



Product Safety Engineering Society

SAN DIEGO CHAPTER MEETING – OCTOBER 2017

ONE WORLD ◦ OUR APPROVAL

# Anticipated Changes for 3<sup>rd</sup> Edition of IEC 62368-1:

Presented by George Daverin, October 10, 2017  
Information from ISPICE meeting / presentation May  
2017



# Ed. No. 3 of IEC 62368-1: Anticipated Changes

## Significant technical changes from 2<sup>nd</sup> Edition

- Includes the following significant technical changes with respect to the previous edition:
  - – addition of requirements for outdoor equipment;
  - – new requirements for optical radiation;
  - – addition of requirements for insulating liquids;
  - – addition of requirements for work cells;
  - – addition of requirements for wireless power transmitters;
  - – addition of requirements for Fully Insulated Wire (FIW);
  - – alternative method for determination of top, bottom and side openings for fire enclosures;
  - – alternative requirements for sound pressure.



# Ed. No. 3 of IEC 62368-1: Anticipated Changes

- **Clause 1 (Scope)**

- Inclusion of 'large equipment installed in Restricted Access Locations' and equipment for use in tropical regions
- Modernization of examples of products under scope, incl. **Tablets, Smartphones, 3D Printers, Kiosks & Wearable Technology** (Annex A).
- Incorporation of **IEC 60950-22** (Outdoor Equipment) into scope/body.
  - Enclosure requirements – Annex Y
- Incorporation of **IEC 60950-23** (Large data storage equipment, ICT w/Robotics) into scope/body.
  - Does not apply to equipment with non-self-contained hazardous moving parts, such as robotic equipment; and personal care robots, including mobile servant robots, physical assistant robots.



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- **Clause 1 (Scope)**
- **IEC 60950-21 (Remote power feeding) - Requirements for Remote Feeding Telecommunication (RFT) circuits** are being incorporated into new **IEC 62368-3, DC power transfer through communication cables or ports**, with expansion to cover both **RFT & USB/PoE/etc.** interfaces...



# Ed. No. 3 of IEC 62368-1: Anticipated Changes

- **Clause 2 (Norm. References) & Clause 3 (Terms/Defs.)**
- Various updates & refinements.
- *New terms/definitions, include,*
  - ***Fixed and Professional Equipment***
  - ***Outdoor enclosure, equipment and location***
  - ***Wireless Power Transmitter***
  - ***Backfeed and Backfeed safeguard***
  - ***Stored Energy Mode***
  - ***Work Cell***
  - ***Fully Insulated Winding Wire (FIW) – ‘Zero-defect wire’***
  - ***Sound exposure levels and Calculated Sound Dose (CSD)***



# Ed. No. 3 of IEC 62368-1: Anticipated Changes

- **Clause 4 (General)**
- IEC TC108 has decided to keep the **legacy component (60065 & 60950-1)** provision in 4.1.1 (for Ed. 3 CDV).
  - **Note:** IEC TC108 **Interpretation Panel** also working on **formal interpretation** of 4.1.1, and its application to systems of AV/ICT, including external components like external power supplies...



# Ed. No. 3 of IEC 62368-1: Anticipated Changes

- **Clause 4 (General)**
- For equipment installed by Ordinary Persons, all *likely* positions of **orientation** of the equipment to be taken into account, incl. possibility of mounting to a non-vertical surface, and regardless of instructions provided by the manufacturer...
- New requirements for **insulating liquids** (also Cl 5 & 6).
- New requirements for **coin/button cell batteries**.



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- **Clause 5 (Electric Shock)**
- New material on **interconnected ES3/ES2/ES1** circuits in secondary circuits of **SMPSs** (similar to 60950-1 approach).
- Refinement of requirements for **Clearances**, incl. new prescriptive option (**Annex X**) *based on* 60950-1 Tables.
- Updated requirements for **Resistors** as safeguards – **Table 29**





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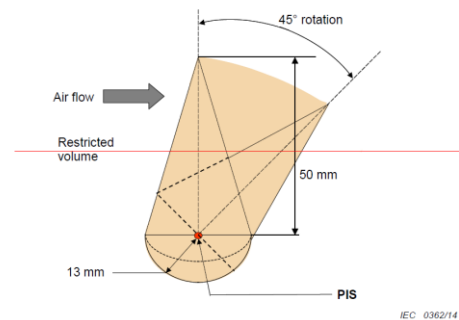
- **Clause 5 (Electric Shock)**
- New requirements for safeguards associated with **Backfeed (5.8)**.
  - Applicable to a battery backed up supply that is an integral part of the equipment and is capable of backfeeding
- **Note:** Recently announced -> **CENELEC OSM (EU)** now accepts **UL 1446** for **EIS** (electrical insulation system) instead of **IEC 60085**.

**UL 1446 ↔ IEC 60085**



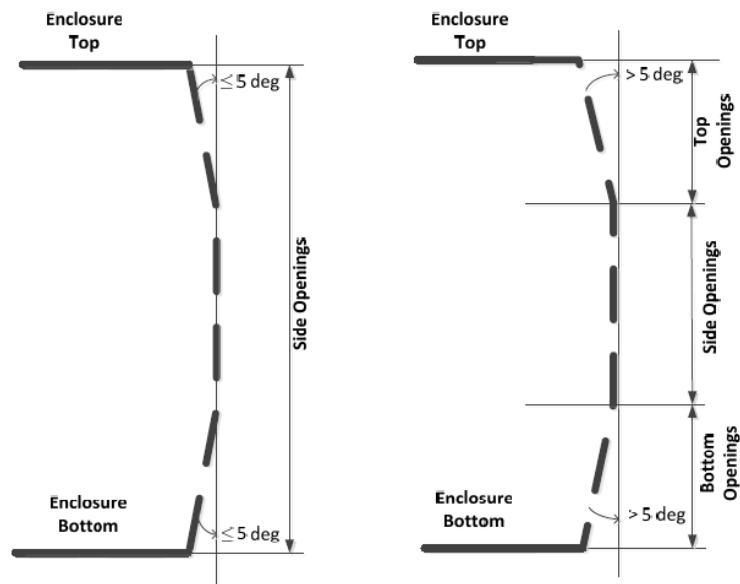
# Ed. No. 3 of IEC 62368-1: Anticipated Changes

- **Clause 6 (Fire)**
- **Glow Wire Test** ( $550^{\circ}\text{C}$ ) reintroduced as option for parts outside Fire Enclosure.
- New allowance for **VW-1** rated wiring instead of IEC wiring flammability standards.
  - Wire complying with UL 2556 VW-1 is considered to comply with these requirements.
- Removal of forced **air flow** considerations...

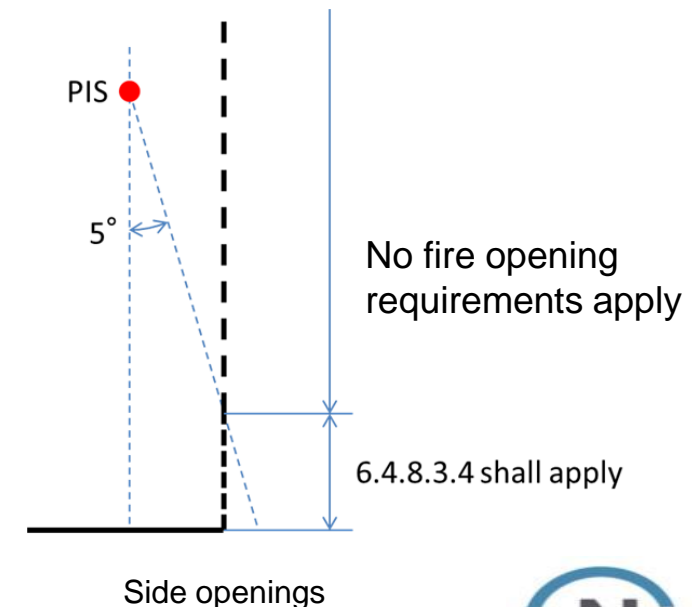


# Ed. No. 3 of IEC 62368-1: Anticipated Changes

- **Clause 6 (Fire)**
- Refined **Top, Side & Bottom Opening** requirements, incl. reintroduction of 5 degree principle from 60950-1.
  - Critical for products requiring *high air flow*, such as enterprise servers.



Determination of Top, Side and Bottom openings



Side openings



# Ed. No. 3 of IEC 62368-1: Anticipated Changes

- **Clause 6 (Fire)**
- **Note:** Agreement also reached by HBSDT to pursue a **Formal Interpretation.**
  - For Peripherals (PDs) not investigated in a system (PSE & PD), and connected to common industry busses featuring power delivery (e.g., USB, PoE, etc.), we no longer can automatically assume supplied by PS 2 or LPS (i.e., they may **not be** < 100 W).
  - Rationale: Such busses are potentially > 100 W, especially non-industry-spec-compliant PSE .
  - Impact: Casing flammability of peripherals (PDs).



# Ed. No. 3 of IEC 62368-1: Anticipated Changes

- **Clause 8 (Mechanical)**
- New 60950-23 -based requirements for **Work Cells** (8.5.4).



- Refinement of **Slide Rail Mounted Equipment (SRME)** requirements.



# Ed. No. 3 of IEC 62368-1: Anticipated Changes

- **Clause 9 (Touch Temperatures)**
- New allowance for devices/parts w/ low heat retention capacity (considerations per IEC Guide 117) instead of Table 38.
- Refinement of **Touch Temperature Limits** (Table 38).
  - New category: Devices worn on the body (in direct contact with the skin) in normal use (> 8 h)
    - Examples include portable lightweight devices such as watches, headsets, music players and sports monitoring equipment. For larger devices or devices in direct contact with vital areas of the face (e.g. the airways), lower limits may apply.



# Ed. No. 3 of IEC 62368-1: Anticipated Changes

- **Clause 9 (Touch Temperatures)**
- New requirements for Wireless Power Transmitters.
  - Wireless power transmitters for near field wireless power transfer can warm up foreign metallic objects that may be placed close to or on such a transmitter.
    - Steel disc
    - Aluminium ring
    - Aluminium foil



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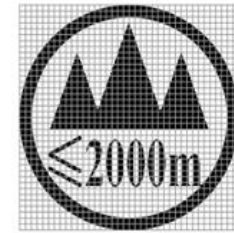
- **Clause 10 (Radiation)**
- Refinement of **Radiation Energy** Source Classifications.
- Refinement of **Acoustic Energy** requirements for Personal Music Players (PMPs), including addition of **Dose Methodology**.
- Addition of **IEC 62471-5** for **laser illuminated projectors** (including LEDs).
- Refinement of Safeguards against laser radiation and optical radiation from lamps and lamp systems (including LEDs)





# Ed. No. 3 of IEC 62368-1: Anticipated Changes

- **Annex A (Equipment within scope)**
  - Inclusion of Tablets, Smartphones, 3D Printers, Kiosks & Wearable Technology
- **Annex F (Markings & Instructional Safeguards)**
  - Removal of **maximum altitude symbol** (from earlier draft).
- **Annex G (Components)**
  - New requirements for enameled Fully Insulated Wire (FIW), sometimes known as Zero Defect Wire.
    - Refinement of requirements for Enameled Wire



# Ed. No. 3 of IEC 62368-1: Anticipated Changes

- **Annex G (Components)**
- Refinement of **IC Current Limiter** requirements (incl. replacement of current three (3) test program options with refined single (1) test program).
- Refinement of **Resistor** (as safeguard) requirements.

Table 29 – Overview of tests for resistor applications

<u>Resistor application</u>	<u>Conditioning G.10.2</u>	<u>Resistor test G.10.3</u>	<u>Voltage surge test G.10.4</u>	<u>Impulse test G.10.5</u>	<u>Overload test G.10.6</u>
<u>Reinforced safeguard or bridging reinforced insulation</u>	X	X			
<u>Between a mains connected circuit and a coaxial cable</u>	X		X <sup>a</sup>	X <sup>b</sup>	
<u>Capacitor discharge safeguard</u>	X				X
<sup>a</sup> For an <u>external circuit</u> indicated in Table 14 ID 6 and 7.					
<sup>b</sup> For an <u>external circuit</u> indicated in Table 14 ID 3, 4 and 5.					

(Table 29 from 5.5.6)



# Ed. No. 3 of IEC 62368-1: Anticipated Changes

- **Annex K (Safety Interlocks)**
  - Refinement of isolation and separation distance requirements
- **Annex M (Batteries)**
- Update to latest **IEC 62133-1 & IEC 62133-2**
- Addition of **IEC 62619** for non-portable applications.
  - *IEC 62619: Secondary cells and batteries containing alkaline or other non-acid electrolytes - Safety requirements for secondary lithium cells and batteries, for use in industrial applications*
- Refined **Battery Ventilation** requirements  
For lead acid and NiCd batteries.



# Ed. No. 3 of IEC 62368-1: Anticipated Changes

- **Annex X** (Alternative method for determining clearances for insulation in circuits connected to an AC mains not exceeding 420 V peak (300 V RMS))

<u>Voltage up to and including</u> <u>V</u>	<u>Mains transient voltage</u>							
	<u>1 500 V<sup>a</sup></u>				<u>2 500 V<sup>a</sup></u>			
	<u>Pollution degree</u>							
	<u>1 and 2</u>		<u>3</u>		<u>1 and 2</u>		<u>3</u>	
	<u>B/S</u>	<u>R</u>	<u>B/S</u>	<u>R</u>	<u>B/S</u>	<u>R</u>	<u>B/S</u>	<u>R</u>
<u>71</u>	<u>1,0</u>	<u>2,0</u>	<u>1,3</u>	<u>2,6</u>	<u>2,0</u>	<u>4,0</u>	<u>2,0</u>	<u>4,0</u>
<u>210</u>	<u>1,0</u>	<u>2,0</u>	<u>1,3</u>	<u>2,6</u>	<u>2,0</u>	<u>4,0</u>	<u>2,0</u>	<u>4,0</u>
<u>420</u>	<u>B/S 2,0 R 4,0</u>							
<u>If the peak of the <b>working voltage</b> exceeds the peak value of the AC <b>mains</b> supply voltage, linear interpolation is permitted between the nearest two points, the calculated minimum <b>clearance</b> being rounded up to the next higher 0,1 mm increment.</u>								
<u><sup>a</sup> The relationship between <b>mains transient voltage</b> and AC <b>mains</b> supply voltage is given in Table 12.</u>								

Table X1

