



# The evolution of IEC 62368-1

Keep up with changes in the 3rd edition

As the pace of new product introductions increases, the line between a “traditional” AV devices and an ITE (Information Technology Equipment) changing beyond recognition. The International Electrotechnical Commission’s IEC 62368-1 standard was created to revise the existing IEC 60065 and IEC 60950-1 designations and provide a new “hazard-based” standard covering both electronic equipment and IT/ Communication technology. This new “hybrid” standard is intended to be more performance oriented, technology independent and allow more design freedom.

With the 3<sup>rd</sup> edition published in October 2018, the key updates include addition of requirements for outdoor equipment, wireless power transmitters, work cells, fully insulated winding wires and insulating liquids. Further, requirements for optical radiation and sound pressure are also described in this edition.

This data sheet highlights the key changes the standards has gone through to help you comply with its requirements to optimize your supply chains.

## COVERING A WIDE RANGE OF PRODUCTS

IEC 62368-1 (3rd edition) applies to a wide range of electrical and electronic equipment in the fields of audio, video, information and communication technology. It also covers business and office machines with a rated voltage not exceeding 600V, such as power supplies, servers, computer monitors, televisions, laptops, personal computers and computer peripherals.

In addition, IEC 62368-3 contains requirements for equipment supplying DC power over commonly used communication cables, such as USB or Ethernet (PoE).

IEC 62368-3 does not apply to

- Equipment supplying power using proprietary connectors.
- Equipment using a proprietary protocol for power selection.

## STANDARDS UPDATES

IEC	Edition	Year	Status
62368-1	2 <sup>nd</sup>	2014	Voluntary and TRF is published and ready for testing
62368-2	2 <sup>nd</sup>	2015	Explanatory info related to IEC 62368-1:2014
62368-3	1 <sup>st</sup>	2017	Shall be taken into account for all products with USB and PoE ports
62368-1	3 <sup>rd</sup>	2018	Voluntary and wait for announcement of TRF

Standards	Publication Date	Enforcement Date
EN 62368-1:2014 + A11: 2017	Aug 1 <sup>st</sup> , 2014	Dec 20 <sup>th</sup> , 2020
EN 62368-1:xxxx (3rd edition)	Q4, 2018 or Q1, 2019	To be determined
UL 62368-1:2014 (2nd edition) C22.2 No.62368-1-14	Dec 1 <sup>st</sup> , 2014	Dec 20 <sup>th</sup> , 2020 to replace UL 60950-1 and UL 60065
UL 62368-1:xxxx (3rd edition) C22.2 No.62368-1-14:xxxx	Q4, 2018 or Q1, 2019	To be determined
JIS C62368-1:2018 (J 62368-1 (H30))	Jan 22 <sup>nd</sup> , 2018	July 20 <sup>th</sup> , 2018
AS.NZS 62368-1:2018	Feb 15 <sup>th</sup> , 2018	July 02 <sup>nd</sup> , 2018

## INTERNAL AND EXTERNAL COMPONENTS AND SUBASSEMBLIES

To provide a smooth transition to the new standard, the 1st, 2nd and 3rd editions of IEC 62368-1 will continue to accept internal and external components and subassemblies that are in accordance with the final versions of IEC 60065 and IEC 60950-1.

This includes products, such as ICX, bleeder resistors, wire or external power supplies. They will be accepted without additional evaluation, unless the intended application is intended to operate in ambient temperatures of 50°C or more (which is greater than the 40°C limit in IEC 60065 and IEC 60950-1).

IEC 62368-1, evaluated at IEC 60950-1 (see clause 1.5.1 in version A2) and IEC 60065 (see clause 3.4 in the 8th edition) are also acceptable. However, these exceptions will automatically expire in the next edition, which means components and subassemblies that comply with IEC 60065 and IEC 60950-1 will no longer be accepted.

## KEEP AHEAD OF THE IEC 62368-1 WAVE

IEC 62368-1 is transforming the safety evaluation of products – from design stage through to final testing and certification. To reduce risks in the supply chain, procurement and product managers should work with an independent certification body. The right partner can check off each piece along the line, ensuring that every component is compliant and that the final product is ready for the market or markets in which it will be sold.

TÜV Rheinland has been involved in the standards-developing process from the beginning. This enables us to help manufacturers throughout the process – especially during the transition period – by offering IECEE CB Scheme test reports for both the new IEC 62368-1 3rd edition standard and legacy standards.

## ABOUT TÜV RHEINLAND

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# Technical changes to IEC 62368-1 3<sup>rd</sup> edition

**Note:** All comparisons highlighted below are derived from the official documents of IEC 62368-1 (2nd edition) and IEC 62368-1 (3rd edition).

- (4.4.3.7, T.9) Add a new requirement for **glass fixation tests for laminated glass as a safeguard** that prevents access to a class 3 energy sources other than PS3.
- (4.8.3, 4.8.5) Add **test conditions for battery compartments opened by using a tool in 4.8.3** and correct the compliance criteria of 4.8.5, which is according to **Figure V.1, not Figure V.2**.
- (4.10.2) Add a new paragraph that **switches and relays located in a PS3 circuit or used as a safeguard shall comply with Clause G.1 or Clause G.2 respectively**.
- (5.2.2.5) **Delete the previous Table 8** for Electrical energy source limits for repetitive pulses and **replace with 5.2.2.2 (Table 4) and 5.2.2.4 (Tables 6 and 7)**.
- (5.3.1) Add additional description of **accessible ES1 or ES2 circuits derived from ES3 or ES2 circuits except shall be separated from ES3 mains**, the single fault shall also be conducted, for example in secondary circuits.
- (5.4.2.3.2.3) Add a sentence about DC mains supply not within the same building, stating that **the mains transient voltage shall be declared in the installation instructions** by the manufacturer.
- (5.4.4.9) Modify the alternative test method of **solid insulation requirements at frequencies higher than 30 kHz** by calculation **using the parameter of measuring V<sub>pk</sub> and K<sub>R</sub>**.
- (5.4.9.2) Add **IEC 62911 for routine testing** of the equipment in the note.
- (5.6.2.1) Increase the description of **protective conductors regarding fixed method**.
- (5.6.4.1, 5.6.4.3, 5.6.5.1) Delete **“the requirement of 5.6.6”** in the 2nd and 3rd dash of 5.6.4.1 and 5.6.5.1, and the compliance check are **according to 5.6.4.3 and 5.6.5.1** for the conductor/terminal sizes and the test.
- (5.6.4.2.1) Expand Note 4 of **pluggable equipment type A in France**, where in certain cases the protective current rating of the circuit supplied from **the mains is taken as 20 A instead of 16 A**.
- (5.6.8) Add new requirements for functional earthing: e.g. in appliance inlets, creepage and clearance shall **comply with double or reinforced insulation**.
- (5.7.4) Add additional test method for **unearthed accessible parts** concerning touch current or touch voltage.
- (5.7.6) Modify requirements when **touch current exceeds ES2 limit** as below:
  - The value of current **exceeding 10mA** shall be indicated **in the installation instructions**, and;
  - Measuring test method** specified in clause 8 of IEC 60990: 2016 **by inserting an ammeter of negligible impedance (for example, 0,5 Ω) in series with the protective conductor**.
- (5.8) Add new requirements for **backfeed safeguards** in battery backed up supplies.
- (6.3.1, 6.4.5.2, 6.4.6, 6.4.7.2) Add a mass of **less than 4g** or **a volume not exceeding 1750mm<sup>3</sup>** not applied to requirements of combustibal materials (without considering distance from PIS)
- (6.3.1, 6.4.6) Add that combustible materials can be tested by a **Glow-Wire test at 550°C** (same as IEC 60950-1).
  - 6.3.1** (basic safeguards under normal and abnormal conditions): combustible materials for components and other parts (including electrical enclosures, mechanical enclosures and decorative parts) not inside a fire enclosure.
  - 6.4.6** (Control of fire spread in a PS3 circuit): Within the fire enclosure, combustible materials around tubing for air or fluid systems, containers for powders or liquids and foamed plastic parts.
- (6.4.8.3.1, 6.4.8.3.3, 6.4.8.3.4) Add **brand-new Figure 40** for the determination of top, bottom and side openings, that an **angle of more than 5 degrees on the side** can be considered as a top or bottom opening. Delete **NOTES 6.4.8.3.3 and 6.4.8.3.4**.

- “NOTE Any openings within the zone as shown in Figure 41 (Figure 42) are regarded to be top openings (bottom openings), including side openings.”
19. (6.4.8.3.3, 6.4.8.3.4) Add the description of **top and bottom opening properties** shall apply to openings **located in PS3 circuit**.
  20. (6.4.8.3.4) Modify the bottom opening and bottom properties as specified below.
    - a. **Delete item c)** for mesh openings and **item d)** for other shaped openings in Table 34 & Table 35.
    - b. **Add Figure 43** for a baffle plate construction. (Same as IEC 60950-1)
    - c. **Add an additional elements for instructional safeguards for use in fixed installations.**
  21. (6.4.8.3.5) Add **side openings and opening properties**, major projections from the PIS point down to 5 degrees angle **can be regarded as bottom openings**. The maximum projection distance does not **exceed the horizontal distance 15mm**.
  22. (6.4.7.2, 6.4.8.3.1, 6.4.8.3.2) Remove **the illustration of old version Figure 39** for caused by **forced air flow**.
  23. (6.4.8.3.3) Delete the description of the original **test method in the paragraph of top openings**, and directly point to the requirements of S.2 which is in accordance with IEC 60695-11-5 specifications.
  24. (6.5.3) Add new requirements of wire size dimension of **internal wiring for socket-outlets specified in Table G.7**.
  25. (8.5.1) **For the intended function, MS2 or MS3 parts** accessible by an ordinary or instructed person will have the following changes.
    - **MS2 part** accessed by an ordinary person: add an **instructional safeguard** shall be provided.
    - **MS3 part** accessed by an ordinary or instructed person: except instructional safeguard shall be provided, also add the requirement for **manually activated stopping device**.
  26. (8.6.1) Add **floor standing equipment** which has controls or a display is **not required to conduct the glass slide test**.
  27. (8.6.2.2) Modify the test method for the static stability test, except for tilt 10° not changed, e.g. changed from **a 20% of the weight but limited to 250N** in any direction except upwards to **a 50% of the weight vertical downwards but limited to 100N** and **a 13% of the weight in all horizontal directions but limited to 100N**, or a tilt 10° at **360° rotation**.
  28. (8.6.5) Modify the test method for the Horizontal force test from **13% or 100N to 20% or 250N**, whichever is less.
  29. (8.7.2) Modify the test method for equipment mounted to a wall, ceiling or other structure; **screw test shall be performed 3 times** according to Table 37.
  30. (9.3, 9.4) Modify the room ambient temperature from 20~25°C to 20~30°C for the temperature test and Table 38, remove accessible parts for intended function to 9.4 (originally in 9.3 for safeguards against thermal energy sources); and add more stringent restrictions to wearable devices.
  31. (9.4) Remove the **protection against TS3** for ordinary and an instructed person, requiring it only for a **skilled person**.
  32. (9.6) Add new requirements and tests for **wireless power transmitters**.
  33. (10.2.1~10.4.4) Modify **radiation for energy source classification, lamps safeguards and laser safeguards**.
  34. (10.6.1) Add the requirements of personal music players as specified below.
    - **Listening devices sold separately** shall comply with the requirements of 10.6.6.
    - Listening devices clearly designed or intended primarily **for use by children**, additional limits of the relevant toy standards may be subject to **EN 71-1: 2011 in Europe**.
    - **An alternative sound pressure in 10.6.3** may be used
  35. (10.6.2.1, 10.6.2.2) Increase **the RS1 or RS2 limits of the digital signal source**.
  36. (10.6.3) Increase an alternative requirement of new standard for **maximum dose exposure and test according to EN 50332-3**, Measurement method for sound dose management.
  37. (10.6.5) Modify the procedure for preventing the exposure of **an ordinary person to an RS2 source** by mandating the provision of **instructional safeguards** and related requirements.
  38. (B.2.3) Delete the text description with the sentence **“the most unfavourable supply voltage required on subclause”**.
  39. (B.4.8) Add the description about whether a PCB forming an open circuit of conductors can be regarded as a safeguard after single fault conditions.
  40. (F.2.2) Add the words **“for safety purpose”** in the sentence

of [graphical symbols](#) shall be in accordance with IEC 60417, ISO 3864-2, ISO 7000 or ISO 7010, if available.

41. (F.3.5.3) Add the sentence “[after operation of the fuse, parts of the equipment that remain energized are at ES3 levels during servicing](#)” for [the fuse in the neutral of the mains](#). In addition, instructional safeguards shall be provided.
42. (F.3.8) Modify to explain that polarity marking is not required when [the pin configuration prevents reversed polarity](#).
43. (G.3.4) Add the description that [a protective device](#) shall feature an adequate [breaking capacity \(rupturing\)](#) to interrupt the maximum fault current (including short-circuit current) that can flow.
44. (G.8.2.1) Add and modify the following:
  - Add additional overload requirements for [fire safeguards for varistors used in controlling the spread of fire](#).
  - [Delete a 10A fuse limit by a short circuited](#) for a method “reduce the likelihood of ignition” chosen.
  - [Change](#) the description of “[clamping voltage](#)” to “[nominal varistor voltage](#)” is above AC mains transient voltage.
45. (G.8.2.3) Modify so that the overload test method for [varistors between the mains conductors and the earth is conducted](#) according to 8.3.8.1 and 8.3.8.2 of IEC 61643-11.
46. (G.9) Modify the test method for [Integrated circuit \(IC\) current limiters](#) with the procedure as outlined in the [brand-new Table G.10](#).
47. (G.10.6, 5.5.6) Modify the test method for [bleeding resistor](#) that is the same as 14.2 b) of the IEC 60065 specification.
48. (Previous G.11.4) [Delete](#) the previous paragraph in [G.11.4](#) and the application example of X/Y capacitors in [previous Tables G.12 to G.15](#).
49. (G.16) Modify the test method for [IC, including capacitor discharge function \(ICX\)](#) as follows:
  - Modified by using [smallest capacitance and resistance for impulse tests](#)
  - Modified by using [largest capacitance and smallest resistance for on/off recycling test](#) shall not less than [2s](#) during the the connection and disconnection cycle time.
- Change the application of an [AC mains voltage from 110% of rated voltage to 120%](#) for 2.5 min.
50. (K.7.1) Add more description on the [separation distances of basic and reinforced insulation](#) for the contact gap [between contacts in the off position](#). e.g. for isolation of class 3 energy sources, which do not pose a threat to life safety, basic insulation should be sufficient.
51. (M.4.3) Remove clause 6.4.5.2 from the fire enclosure of secondary lithium batteries and replace it with the following content.
  - “Equipment with batteries are exempt from the above requirement, if the equipment uses a cell that complies with PS1.”
52. (Annex S, 6.4.8.3.3) Move the needle flame test of top openings into the description of chapter S.2, slightly modify it and include the [brand-new Figure S.1](#) for easy understanding.
53. (Annex X, 5.4.2.1) Add [alternative method of determining clearances](#) for overvoltage category II in insulation in circuits connected to an A.C. mains not exceeding 420 V peak (300 V r.m.s.), as specified in [Annex X](#), which is the same as IEC 60950-1 and IEC 60065.
54. (5.0 of IEC 62368-3, 6.2 or Q.1 of IEC 62368-1) Increase the requirements of new IEC 62368-3 standard for DC power transfer through communication cables and ports, such as USB or PoE.
55. Other than mentioned above, please refer to the latest standard specified, such as...
  - (4.1.4, 5.3.2.1, 5.4.2.3.2.1, 5.4.2.3.2.3, 5.5.9, F.4, Annex C, Annex Y) Outside equipment,
  - (4.1.8, 4.4.4, 5.4.12, 6.4.9, F.4, G.15) Insulating liquids.
  - (8.5.4) Work cells mean areas containing hazardous moving parts, into which people may enter or insert a complete limb or head in order to service or operate the equipment.
  - (8.11.2, 8.11.3.1, 8.11.3.3) Slide-rail mounted equipment (SRME) for requirements, downward test and integrity of slide rail end stops.
  - (G.5.3.4) Transformers using fully insulated winding wire (FIW).
  - (M.7) Lead-acid and nickel-cadmium may explode due

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