Nemko

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IEC 62368-1 4th Edition main Differences with prior Editions

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Introduction to Presenter

- **Nemko Canada**
- Safety Testing (IEC 62368, IEC 60950, IEC61010,…)
- Energy testing (CEC, DOE, NRCAN, ErP, Energy Star)
- Cybersecurity Evaluator (EN 18031, ETSI 303 645)
  Canada Local IT

- **Education**
- **Macmaster University:**
  Bachelor of Technology in Software Engineering

IEC 62368-1 Today

- **IEC 62368-1:** Audio/video, information and communication technology equipment -Part 1: Safety requirements
- **IEC TR 62368-2**: Audio/video, information and communication technology equipment -Part 2: Explanatory information related to IEC 62368-1

IEC 62368-1:2010 (First Edition) IEC TR 62368-2: 2011 (First Edition)

IEC 62368-1:2014 (Second Edition) IEC TR 62368-2:2015 (Second Edition)

IEC 62368-1: 2018 (Third Edition)IEC TR 62368-2:2019 (Third Edition)

IEC 62368-1: 2023 (Fourth Edition) IEC TR 62368-2:2023 (Fourth Edition)

Main changes in IEC 62368-1:2023

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0.10.1 Models for thermally-caused injury

Thermally-caused injury ~~may~~ can occur when thermal energy capable of causing injury is transferred to a body part (see Figure 7).

Thermal energy transfer occurs when a body touches a hot equipment part. The extent of injury depends on the temperature difference, the thermal mass of the object, rate of thermal energy transfer to the skin, and duration of contact.

~~The requirements in this document only address **safeguards** against thermal energy transfer by conduction. This document does not address **safeguards** against thermal energy transfer by convection or radiation.~~

Main changes in IEC 62368-1:2023

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- 1 Scope

This document does not apply to:

– equipment with non-self-contained hazardous moving parts, such as robotic equipment;

NOTE 6 For requirements related to robotic equipment in an industrial environment, see IEC 60204-1, IEC 60204-11, ISO 10218-1 and ISO 10218-2.

– personal care robots, including mobile servant robots, physical assistant robots, and person carrier robots;

NOTE 7 For requirements related to personal care robots, see ISO 13482.

– power supply systems that are not an integral part of the equipment, such as motor-generator sets, **battery** backup systems and distribution transformers;

– equipment to be used in wet areas indoors.

Main changes in IEC 62368-1:2023

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- 1 Scope

This document does not address:

– manufacturing processes except for **routine tests**;
– injurious effects of gases released by thermal decomposition or combustion;
– disposal processes;
– effects of transport (other than as specified in this document);
– effects of storage of materials, components, or the equipment itself;
– the likelihood of injury from particulate radiation such as alpha particles and beta particles;
~~– the likelihood of thermal injury due to radiated or convected thermal energy;~~
~~– the likelihood of injury due to flammable liquids;~~

Main changes in IEC 62368-1:2023

- 3.3 Terms and definitions
  - Added definitions: Audio amplifier, Pink noise, Liquid cooling terms, Coolant, device, Loudspeaker driver, Subassembly
  - Clarified definitions: Mains, Fixed equipment, Highest specified charging temperature, Lowest specified charging temperature, Secondary lithium battery,

Main changes in IEC 62368-1:2023

- **Clause 4.1.1:** Components and subassemblies approved to legacy standards 60065 and 60950-1 cannot be used unless additionally evaluated to IEC 62368-1 requirements.

Main changes in IEC 62368-1:2023

- **Clause 4.1.2**: For components used in circuits not in accordance with their specified ratings, the requirement statement has been clarified that the components shall be subjected to the applicable tests of the component standard under the conditions occurring in the equipment.
- **Clause 4.1.3**: New material has been added clarifying how accessibility by using a tool should be considered when an ordinary person or an instructed person has to access areas containing Class 2 and Class 3 energy sources.
- **Clause 4.1.8**: The > 1 liter exemption has been removed since Annex G.15 now covers > 1-liter systems in its modular LFC requirements.
  Equipment using refrigerants to see IEC 60335-2-40 and/or IEC 61010-2-011.
  This consideration would include flammable refrigerants.

Main changes in IEC 62368-1:2023

- **Clause 4.4.3.1**: A solid safeguard made of thermoplastic material that is not accessible shall comply with the stress relief test of 4.4.3.8.
- **Clause 4.8.3**: Added following statement
  - equipment for which it is unlikely that the **coin or button cell battery** will be removed by children due to location of the **battery** within the equipment; in such cases, 4.8.2 still applies;
- **Clause 5.2.2.1**: Added following statement

  The classification of **external circuits** is done by using their normal operating voltage or current, disregarding the communication or data signals, except for ringing signals (see 5.2.2.6) and for audio signals (see 5.2.2.7).

- **Clause 5.3.1**: Changed the wording of ES1 or ES2 “derived” from ES2 or ES3, to ES2/ES3 that are not ES2/ES3 mains. (Similar to “secondary hazardous voltage” in 60950-1)

Main changes in IEC 62368-1:2023

- **Restructured table 13:** External circuit transient voltages. Correlate with IEC TR 62102.

IEC 62368-1:2018

Table 13
External circuit transient voltages

ID	Cable type	Additional conditions	Transient voltages
1	Paired conductor [a] – shielded or unshielded	The building or structure may or may not have equipotential bonding.	1 500 V 10/700 µs Only differential if one conductor is earthed in the equipment

IEC 62368-1:2023

Table 13 – External circuit ID assignment and associated transient voltages

ID	Cable type	Additional conditions	Transient voltages
1a	Symmetrical paired[a] conductors – shielded or single ended paired[a] or unpaired conductors – outdoor aerial or buried exposure (for example, outdoor telecommunications cables).	The building or structure containing the equipment has equipotential bonding or not. Assumes primary protection is installed. "Network Environment 1"	1 500 V 10/700 µs (see IEC 61000-4-5 and ITU-T K (all parts))
1b	Symmetrical paired[a] conductors or single ended paired[a] or unpaired conductors – shielded or unshielded, typically short outdoor or stays within a structure. Typically less than 300 m.	The building or structure containing the equipment has equipotential bonding or not. Assumes primary protection is installed. "Network Environment 1"	1 500 V 1,2/50 µs (see IEC 61000-4-5 and ITU-T K (all parts))
1c	Symmetrical paired[a] conductors or single ended paired[a] or unpaired conductors – shielded or unshielded, short interconnection lines or circuits between equipment not connected to building wiring. The cable can be connected to an outdoor antenna. Typically less than 10 m.	The building or structure containing the equipment has equipotential bonding or not. "Network Environment 0"	Transient voltages are negligible and are therefore disregarded[b]

Note: The following previous condition to Table 13 has been removed, so there could be some additional impact on products with external circuits contained wholly within building structures —
"In general, for EXTERNAL CIRCUITS installed wholly within the same building structure, transients are not taken into account."

Main changes in IEC 62368-1:2023

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- **Table 18**:Minimum values of creepage distances for frequencies higher than 30 kHz and up to 400 kHz, had deviated from the source document, IEC 60664-4.

Table 18 – Minimum values of creepage distances (in mm) for frequencies higher than 30 kHz and up to 400 kHz

Peak voltage kV	30 kHz < f ≤ 100 kHz	100 kHz < f ≤ 200 kHz	200 kHz < f ≤ 400 kHz
0,1	0,016 7	0,02	0,025
0,2	0,042	0,043	0,05
0,3	0,083	0,09	~~0,1~~ 0,09
0,4	0,125	0,13	0,15
0,5	0,183	~~0,23~~ 0,19	0,25
0,6	0,267	~~0,38~~ 0,27	0,4
0,7	0,358	~~0,55~~ 0,38	0,68
0,8	0,45	~~0,8~~ 0,55	1,1
0,9	0,525	~~1,0~~ 0,82	1,9
1	0,6	1,15	3
The values for the **creepage distances** in the table apply for **pollution degree** 1. For **pollution degree** 2 a multiplication factor of 1,2 and for **pollution degree** 3, a multiplication factor of 1,4 shall be used.			

Main changes in IEC 62368-1:2023

- **Clause 5.4.11.1:** The previous association of the requirement with “external circuits indicated in Table 13, ID No. 1” has been removed, which makes the requirement potentially broader in application.
- **Clause 5.5.2.2:** Relaxation of requirement for pluggable equipment type B. Discharge time from 2 s to 5 s.
- **Clause 5.6.2.2:** A new requirement has been added that for functional earthing conductors, the colour combination green and yellow shall not be used, except for multipurpose preassembled components (for example, multiconductor cables or EMC filters).

Main changes in IEC 62368-1:2023

- **Resistive PIS:** Simplified Definition in PS2 or PS3 circuit.

6.2.3.2 Resistive PIS

A **resistive PIS** is any part in a PS2 or PS3 circuit that, under **normal operating conditions**, **abnormal operating conditions** or **single fault conditions**, dissipates more than 15 W for longer than 30 s.

~~– dissipates more than 15 W measured after 30 s under **normal operating conditions**; or~~

~~NOTE During the first 30 s there is no limit.~~

~~– under **single fault conditions**:~~

- ~~dissipates more than 100 W measured for 30 s, disregarding the first 3 s, immediately after the introduction of the fault if electronic circuits, regulators or PTC devices are used; or~~
- ~~dissipates more than 15 W measured 30 s after the introduction of the fault.~~

Main changes in IEC 62368-1:2023

- **Clause 6.3.1 :** Added two exemptions
  - **loudspeaker drivers** and **loudspeaker driver** assemblies;
  - grille covering material, cloth, and reticulated foam that comply with S.6;

Methenamine Tablet for Timed Burning

Model: FP100
Standard: UL1492

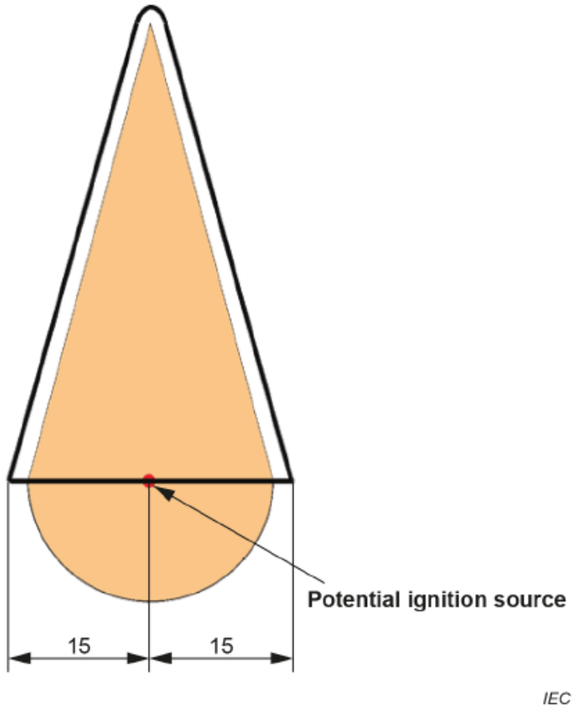
Request a Quote

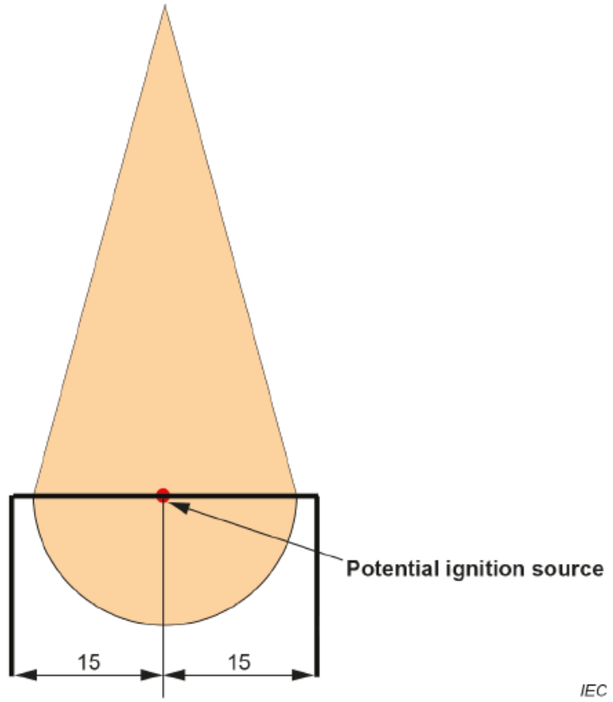
Main changes in IEC 62368-1:2023

- **Clause 6.4.5.1:** The previous statement: “circuits that meet the requirements of Annex Q are considered to be PS2 circuits.” has been removed, meeting LPS may not meet PS2.
- **Clause 6.4.6:** Exempt loudspeaker drivers and assemblies.
- **Clause 6.4.7.1:** Exempt loudspeaker drivers and assemblies. However, loudspeakers remain a component that can be short-circuited or disconnected, whichever is more unfavourable.

Main changes in IEC 62368-1:2023

- **Clause 6.4.8.3.3 and 6.4.8.3.4:** Clarification has been provided that the 2 mm boundary associated with the Figure 41 fire cone also must be considered when applying requirements for top and bottom openings.





Main changes in IEC 62368-1:2023

- **Openings in the fire enclosure:** 6.4.8.3.5 Figure 44. For professional equipment only.

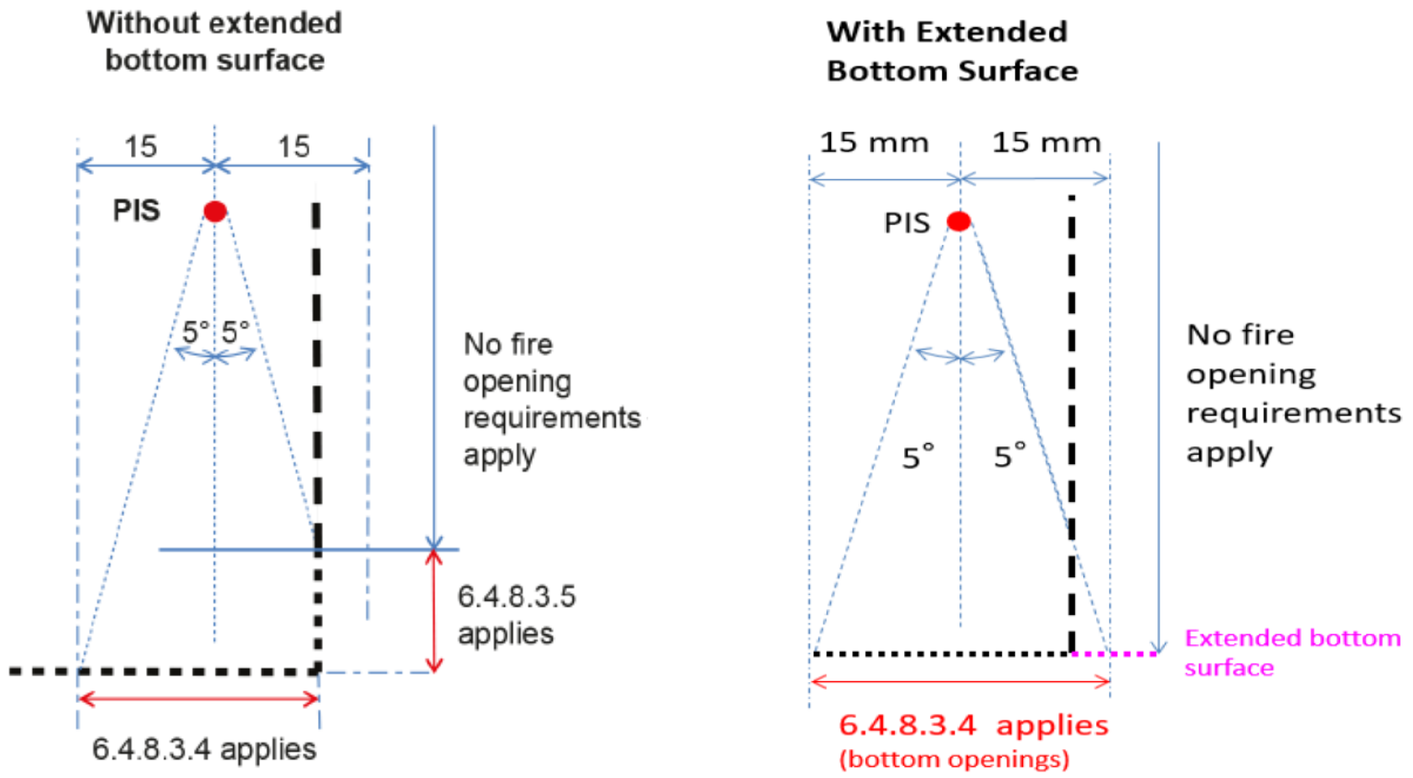


Figure 44 – Application of bottom opening requirements

Main changes in IEC 62368-1:2023

- **Clause 6.4.8.3.5:** Figure 45.

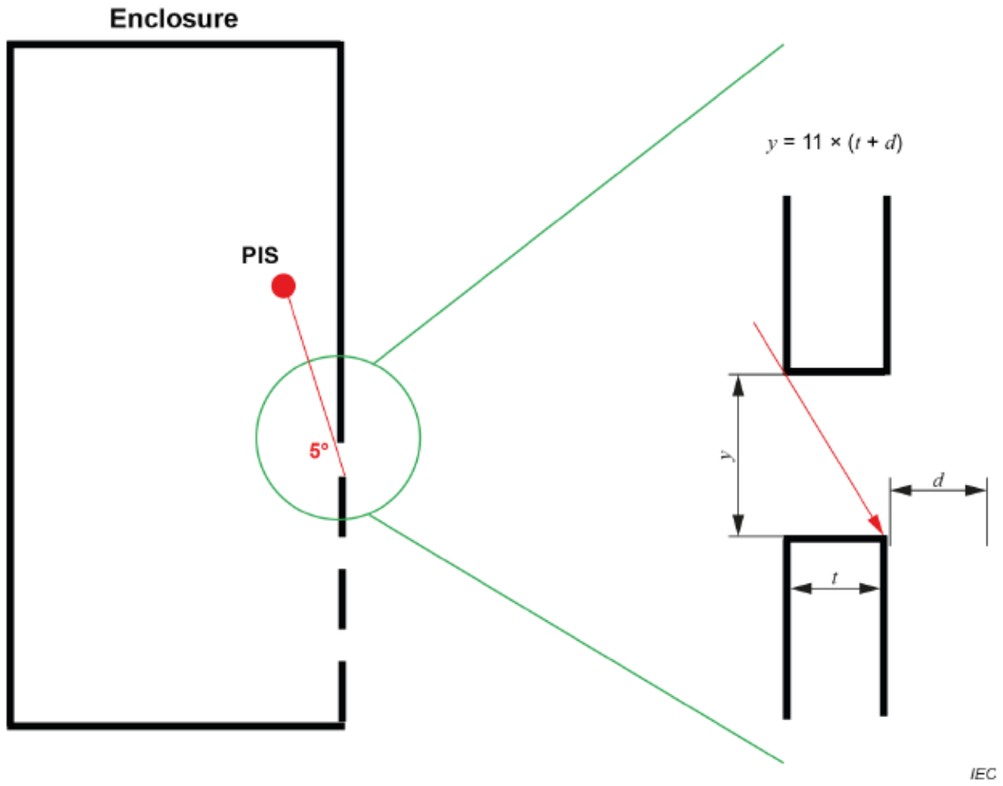


Figure 45 – Application of bottom opening properties to side enclosure material thickness

Thickness of materials to be considered during 5° rule application

- y = maximum side opening vertical dimension
- t = thickness of side **enclosure** material
- d = maximum bottom opening size as specified in 6.4.8.3.4

Main changes in IEC 62368-1:2023

- **Clause 6.5.2:** Added “normal operating condition” before “external load condition.
- **Clause 6.6:** Removed reference to Annex Q.

Main changes in IEC 62368-1:2023

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- **Clause 9.3:** New requirements for wearable devices.

Table 37 – Touch temperature limits for accessible parts

	Accessible parts [b]	Maximum temperature (T_{max}) °C			
		Metal [d]	Glass, porcelain and vitreous material	Plastic and rubber	Wood
TS1	**Devices** worn on the body (in direct contact with the skin) in normal use (> 8 h) [e]	43 to 48	43 to 48	43 to 48	43 to 48
	Handles, knobs, grips, etc., and surfaces either held or touched in normal use (> 1 min and < 8 h) [a]	48	48	48	48
	Handles, knobs, grips, etc., and surfaces held for short periods of time or touched occasionally (> 10 s and < 1 min)	51	56	60	60
	Handle, knobs, grips etc., and surfaces touched occasionally for very short periods (> 1 s and < 10 s) [f]	60	71	77	107
	Surfaces that ~~need~~ do not have to be touched to operate the equipment (< 1 s)	70	85	94	140
	Devices worn on the body (in direct contact with the skin) in normal use (> 8 h) [e]	43 to 48	43 to 48	43 to 48	43 to 48

Main changes in IEC 62368-1:2023

- **Clause 9.6:** Requirements for Wireless Power Transmitters are revised in order to make IEC 62368-1 and the WPC Qi test procedures more aligned / compatible
  (WPC: Wireless Power Consortium, Qi: Standard for inductive low power charging)

Main changes in IEC 62368-1:2023

- **Annex G.15:** The requirements for pressurized liquid filled components (LFC) are modified and extended.

  The sub-clause covers now also requirements for:

  - self-contained LFC (smaller systems, typically in movable or transportable equipment)
  - modular LFC (larger systems, typically in stationary equipment)

Main changes in IEC 62368-1:2023

- **Annex E:** has been wholly revised since it was difficult to apply to modern audio amplifiers with state-of-art technology. Some additional provisions or iginally part of IEC 60065 were also added to it.

Main changes in IEC 62368-1:2023

- **Annex M:**
  - IEC 62133-2 may be used as an alternative to IEC 62619 for batteries used with sub-system powering applications in stationary equipment.
  - **Coin-cell secondary lithium batteries with an internal resistance greater than 3 Ω:** are exempt from M.4.
  - **Fire enclosure for secondary lithium batteries:** The fire enclosure may be that of the secondary lithium battery itself or that of the equipment containing the secondary lithium battery.

Thank you!

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