



Safety of AV & ICT Equipment Containing Work Cells with MS3 parts *The transition from IEC 60950-23 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 containing work cells with MS3 parts, including large data storage equipment, now are included in the base IEC 62368-1 standard.

History

For safety of information technology equipment (ITE) specifically associated with large data storage equipment, *IEC 60950-23, Information Technology Equipment - Safety - Part 23: Large Data Storage Equipment*, has been available since 2005.

Per its Scope,

“This part of IEC 60950 specifies requirements for information technology equipment (ITE) with self contained data storage systems that contain hazardous moving parts. These data storage systems are typically large enough to permit a person to enter completely, however, the systems also include similar large equipment permitting complete limb or head access to the area containing hazardous moving parts. These requirements are additional to the relevant requirements in IEC 60950-1. The maximum three dimensional reach of a cartridge accessory assembly typically has a minimum motion envelop of 0,75 m³ or more... The equipments shall be installed in a RESTRICTED ACCESS LOCATION, such as a data centre... This standard is not applicable to equipment with non-self-contained hazardous moving parts, such as robotic equipment installed in an industrial environment.”

Additionally, per the Scope’s Note 1,

“An example of equipment covered by this scope is an automated information mass storage and retrieval system that uses integral hazardous moving parts for



the handling of recorded media (for example, tape cartridges, tape cassettes, optical disks, etc.) and similar functions.”

When tape and disk storage was more prevalent in the 1990s and early 2000s, it was believed by IEC TC108 that there was a need for such a Part 2 standard since the equipment involving such tape / media storage was very large, often involving complete body, head and / or limb access to (interlocked) areas involving moving parts.

More importantly, the fact that this equipment had relatively complex (powerful and fast moving) robotic arms and parts was leading some to the conclusion that the EU Machinery Directive was required for such equipment. However, IEC TC108 took the position that if there was a standard that had inclusive requirements that addressed all the potential hazards unique to such large equipment with moving parts, there would be no need to refer and use other IEC standards beyond those produced by IEC TC108. As a result IEC 60950-23 was developed and proposed by a team of manufacturers and other experts who had an interest in the topic, resulting in the 2005 publication of IEC 60950-23.

Like other Part 2 standards, such as IEC 60950-22 for Outdoor ITE, IEC 60950-23 is intended to be used with IEC 60950-1 to cover all potential hazards associated with the equipment. IEC 60950-23 specifically concentrated on the moving parts associated with the work cell, but did not address other safety aspects such as risk of electric shock and fire.

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, and because of the existence of IEC 60950-23, it was felt there was no need to take immediate action on incorporating detailed requirements in hazard-based format for large data storage 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, within the clause for *Mechanically-caused injury* (Clause 8), sub-clause 8.5.4, *Special categories of equipment comprising moving parts*, specific interim requirements were included as sub-clause 8.5.4.1, *Large data storage equipment*,

“The requirements of IEC 60950-23 are additional to the relevant requirements in this standard ... Large equipment is typically of such a size that a person may enter completely. Systems may also include similar equipment having areas containing moving parts into which only a complete limb or head may enter. These requirements apply to a three dimensional envelope of 0,75 m³ or more within reach of the moving part.

The following references in IEC 60950-23 shall be treated as follows:

- *replace IEC 60950-1:2005, 2.8 by Annex K;*
- *replace IEC 60950-1:2005, 2.8.6 by Clause K.4;*
- *replace "SERVICE PERSON" by "skilled person";*
- *replace "OPERATOR ACCESS AREA" by "areas accessible by an ordinary person as determined by Annex V".*

NOTE An example of these systems is a self-contained data storage system.”

Due to the existence of IEC 60950-23, this treatment of such equipment was considered adequate for the first two editions of IEC 62368-1.

However, in preparation for Edition No. 3 of IEC 62368-1, IEC TC108 believed that action was needed on IEC 60950-23 to either (a) modify and propose incorporating 60950-23 content into the Part 1 standard (IEC 62368-1), but in hazard-based format, or (b) modify and propose the content of 60950-23 as a Part 2 standard (similar to IEC 60950-23), but in hazard-based format.

After deliberation IEC TC108 decided that, due to the limited number of special requirements for AV / ICT Equipment Containing Work Cells with MS3 parts, it would be more effective if the principles and requirements from IEC 60950-23 were integrated into and associated with the Part 1 standard (62368-1) rather proposing them in a separate Part 2 standard. Essentially, agreement was reached that sub-clause 8.5.4, *Special categories of equipment containing moving parts*, could be expanded to include



all the key considerations previously covered in IEC 60950-23, but with modification to make the requirements hazard-based so they are consistent with the rest of IEC 62368-1.

For those users already familiar with IEC 60950-23, a key observation on the 60950-23 to 62368-1 transition is that, for the most part, the requirements in IEC 62368-1:2018 are either very similar or the same in effect as the legacy requirements in IEC 60950-23.

However, IEC TC108 converted principles and requirements from IEC 60950-23 into hazard-based safety concepts, terminology and requirements, so certainly there is different presentation of the requirements. Nevertheless, the overall impact is expected to be relatively minor and likely will be no more impactful to most manufacturers of AV/ICT equipment containing work cells with MS3 parts than the transition of other AV/ICT equipment from IEC 60950-1 to IEC 62368-1.

It is noted that with the more recent publication of CSA / UL 62368-1:2019 and EN IEC 62368-1:2020, national / regional differences also were carried over from the CSA / UL 60950-23 and EN 60950-23 standards without significant changes.

Roadmap

Considering the above context, most users of IEC 62368-1 who produce equipment currently covered by IEC 60950-23 will benefit from a roadmap of the legacy requirements in IEC 60950-23 and their parallel location in IEC 62368-1.

As a result, UL LLC has compiled in tabular form a correlation between sub-clause references in IEC 60950-23 and the content of parallel content in IEC 62368-1:2018. See ***Annex - Roadmap: IEC 60950-23:2005 & IEC 62368-1:2018 (Edition No. 3)*** at the conclusion of this paper.

For most existing users of IEC 60950-23, this roadmap will provide adequate information on the 60950-23 to 62368-1 transition and will not require full retraining on requirements for AV & ICT equipment containing work cells with MS3 parts.

UL LLC 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 60950-23:2005 & IEC 62368-1:2018 (Edition No. 3)

IEC 60950-23: 2005	Information Technology Equipment - Safety - Part 23: Large Data Storage Equipment	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	
2	Normative references	2	Normative references	
3	Terms and definitions	3	Terms and definitions	
3.1	Work cell	3.3.6.16	Work cell	
-		8.5.4	Special categories of equipment containing moving parts	
-		8.5.4.1	General	
-		8.5.4.2	Equipment containing work cells with MS3 parts	
4	Protection of persons in the work cell	8.5.4.2.1	Protection of persons in the work cell	
5	Interlock override	8.5.4.2.2	Access protection override	
5.1	General	8.5.4.2.2.1	General	



5.2	Visual indicator		8.5.4.2.2.2	Visual indicator	
6	Emergency stop system		8.5.4.2.3	Emergency stop system	
7	Endurance tests		8.5.4.2.4	Endurance requirements	
8	Abnormal operation		-	-	Covered under 8.5.4.2.1
Annex A	Bibliography		Bibliography	-	