Safety of AV/ICT Equipment Installed Outdoors

The transition from IEC 60950-22 to IEC 62368-1

With the publication of Edition No. 3 of *IEC 62368-1:2018*, new requirements for audio/ video, information and communication technology (AV/ICT) equipment intended to be installed outdoors now are included in the base IEC 62368-1 standard.

The *Scope* (Clause 1) of IEC 62368-1:2018 now states:

> *"This document also includes requirements for audio/video, information and communication technology equipment intended to be installed in an outdoor location. The requirements for outdoor equipment also apply, where relevant, to outdoor enclosures suitable for direct installation in the field and supplied for housing audio/video, information and communication technology equipment to be installed in an outdoor location. See Annex Y for specific construction requirements not covered elsewhere in this document."*

History

For safety of audio/video (AV) equipment, *IEC 60065:2014, Audio, video and similar electronic apparatus - Safety requirements,* included requirements for *"protection against splashing water"* but did not have a complete set of outdoor installation requirements. The requirements for protection against splashing water were found in *Annex A, Additional requirements for apparatus with protection against splashing water.* The annex included modified requirements for markings and instructions, and insulation, including consideration for splashing water and humidity.

For safety of information technology equipment (ITE), *IEC 60950-22, Information technology equipment - Safety - Part 22: Equipment to be installed outdoors,* has been available since 2005. The first edition of this standard was published in 2005, with a second edition published in 2016.

Per its foreword,

> *"This Part 22 of IEC 60950 is intended to be used with IEC 60950-1:2005. The subclauses of IEC 60950-1 apply as far as reasonable. Where safety aspects are similar to those of Part 1 the relevant Part 1 clause or subclause is shown for reference in parentheses after the clause or subclause title in Part 22. Where a requirement in Part 22 refers to a requirement or criterion of Part 1, a specific reference to IEC 60950-1, is made."*

Therefore, for ITE intended to be installed outdoors, such equipment has been investigated to comply with both IEC 60950-1 and IEC 60950-22, which is the typical relationship between Part 1 and Part 2 standards within the IEC.

IEC 60950-22 is more comprehensive than Annex A of IEC 60065, and covers

- outdoor equipment terminology
- mains transient voltages on mains supply
- markings and instructions
- voltage limits of user-accessible parts in outdoor locations
- construction requirements for outdoor enclosures, including
  - mechanical strength
  - protection from moisture,
  - uv radiation resistance,
  - oil resistance,
  - corrosion resistance,
  - risk of explosion from storage batteries
  - related aspects.

It is important to note that IEC 60950-22 applies to equipment *installed* outdoors, not simply used or operated outdoors. Many AV/ICT products may be used outdoors, including smart phones, tablets, notebook computers and similar products. However, IEC 60950-22 only applies when the equipment is *installed* outdoors (although a manufacturer may apply it to other applications).

Transition to 62368-1

As IEC TC108 was producing the first two editions of IEC 62368-1, initially resulting in Edition No. 1 in 2010 and Edition No. 2 in 2014, it was felt there was no need to take immediate action on specifying new requirements for outdoor equipment covered by IEC 62368-1 during the initial phases of the transition to it. There were many other subject areas of higher priority within the first two editions of IEC 62368-1 that needed considerable refinement.

Therefore, a simple statement was added to the scope (Clause 1) of IEC 62368-1 that indicated, *"Additional requirements for equipment intended for outdoor installation are given in IEC 60950-22."*

However, in preparation for Edition No. 3 of IEC 62368-1, IEC TC108 believed that action was needed on IEC 60950-22 to either (a) modify and propose incorporating 60950 -22 content into the Part 1 standard (IEC 62368-1), but in hazard-based format, or (b) modify and propose the content of 60950-22 as a Part 2 standard (similar to IEC 60950-22), but in hazard-based format.

After considerable deliberation IEC TC108 decided that, due to the prevalence of AV/ICT equipment installed outdoors, but with only a limited of number of special requirements as a result, it would be most effective if the principles and requirements in IEC 60950-22 were integrated into and associated with the Part 1 standard (62368-1) rather proposing them in a separate Part 2 standard. Members agreed that certain aspects could be incorporated into the main body (Clauses 1-10), with special requirements— particularly for outdoor enclosures— being incorporated into a new annex. Members created a proposal in this direction.

For users already familiar with IEC 60950-22, a key observation on the 60950-22 to 62368-1 transition is that, for the most part, the requirements in IEC 62368-1:2018 are either very similar or the same as the legacy requirements in IEC 60950-22.

However, IEC TC108 converted principles and requirements from IEC 60950-22 into hazard-based safety concepts, terminology and requirements, so the presentation of the requirements is different. Nevertheless, the overall impact is

expected to be relatively minor and likely will be no more impactful to most manufacturers of outdoor AV/ICT equipment than the transition of their indoor AV/ICT equipment from IEC 60065 and IEC 609501 to IEC 62368-1.

With the more recent publication of CSA / UL 62368-1:2019 and EN IEC 62368-1:2020, national and regional differences also were carried over from the CSA/UL 60950-22 and EN 60950-22 standards without significant changes.

Roadmap

Considering the above context, most users of IEC 62368-1 will benefit from a roadmap of the legacy requirements in IEC 60950-22 and their parallel location in IEC 62368-1.

As a result, UL Solutions has compiled in tabular form a correlation between sub-clause references in IEC 60950-22 and the content of parallel content in IEC 62368-1:2018. See ***Annex - Roadmap: IEC 60950-22:2016 & IEC 62368-1:2018 (Edition No. 3)*** *at the conclusion of this paper.*

For most existing users of IEC 60950-22, this roadmap will provide adequate information on the 60950-22 to 62368-1 transition and will not require full retraining on requirements for outdoor AV/ICT equipment.

UL Solutions hopes this roadmap will be helpful to interested industry members and other stakeholders preparing for the industry transition from the legacy AV/ICT standards to the IEC 62368-1 standard.

Annex

Roadmap: IEC 60950-22:2016 & IEC 62368-1:2018 (Edition No. 3)

IEC 60950-22: 2016	**Information Technology Equipment - Safety - Part 22: Equipment to be Installed Outdoors**		**IEC 62368-1: 2018**	**Audio/video, information and communication technology equipment - Part 1: Safety requirements**	**Observation**
Sub-clause/ Annex	**Title**		**Sub-clause/ Annex**	**Title**	
1	**Scope**		**1**	**Scope**	
1.1	Equipment covered		1		
1.2	Additional requirements		1		
2	**Normative references**		**2**	**Normative references**	
3	**Terms and definitions**		**3**	**Terms and definitions**	
3.1	Outdoor location		3.3.6.7	Outdoor location	
3.2	Outdoor equipment		3.3.3.5	Outdoor equipment	
3.3	Outdoor enclosure		3.3.2.5	Outdoor enclosure	
4	**Conditions for outdoor equipment**		-	-	
4.1	Ambient air temperature		4.1.4	Equipment installation	

IEC 60950-22: 2016	Information Technology Equipment - Safety - Part 22: Equipment to be Installed Outdoors		IEC 62368-1: 2018	Audio/video, information and communication technology equipment - Part 1: Safety requirements	Observation
4.2	Mains Supply		-	-	
4.2.1	General		5.4.2.3.2.1	Determining transient voltages – General	
4.2.2	Mains transient voltage on AC mains supply		5.4.2.3.2.2	Determining AC mains transient voltages	
4.2.3	Mains transient voltage on DC mains supply		5.4.2.3.2.3	Determining DC mains transient voltage	
4.3	Rise of earth potential		-	-	Inherently covered within Cl. 5
5	**Marking and instructions**		F.4	Instructions	
6	**Protection from electrical shock in outdoor location**		-	-	
6.1	Voltage limits of user-accessible parts in outdoor locations		5.3.2.1	Accessibility to electrical energy sources and safeguards - Requirements	

IEC 60950-22: 2016	Information Technology Equipment - Safety - Part 22: Equipment to be Installed Outdoors		IEC 62368-1: 2018	Audio/video, information and communication technology equipment - Part 1: Safety requirements	Observation
6.2	Limited current circuits in outdoor locations		5.3.2.1		
6.3	Protection for socket-outlet in outdoor locations		5.5.9	Safeguards for socket-outlets in outdoor equipment	
7	**Wiring terminals for connection of external conductors**		-	-	Inherently covered within Cl. 4 & Annex G.
8	**Construction requirements for outdoor enclosures**		**Annex Y (normative)**	**Construction requirements for outdoor enclosures**	
8.1	General		Y.1	General	
8.2	Resistance to ultra-violet radiation		Y.2	Resistance to UV radiation	
8.3	Resistance to corrosion		Y.3	Resistance to corrosion	
8.3.1	General		Y.3.1	General	

IEC 60950-22: 2016	Information Technology Equipment - Safety - Part 22: Equipment to be Installed Outdoors		IEC 62368-1: 2018	Audio/video, information and communication technology equipment - Part 1: Safety requirements	Observation
8.3.2	Test apparatus		Y.3.2	Test apparatus	
8.3.3	Test procedure		Y.3.4	Test procedure	
8.3.4	Compliance criteria		Y.3.5	Compliance criteria	
8.4	Bottoms of fire enclosures		-	-	Inherently covered within Cl. 6.
8.5	Gaskets		Y.4	Gaskets	
8.5.1	General		Y.4.1	General	
8.5.2	Oil resistance		Y.4.5	Oil resistance	
8.5.3	Securing means		Y.4.6	Securing means	
9	**Protection of equipment within an outdoor enclosure**		Y.5	Protection of equipment within an outdoor enclosure	
-	-		Y.5.1	General	
9.1	Protection from moisture		Y.5.2	Protection from moisture	
9.2	Protections from plants and vermin		Y.5.4	Protections from plants and vermin	
9.3	Protection from excessive dust		Y.5.5	Protection from excessive dust	

IEC 60950-22: 2016	Information Technology Equipment - Safety - Part 22: Equipment to be Installed Outdoors		IEC 62368-1: 2018	Audio/video, information and communication technology equipment - Part 1: Safety requirements	Observation
10	**Mechanical strength of enclosures**		Y.6	Mechanical strength of enclosures	
10.1	General		Y.6.1	General	
10.2	Impact test		Y.6.2	Impact test	
11	**Outdoor equipment containing valve regulated or vented batteries**		**Annex M (normative)**	**Equipment containing batteries and their protection circuits**	
11.1	Risk of explosion from lead acid, NiCd and NiMH batteries		M.7	Risk of explosion from lead acid, NiCd and NiMH batteries	
11.2	Ventilation preventing an explosive gas concentration		M.7.1	Ventilation preventing an explosive gas concentration	
11.2	Ventilation test		M.7.3	Ventilation test	
Annex A (normative)	**Water-saturated Sulphur dioxide atmosphere (see. 8.3.2 and 8.3.3)**		Y.3.3	Water-saturated Sulphur dioxide atmosphere	
Annex B (normative)	**Water spray test (see 9.1)**		Y.5.3	Water spray test	

IEC 60950-22: 2016	Information Technology Equipment - Safety - Part 22: Equipment to be Installed Outdoors		IEC 62368-1: 2018	Audio/video, information and communication technology equipment - Part 1: Safety requirements	Observation
Annex C (normative)	**Ultraviolet light conditioning test (see 8.2)**		**Annex C (normative)**	**UV radiation**	
C.1	Test apparatus		C.2.1	Test apparatus	
C.2	Mounting of test samples		C.2.2	Mounting of test samples	
C.3	Carbon-arc light-exposure apparatus		C.2.3	Carbon-arc light-exposure test	
C.4	Xenon-arc light-exposure apparatus		C.2.4	Xenon-arc light-exposure test	
Annex D (normative)	**Gasket tests (see 8.5)**		-	-	
D.1	Gasket tests		Y.4.2	Gasket tests	
D.2	Tensile strength and elongation tests		Y.4.3	Tensile strength and elongation tests	
D.3	Compression tests		Y.4.4	Compression tests	
D.4	Oil immersion tests		Y.4.5	Oil resistance	
Annex E informative	**Rationale**		**IEC TR 62368-2**	**Part 2: Explanatory information related to IEC 62368-1:2018**	

IEC 60950-22: 2016	Information Technology Equipment - Safety - Part 22: Equipment to be Installed Outdoors		IEC 62368-1: 2018	Audio/video, information and communication technology equipment - Part 1: Safety	Observation
E.1	General		See corresponding Clause/Annex in TR 62368-2 correlating with above.		
E.2	Electric shock		"	-	
E.3	Energy related hazards		"	-	
E.4	Fire		"	-	
E.5	Mechanical hazards		"	-	
E.6	Heat-related hazards		"	-	
E.7	Radiation		"	-	
E.8	Chemical hazards		"	-	
E.9	Biological hazards		"	-	
E.10	Explosive hazards		"	-	
Bibliography	-		**Bibliography**	-	