70-2011; and the National Electrical Safety Code, IEEE C2-2007.

1DV.1.2 The standard is also applicable to equipment, when identified by a marking or instruction [see Annex DVK (Annex DVA, Clause 1)], designed to be installed in accordance with Article 645 of the National Electrical Code, NFPA 70-2011, and the Standard for the Protection of Information Technology Equipment, NFPA 75-2009.

1DV.1.3 See Annex DVA for requirements and references to regulatory requirements that apply to this equipment, as applicable.

1DV.2 D2 *Modify Clause 1 by adding the following text:*

1DV.2.1 This standard includes additional requirements for equipment used for entertainment purposes intended for installation in general patient care areas of health care facilities. See Annex DVB.

1DV.2.2 This standard includes additional requirements for equipment intended for mounting under kitchen cabinets. See Annex DVC.

1DV.2.3 This standard does not apply to equipment having Remote Feeding Telecommunication (RFT) circuits. Equipment having RFT circuits is covered by CSA/UL 60950-21.

1DV.2.4 Additional requirements may apply to large data storage equipment. Refer to CSA/UL 60950-23.

1DV.3 DE *Modify Clause 1 by replacing the sixth paragraph and Note 3 with the following:*

1DV.3.1 For equipment intended for outdoor installation, additional requirements may apply.

NOTE 3 Information and communication technology equipment that is intended for use outdoors is covered by CSA/UL 60950-22. Audio/video equipment that is intended for use outdoors is covered by the relevant requirements in CSA C22.2 No. 60065 or UL 60065.

1DV.4 DC *Modify Clause 1 by adding the following text:*

1DV.4.1 Power Distribution Equipment and Sub-Assemblies

1DV.4.1.1 This standard also is applicable to power distribution sub-assemblies connected to a mains used to distribute power entirely within a system of equipment also covered by this standard, such as power distribution units (PDUs) in the form of cord-connected power strips and shelves with multiple power outlets (receptacles) and intended to be installed in system racks, cabinets, home entertainment centers, etc.

1DV.4.1.2 For equipment covered by this standard that incorporates components and sub-assemblies that perform a power distribution and control function covered by other standards, such as panelboards, load transfer equipment, or uninterruptible power systems utilized in power conditioners and computer power centers, this standard only may be used for investigation of safety for those aspects not covered by the other standards.

1DV.4.1.3 This standard also does not apply to stand-alone equipment used for distribution of mains power that is covered by individual power distribution equipment standards.

1DV.4.1.4 Based on the specific function, the following requirements are applicable to the stand-alone distribution equipment, or apply additionally to power distribution sub-assemblies and components of equipment covered by this standard, as described in 1DV.4.1.2 and 1DV.4.1.3:

– For Industrial Control Equipment, see CSA C22.2 No. 14-10 Eleventh Edition and UL 508 Seventeenth Edition.

– For Panelboards, see CSA C22.2 No. 29-11 Fifth Edition and UL 67 Twelfth Edition.

– For Switchboards, see CSA C22.2 No 244-05 First Edition and UL 891 Eleventh Edition.

– For Transfer Switch Equipment, see CSA C22.2 No 178.1-07 First Edition and UL 1008 Fifth Edition.

– For Uninterruptible Power Systems, see CSA C22.2 No. 107.3-05 Second Edition and UL 1778 Fourth Edition.

– For Power Distribution Centers for Communications Equipment, see UL Subject 1801.

– Other forms of power distribution units for general applications, such as,

• Relocatable Power Taps, CSA-C22.2 No. 21-1995, Cord Sets and Power Supply Cords, and UL 1363, Relocatable Power Taps.

• Cord connected Surge Protective Devices, CSA Technical Information Letter No. A-24, Interim Certification Requirements for AC Line Connected Wiring Devices with Varistors, and UL 1449, Surge Protective Devices.

- **Furniture Power Distribution Units, CSA-C22.2 No. 21-1995, Cord Sets and Power Supply Cords and UL 962A, Furniture Power Distribution Units.**

NOTE 1 It is assumed that power distribution equipment covered by the scope of this Standard is interconnected to the "Outlet" of a "Branch Circuit" as defined in Section 0 of the CEC and Article 100 of the NEC. In the case of cord-connected equipment, the Outlet is the Receptacle associated with the building wiring. In the case of permanently connected equipment, the Outlet is the interface between the Branch Circuit conductors associated with the building wiring and the input terminals, pressure connectors, or leads associated with the power distribution equipment covered in whole or part by this standard.

NOTE 2 The following are common definitions of the hardware with related functions that require additional investigation to the appropriate Canadian and U.S. standards.

Industrial Control Panel – An assembly of two or more components consisting of one of the following:

(1) Power circuit components only, such as motor controllers, overload relays, fused disconnect switches, and circuit breakers

(2) Control circuit components only, such as pushbuttons, pilot lights, selector switches, timers, switches, control relays

(3) A combination of power and control circuit components

These components, with associated wiring and terminals, are mounted on or contained within an enclosure or mounted on a subpanel. The industrial control panel does not include the controlled equipment.

Panelboard – A single panel or group of panel units designed for assembly in the form of a single panel, including buses and automatic overcurrent devices, and equipped with or without switches for the control of light, heat, or power circuits; designed to be placed in a cabinet or cutout box placed in or against a wall, partition, or other support; and accessible only from the front.

Switchboard – A large single panel, frame, or assembly of panels on which are mounted on the face, back, or both, switches, overcurrent and other protective devices, buses, and usually instruments. Switchboards are generally accessible from the rear as well as from the front and are not intended to be installed in cabinets.

Transfer Switch – An automatic or nonautomatic device for transferring one or more load conductor connections from one power source to another.

Uninterruptible Power Supply – A power supply used to provide alternating current power to a load for some period of time in the event of a power failure.

2DV.1 DE *Modify Clause 2 by adding the following NOTE:*

NOTE See also 4.1.1DV.1.

2DV.2 DE *Modify Clause 2 by adding the following references:*

ANSI/ASA S3.25-1989,
American National Standard for Occluded Ear Simulator

ASTM E 84,
Standard Test Method for Surface Burning Characteristics of Building Materials

ASTM E 162,
Standard Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source

CSA C22.1,
Canadian Electrical Code, Part I

CAN/CSA C22.2 No. 0,
Canadian Electrical Code, Part II, General Requirements

CSA C22.2 No. 0.12,
Wiring Space and Wire Bending Space in Enclosures for Equipment Rated 750 V or Less

CSA C22.2 No. 14,
Industrial Control Equipment

CSA C22.2 No. 21,
Cord Sets and Power Supply Cords

CSA C22.2 No. 29,
Panelboards and enclosed panelboards

CSA C22.2 No. 31,
Switchgear Assemblies

CSA C22.2 No. 42,
General use receptacles, attachment plugs, and similar wiring devices

CAN/CSA C22.2 No. 94,
Special Purpose Enclosures

CAN/CSA C22.2 No. 94.2,
Enclosures for Electrical Equipment, Environmental Considerations

CSA C22.2 No. 107.3,
Uninterruptible Power Systems

CSA C22.2 No. 178.1,
Requirements for Transfer Switches

CSA C22.2 No. 205,
Signal Equipment

CAN/CSA C22.2 No. 226,
Protectors in Telecommunication Networks

CSA C22.2 No. 233,
Cords and cord sets for communication systems

CSA C22.2 No. 244,
Switchboards

CAN/CSA C22.2 No. 60065,
Audio, Video and Similar Electronic Apparatus – Safety Requirements

CAN/CSA C22.2 No. 60601-1,
Medical Electrical Equipment – Part 1-1: General Requirements for Safety

CAN/CSA C22.2 No. 60950-1,
Information Technology Equipment – Safety – Part 1: General Requirements

CAN/CSA C22.2 No. 60950-21,
Information Technology Equipment – Safety – Part 21: Remote Power Feeding

CAN/CSA C22.2 No. 60950-22,
Information Technology Equipment – Safety – Part 22: Equipment to be Installed Outdoors

CAN/CSA C22.2 No. 60950-23,
Information Technology Equipment – Safety – Part 23: Large Data Storage Equipment

CSA CAN3-C235,
Preferred Voltage Levels for AC Systems, 0 to 50 000 V

CAN/CSA-E60825-1,
Safety of laser products – Part 1: Equipment classification, requirements and user's guide

CSA Technical Information Letter No. A-24,
Interim Certification Requirements for AC Line Connected Wiring Devices with Varistors

REDR C1370,
Canadian Radiation Emitting Devices Act

IEC 60318,
Electroacoustics – Simulators of human head and ear – Part 1: Ear simulator for the measurement of supra-aural and circumaural earphones

IEEE C2,
National Electrical Safety Code

IEEE 269,
Standard Methods for Measuring Transmission Performance of Analog and Digital Telephone Sets, Handsets, and Headsets

IEEE 487,
Recommended Practice for the Protection of Wire-Line Communication Facilities Serving Electric Power Locations

IEEE 1613,
Standard Environmental and Testing Requirements for Communications Networking Devices Installed in Electric Power Substations

ISO 261,
ISO general purpose metric screw threads – General plan

ISO 262,
ISO general purpose metric screw threads – Selected sizes for screws, bolts and nuts

NEMA C84.1,
American National Standard for Electric Power Systems and Equipment-Voltage Ratings (60 Hz)

NFPA 70,
National Electrical Code

NFPA 72,
National Fire Alarm and Signaling Code

NFPA 75,
Standard for the Protection of Information Technology Equipment

NFPA 99,
Health Care Facilities Code

UL 50
Enclosures for Electrical Equipment

UL 50E
Enclosures for Electrical Equipment, Environmental Conditions

UL 67
Panelboards

UL 497
Protectors for Paired Conductor Communications Circuits

UL 497A
Secondary Protectors for Communications Circuits

UL 498
Attachment Plugs and Receptacles

UL 508
Industrial Control Equipment

UL 723
Tests for Surface Burning Characteristics of Building Materials

UL 746A
Polymeric Materials – Short Term Property Evaluations

UL 891
Switchboards

UL 962A
Furniture Power Distribution Units

UL 1008
Transfer Switch Equipment

UL 1059
Terminal Blocks

UL 1069
Hospital Signaling and Nurse-Call Equipment

UL 1363
Relocatable Power Taps

UL 1449
Surge Protective Devices

UL 1778
Uninterruptible Power Systems

UL Subject 1801
Outline for Power Distribution Centers for Communications Equipment

UL 1863
Communications-Circuit Accessories

UL 2043
Fire Test for Heat and Visible Smoke Release for Discrete Products and Their Accessories Installed in Air-Handling Spaces

UL 60065
Audio, Video, and Similar Electronic Apparatus – Safety Requirements

UL 60950-1
Information Technology Equipment Safety – Part 1: General Requirements

UL 60950-21
Information technology equipment – Safety – Part 21: Remote power feeding

UL 60950-22
Information technology equipment – Safety – Part 22: Equipment to be installed outdoors

UL 60950-23
Information technology equipment – Safety – Part 23: Large data storage equipment

U.S. Code of Federal Regulations (CFR),
Title 21, Chapter I, Subchapter J, Part 1020, Section 1020.10

U.S. Code of Federal Regulations (CFR),
Title 21, Chapter I, Subchapter J, Part 1040

U.S. Code of Federal Regulations (CFR),
Title 16, Chapter II, Subchapter C, Part 1505

3.3DV.1 DE *Modify 3.3 by adding the term "telecommunication network" to the above list.*

telecommunication network 3.3.1.3DV.1

3.3.1.2DV D2 *Modify 3.3.1.2 by adding the following text:*

For additional information regarding D.C. powered equipment and centralized d.c. power systems (DC mains), refer to Annex DVD.

3.3.1.3DV D1 *Add new definition of telecommunication network as 3.3.1.3DV.1:*

3.3.1.3DV.1 telecommunication network – metallically terminated transmission medium intended for communication between equipment that may be located in separate buildings, excluding:

– the mains system for supply, transmission and distribution of electrical power, if used as a telecommunication transmission medium;

– cable distribution systems;

– ES1 circuits connecting units of audio/video, information and communication technology equipment.

3.3.3.5DV DE *Modify 3.3.3.5 by adding the following NOTE:*

NOTE 1-15, 2-15, 2-20, 5-15 and 5-20 plugs and outlets as specified in IEC/TR 60083 are considered to be non-industrial within the meaning of this standard.

4.1.1DV.1 D2 *Modify 4.1.1 by adding the following text:*

In the U.S. and Canada, components and subassemblies that comply with the standards referenced in Annex DVE are required in addition to or as a replacement for the requirements in this standard. Components complying with these standards are considered acceptable as part of equipment covered by this standard without further evaluation other than to give consideration to the appropriate use of the component or subassembly in the end product.

4.1.1DV.2 DC *Modify 4.1.1 by adding the following text:*

In the U.S. and Canada, components and subassemblies that comply with the standards referenced in Annex DVG are acceptable as an alternative to requirements as part of equipment covered by this standard without further evaluation other than to give consideration to the appropriate use of the component or subassembly in the end product.

4.1.2DV DC *Modify 4.1.2 by adding the following text:*

In the U.S. and Canada, some UL/CSA component standards may be used as alternatives to referenced IEC standards for the purposes of North America certifications or surveillance programs. Components and subassemblies that comply with the standards referenced in Annex DVF are acceptable as part of equipment covered by this standard without further evaluation other than to give consideration to the appropriate use of the component or subassembly in the end product.

4.1.16DV DE *Add Clause 4.1.16DV.1:*

4.1.16DV.1 Mains connections

4.1.16DV.1.1 DE See Annex G.9for Mains Supply Cords for Pluggable (Cord Connected) Equipment.

4.1.16DV.1.2 DR See Annex G.9ADV for Mains Supply Cords for Pluggable (Cord Connected) Equipment (Canadian and U.S. regulatory-based requirements).

4.1.16DV.1.3 D2 See Annex DVH for requirements for Permanently Connected Equipment.

4.1.16DV.1.4 DR See Annex DVH for requirements for Permanently Connected Equipment (Canadian and U.S. regulatory-based requirements).

4.1.17DV D2 *Add Clause 4.1.17DV.1:*

4.1.17DV.1 External interconnecting cable and wiring

4.1.17DV.1.1 General

External interconnecting cable and wiring are investigated to the requirements of 6.5 and either 4.1.17DV.1.2 or 4.1.17DV.1.3, as appropriate.

– External interconnecting cable and wiring 3,05 m or less may be investigated as part of the equipment (system) to the requirements of this standard. See 4.1.17DV.1.2.

– External interconnect cable and wiring longer than 3,05 m are regulated by the Canadian Electrical Code, C22.1, and the National Electrical Code, NFPA 70, and are subject to associated requirements. See 4.1.17DV.1.3.

– External interconnect cable longer than 3,05 m designed to carry audio and/or video signals only, and that is not specified by the manufacturer to be routed inside the building structure (e.g., walls, ceilings, etc.), is subject to the applicable requirements of 4.1.17DV.1.2. For purposes of 4.1.17DV.1.2, it is assumed such cables are connected to PS1 circuits.

Alternatively, detachable external interconnecting cable and wiring (with terminations) may be excluded from the equipment evaluation if specified by the manufacturer.

4.1.17DV.1.2 Equipment (system) interconnecting cable and wiring

The following requirements apply to detachable and nondetachable external interconnecting cable and wiring investigated as part of the equipment (system).

– The length of the external interconnecting cable or wiring shall not exceed 3,05 m;

– For external interconnecting cable and wiring connected to PS2 and PS3 circuits, see 6.5 for fire (flammability) considerations;

– There are no fire (flammability) considerations for external interconnecting cable and wiring specified by the manufacturer for connection to circuits that are PS1.

– External interconnecting cable and wiring intended to be connected to an ES3 or PS3 circuit require a jacket for mechanical protection in accordance with Table G.9ADV.2, or equivalent;

– Detachable external interconnecting cable and wiring (with terminations) intended to be connected to a PS2, PS3, ES2 or ES3 circuit and furnished as part of the equipment shall be either marked, or similarly identified in the installation instructions with (a) the name, trademark or trade name of the organization that is responsible for the equipment, and (b) the organization's identifying number or equivalent designation for the cable. See Annex DVK.

– The marking may be applied on the cable and wiring at any location

– This marking is not required to comply with the test for permanence of markings, F.3.9

NOTE This marking is required to allow authorities having jurisdiction to identify external interconnecting cables and wiring that are evaluated as a part of the equipment (system).

Optical fiber interconnecting cables 3,05 m or less are not subject to the above requirements.

4.1.17DV.1.3 External interconnecting cable and wiring considered part of the building installation

External interconnecting cables and wiring longer than 3,05 m are regulated by the Canadian Electrical Code, C22.1, and the National Electrical Code, NFPA 70. See Annex DVA(Annex Q entry).

4.4.5DV D1 *Modify 4.4.5 by adding the following text after the third paragraph:*

If a safeguard employs an adhesive, refer to Annex P.4DV.

5.2.2.2DV D1 *Modify 5.2.2.2 by replacing the second paragraph with the following:*

The values are the maximum that can be delivered by the source. Steady state is considered established when the voltage or current values last for 2 s or longer; otherwise the limits of 5.2.2.3, 5.2.2.4 or 5.2.2.5 apply, as appropriate.

5.4.2.1DV D2 *Modify 5.4.2.1 by adding the following text:*

Unless otherwise specified by the manufacturer and supplied with means to assure minimum clearances during all modes of normal operation, the voice coil and adjacent conductive parts of a loudspeaker are considered to be conductively connected.

5.5.5.1DV D2 *Modify 5.5.5.1 by adding the following text:*

For the purpose of assessing compliance it is assumed that:

– two independent fixings will not become loose at the same time; and

– parts fixed by means of screws or nuts provided with self-locking washers or other means of locking are not liable to become loose.

Examples of constructions regarded as meeting the requirements include:

– close-fitting tubing (for example, a heat shrink or rubber sleeve), applied over the wire and its termination;

– conductors connected by soldering and held in place near to the termination, independently of the soldered connection;

– conductors connected by soldering and “hooked in” before soldering, provided that the hole through which the conductor is passed is not unduly large;

– conductors connected to screw terminals, with an additional fixing near to the terminal that clamps, in the case of stranded conductors, the insulation and not only the conductors;

– conductors connected to screw terminals and provided with terminators that are unlikely to become free (for example, ring lugs crimped onto the conductors). The pivoting of such terminators is considered;

– short rigid conductors that remain in position when the terminal screw is loosened;

– **wire-wrap terminals used for the connection of ES1 and ES2 that are:**

  • **provided on equipment that forms part of the telecommunication network, up to and including the demarcation point, and are located in service access areas only. (This equipment is generally considered Central Office Equipment, although it may be deployed elsewhere in similarly controlled environments.) and**

  • **provided with a guard or cover that prevents unintentional contact during normal operation.**

  • **tested with a steady force of 2,5 N ± 0,25 N.**

5.6.6.3DV D1 ***Modify 5.6.6.3 as follows:***

In the second and third dashed items, change the protective current rating value from "16 A" to "25 A".

In the fifth dashed item, change "with a minimum of 16 A" to "which is taken as 20 A".

Table 35DV D1 ***Modify Table 35 as follows:***

Change the first column heading to read: Smaller of the rated current of the equipment or the protective current rating of the circuit under consideration, A, up to and including

Table 36DV D1 ***Modify Table 36 as follows:***

Change the first column heading to read: Smaller of the rated current of the equipment or the protective current rating of the circuit under consideration, A, up to and including

5.7.8.1DV D2 ***Add Clause 5.7.8.1DV.1:***

5.7.8.1DV.1 Limitation of touch current due to ringing signals

An EUT that receives ringing voltages on more than one telecommunication network connection port shall have simulated ringing applied to the network connections.

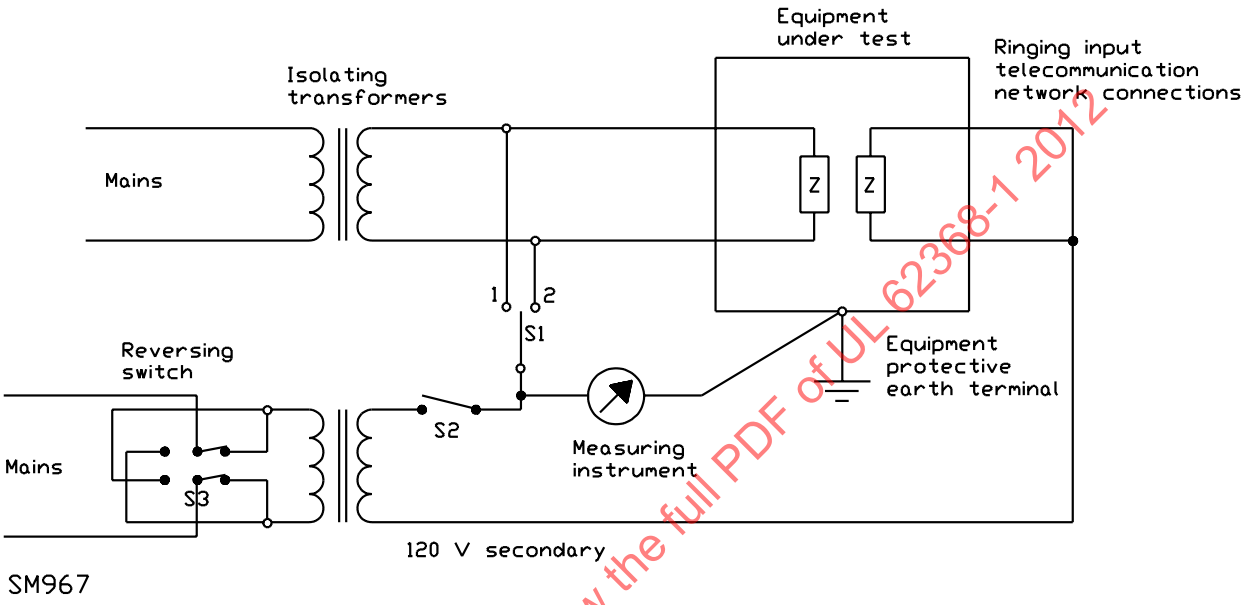
Simulated ringing shall be applied to 3 % (rounding down) of the ports receiving ringing in excess of three ports.

Equipment containing input telecommunication network leads over which ringing voltages are applied to the equipment shall be tested using the circuit of Figure 5.7.8.1DV.1 for mains-connected equipment or Figure 5.7.8.1DV.2 for other equipment. For any position of the selector switches, the current values shall not exceed the relevant limits for ES2 specified in Table 4.

Compliance is checked by the following tests, which are conducted using the relevant measuring instrument described in IEC 60990:1999, Figure 4. Simulated ringing at 120 V, 50 to 60 Hz, shall be applied to ringing input telecommunication network leads, either one lead at a time or connected together. Other telecommunication network leads shall be left disconnected. Equipment shall be evaluated in each operating state, including ground start. The general test methods of 5.7 shall apply, checking leakage current for all positions of switches S1, S2 and S3 in Figure 5.7.8.1DV.1.

NOTE 1 Conducting the test with the leads connected together generally is a more efficient, though sometimes more onerous, test method. Compliance using either test method is acceptable.

NOTE 2 This requirement is intended to measure the total touch current of the equipment, including touch current due to ringing signals, and determine that the total touch current of the equipment continues to comply with the relevant limits for ES2 specified in Table 4. This requirement supplements 5.7.8, which considers cumulative touch currents associated with all telecommunication ports in the equipment, but not ringing signals exclusively.



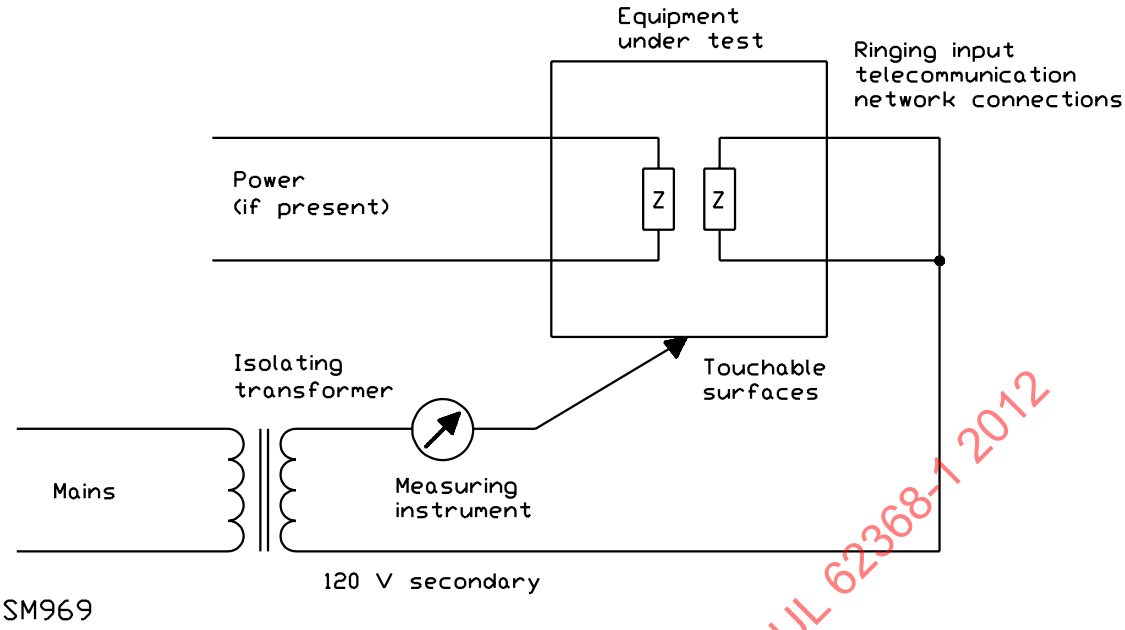


Figure 5.7.8.1DV.2 - Test circuit for earth leakage current on other than mains-connected equipment

6.4.3.3DV D1 ***Modify 6.4.3.3 by replacing the fourth paragraph with the following:***

If the temperature is limited by fuses complying with the IEC 60127 series, the following test is carried out, if necessary, in relation to the characteristic of the fuse. This test is not necessary if the fuse-link opens within one second for three consecutive tests under the same single fault condition.

6.5.2DV.1 DC ***Modify 6.5.2 by adding the following text to the end of both the second and third paragraphs:***

or the insulation of the conductor or cable assembly shall be rated VW-1 or FT-1.

6.5.2DV.2 D2 ***Modify 6.5.2 by adding the following text and NOTES after the third paragraph, and renumber the existing NOTE as NOTE 1:***

PS3 wiring outside a fire enclosure shall comply with single fault testing in B.4. Alternatively, the following constructions are considered to comply:

– conductors provided with overcurrent protection in accordance with Article 240 of the National Electrical Code, NFPA 70, and the Canadian Electrical Code, Part I, C22.1, Section 14;

– internal conductors supplied by a power source that is limited to the output voltage and current values specified in Table Q.1 or is limited to the output voltage values and provided with an overcurrent protective device with a rated current value as specified in Table Q.2;

– interconnecting cables supplied by a limited power source (see Q.1);

– a 20-A protective device used with any size wire in the primary.

NOTE 2 Devices for overload protection of components may also provide protection of associated wiring.

NOTE 3 Internal circuits connected to a mains supply may require individual protection depending on reduced wire size and length of conductors.

6.8DV D1 *Add Clause 6.8DV.1:*

6.8DV.1 Safeguards against electrically-caused fire due to overvoltage from power line crosses

6.8DV.1.1 Equipment with external circuits intended for connection to a telecommunication network that uses outside cable subject to overvoltage from power line failures shall comply with Annex DVI.

8.5.5.1DV D1 *Modify 8.5.5.1 by adding the following text:*

The outer enclosure housing a CRT shall have no opening that exceeds 130 mm^2 unless the minor dimension of the opening is 10 mm or less.

10.4.1DV D2 *Modify 10.4.1 by adding the following text:*

For telecommunication-network connected equipment, see Annex DVJ.

F.1DV DR *Modify F.1 by adding the following text:*

F.1DV.1 See Annex DVK for U.S. and Canadian markings and instructions.

F.3.3.8DV DR *Add Clause F.3.3.8DV.1*

F.3.3.8DV.1 Equipment with output terminals

Output terminals provided for supply of other equipment except mains supply shall be marked with the nominal output voltage and frequency, and, in addition, the maximum output current or power, unless the terminals are marked with the type references of the equipment which are permitted to be connected. When intended to be installed or interconnected in the field by a skilled person, the Class of wiring shall be marked adjacent to the terminals.

Compliance is checked by inspection.

Table G.4DV DR *Delete Table G.4.*

This table does not apply.

G.9.1DV DR *Modify G.9.1 as follows*

In the second paragraph, replace the reference to Table G.4 with a reference to Table G.9ADV.1.

G.9ADV DR *Add Clause G.9ADV – Power supply cords – detachable and non-detachable*

NOTE Applicability of these requirements is dependent on the construction of the equipment and the intended installation and use.

NOTE Related to requirements from the National Electrical Code (NEC), NFPA 70 and the Canadian Electrical Code (CEC), Part I, C22.1, and designated as DR National Differences, this clause is not intended to provide a complete list of all the requirements for power supply cords – detachable and non-detachable, that may be applicable to all equipment covered by this standard, only those that most commonly apply to this type of equipment. For complete requirements, the National Electrical Code (NEC), NFPA 70, the Canadian Electrical Code (CEC), Part I, C22.1, or other referenced documents must be consulted.

G.9ADV.1 General

Flexible cords and plugs are permitted for movable equipment, hand-held equipment, stationary equipment and transportable equipment, and for fixed equipment where the fastening means and mechanical connections of the equipment are designed to permit removal for maintenance and repair.

NOTE Equipment such as automated teller machines (ATMs) and similar bank equipment, which are typically installed in banks, financial institutions, supermarkets, etc., are examples of such fixed equipment where flexible cords and plugs are permitted.

G.9ADV.2 Methods of connection

Flexible cords shall be provided with an attachment plug for connection to the branch circuit.

G.9ADV.3 Sizing and ratings

The attachment plug configuration shall be one that is rated not less than 125 percent of the current rating of the equipment

NOTE The maximum rating of equipment that has a NEMA 5-15P plug is 12 A.

Power supply cords shall have conductors with cross-sectional areas sufficient for the rated current of the equipment. Conductors shall be sized based on the requirements in the National Electrical Code (NEC), NFPA 70, and the Canadian Electrical Code, Part I, C22.1.

Table G.9ADV.1 provides allowable ampacity for flexible cords and cables based on Table 400.5(a)(1) of the NEC. See Table 400.5(a)(2) of the NEC for ampacity information on portable power cables.

For equipment with a rated current up to and including 2 A, 20 AWG is acceptable provided that the mains plug is provided with a 2 A fuse maximum and the equipment is not provided with a socket outlet.

Table G.9ADV.1 – Power supply cord ampacity

Copper Conductor Size (AWG)	Thermoplastic types	Thermoset types		Types
	TPT, TST	C, E, EO, PD, S, SJ, SJO, SJOW, SJOO, SJOOW, SO, SOW, SOO, SOOW, SP-1, SP-2, SP-3, SRD, SV, SVO, SVOO		HPD, HPN, HSJ, HSJO, HSJOO
		Thermoplastic types		
		ET, ETLB, ETP, ETT, NISPT-1, NISPT-2, SE, SEW, SEO, SEOW, SEOOW, SJE, SJEW, SJEO, SJEOW, SJEOOW, SJT, SJTW, SJTO, SJTOW, SJTOO, SJTOOW, SPE-1, SPE-2, SPE-3, SPT-1, SPT-1W, SPT-2, SPT-2W, SPT-3, ST, SRDE, SRDT, STO, STOW, STOO, STOOW, SVE, SVEO, SVT, SVTO, SVTOO		
		A [a]	B [a]	
27 [b]	0,5	–	–	–
20	–	5 [c]	[d]	–
18	–	7	10	10
17	–	9	12	13
16	–	10	13	15
15	–	12	16	17
14	–	15	18	20
12	–	20	25	30
10	–	25	30	35
8	–	35	40	–
6	–	45	55	–
4	–	60	70	–
2	–	80	95	–

NOTE Derived from the NEC and CEC. Based on ambient temperature of 30 °C.

[a] The allowable currents under subheading A apply to 3-conductor cords and other multi-conductor cords connected to utilization equipment so that only 3 conductors are current-carrying. The allowable currents under subheading B apply to 2-conductor cords and other multi-conductor cords connected to utilization equipment so that only 2 conductors are current-carrying.

[b] Tinsel cord.

[c] Elevator cables only.

[d] 7 amperes for elevator cables only; 2 amperes for other types.

G.9ADV.4 Serviceability

Power supply cords and cord sets shall incorporate flexible cords suitable for the particular application or shall be of a type at least as serviceable for the particular application.

Table G.9ADV.2 lists common applications and associated suitable cord types.

Table G.9ADV.2 – Power supply cord serviceability and cord length

Type of equipment	Minimum cord type	Cord length, m
Movable equipment, including desk-top, table-top, musical instruments	NISP-2, NISPE-2, NISPT-2, SP-2, SPE-2, SPT-2, SP-3, SPE-3, SPT-3, SV, SVE, SVO, SVOO, SVT, SVTO, SVTOO, SJ, SJE, SJT	1,5 min [a, b]
Transportable equipment, including hand-held	SV, SVE, SVO, SVOO, SVT, SVTO, SVTOO	1,5 min [a, b]
Stationary equipment, including floor-standing, rack-mounted, fixed (wall ceiling) mounted.	S, SE, SJ, SJE, SJO, SJOO, SJT, SJTO, SJTOO, SO, SOO, ST, STO, STOO, PPE, W	1,5 min [a, b]
	NISP-2, NISPE-2, NISPT-2, SP-2, SPE-2, SPT-2, SP-3, SPE-3, SPT-3, SV, SVE, SVO, SVOO, SVT, SVTO, SVTOO	1,5 min [a], 2,4 max
Movable, stationary and transportable equipment, including audio and video equipment and musical instruments used in non-household[c] applications	SJ, SJE, SJT	1,5 min, 7,5 max
[a] The minimum length of the power supply cord shall be 1,5 m, unless intended for a special installation, such as dedicated equipment intended to be mounted near a receptacle.		
[b] No maximum length specified, except for equipment intended to allow installation in ANSI NFPA 70 Article 645 ITE Rooms [see Annex DVA (Clause 1), and Annex DVK (Annex DVA)], maximum length is 4,5 m.		
[c] Non-household applications include commercial and professional equipment installations.		

G.9ADV.5 Length

G.9ADV.5.1 Minimum length

The minimum length of a power supply cord shall be 1,5 m unless it is intended for a special installation, such as dedicated equipment intended to be mounted near a mains socket-outlet.

For equipment provided with an external power supply, the minimum length of the power supply cord shall be 0,5 m, provided that the total length of the conductive path from the receptacle to the equipment is 1,5 m or greater. The minimum 1,5 m length includes the 0,5 m power supply cord, the axial length of the power supply, and the output conductors, measured from the face of the attachment plug cap to the output connector face. The minimum 0,5 m length of a detachable power supply cord is measured from the face of the attachment plug cap to the cord connector face. The minimum 0,5 m length of a non-detachable power supply cord is measured from the face of the attachment plug cap to the point on the flexible cord where it enters the power supply enclosure, including any strain relief means outside the enclosure.

G.9ADV.5.2 Maximum length

For equipment intended for installation in ITE Rooms, the length of a power supply cord shall not exceed 4,5 m.

For other intended installations, see Table G.9ADV.2.

G.13DV DC *Modify G.13 by adding the following text:*

As an alternative, IC current limiters that comply with Annex CC of CSA/UL 60950-1 are also considered acceptable.

G.22DV D2 *Modify G.22 as follows:*

Delete the last sentence of the NOTE.

H.2DV D2 *Modify H.2 by adding the following text after the second dashed paragraph in item a:*

Continuous ringing signals shall:

- **be located only in areas where a skilled person has access during servicing;**
- **be so located and guarded that unintentional contact with such parts is unlikely during servicing by a skilled person, or be provided with a marking to warn a skilled person of the presence of continuous ringing signals; and**
- **not become accessible to an ordinary person under single fault conditions.**

H.4DV D2 *Add Clause H.4DV:*

H.4DV.1 Other telecommunication signals

Telecommunication signaling systems (e.g., some message waiting systems) using voltages or current, or both, greater than those specified in 5.2.1.1 and 5.2.1.2 shall be permitted if they comply with the following:

NOTE 1 A part may rely on different requirements for different time intervals.

NOTE 2 These requirements are based on small area contact; parts are not grippable.

– continuous signal: For a signal of duration greater than 5 s, the current through the relevant measuring instrument described in IEC 60990:1999, Figure 4, shall be not greater than 7.1 mA peak a.c., or 30 mA d.c., or the limit shown in Figure H.4DV.1 for combinations of a.c. and d.c., when measured in accordance with 5.7.

– intermittent signal: For a signal of duration less than 5 s, the current through the relevant measuring instrument described in IEC 60990:1999, Figure 4, shall be not greater than the limit specified in Figure H.4DV.2. The signal shall be followed