



New Amendment No. 2,
IEC 60950-1, Ed. No. 2:
Overview, Impact & Transition...

Lunch & Learn @ UL Brea
July 11, 2014

Anh K. Nguyen

Introduction

Topics

- Introduction
- Background: Amendment No. 2
- Review: Amendment No. 2, Key Changes
- Status: CB Scheme, Europe, North America, etc.
- Transition: from 60950-1 to 62368-1
- Q&A



Objectives

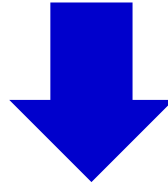
- ❑ Understand the key details and potential impact of Amendment No. 2 to IEC 60950-1 Edition No. 2
- ❑ Assist with strategic planning related to Amendment No. 2, including investigating and certifying equipment to Amendment No. 2
- ❑ Assist with strategic planning for the pending 60950-1 to 62368-1 transition...



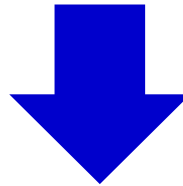
Background: Amendment No. 2

IEC 60950-1

IEC 60950-1, Ed. No. 2 (2005)



IEC 60950-1, Ed. No. 2, Amendment No. 1 (2009)

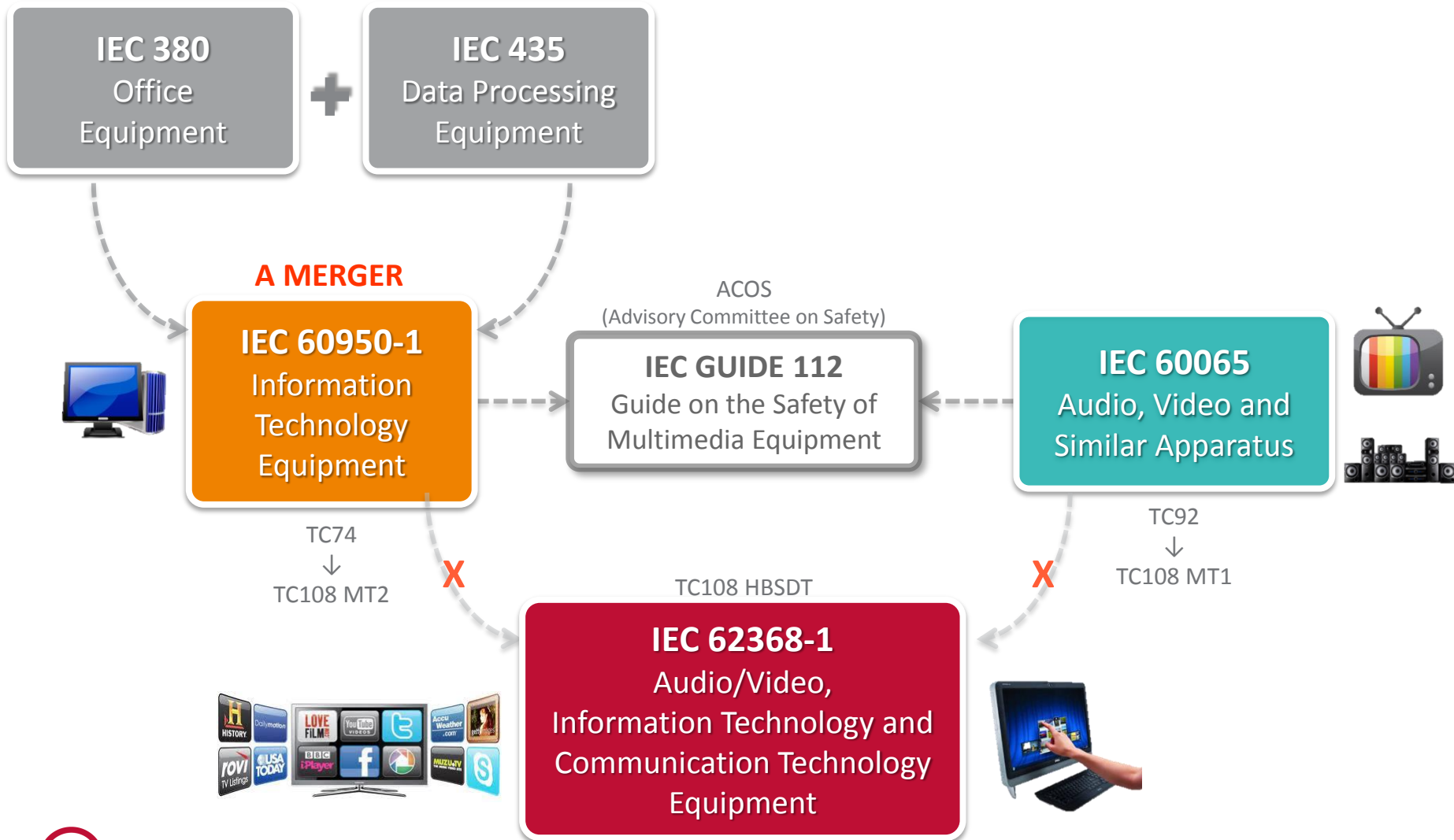


IEC 60950-1, Ed. No. 2, Amendment No. 2 (2013)

Important – Am. No. 2 is last Amendment to 60950-1 before full transition to IEC 62368-1 !



Evolution



Review: Amendment No. 2

Amendment No. 2



Good News !

- Amendment No. 2 changes are mostly minimal impact and mostly to allow for smoother transition from IEC 60950-1 to IEC 62368-1.
- Revisions help promote more consistent and intended application of the standard, accommodate more recent technology advances and also include changes/updates to referenced standards.



1.5.1 - Components

IEC TC108 supply chain dilemma:

What can TC108 do to encourage component manufacturers to use IEC 62368-1 and not penalize the business if they want to sell the components to end product manufacturers still using IEC 60950-1 (or IEC 60065)?



1.5.1 - Components

IEC TC108 solution → add following provision into 60950-1 (and 60065):

1.5.1 Components and subassemblies that comply with **IEC 62368-1** are acceptable as part of equipment covered by this standard *without further evaluation other than to give consideration to the appropriate use of the component or subassembly in the end-product.*

Will allow for backwards compatibility of 62368-1...

Will help ease of transition & implementation...



IEC 62368-1: Clause 4 – General requirements

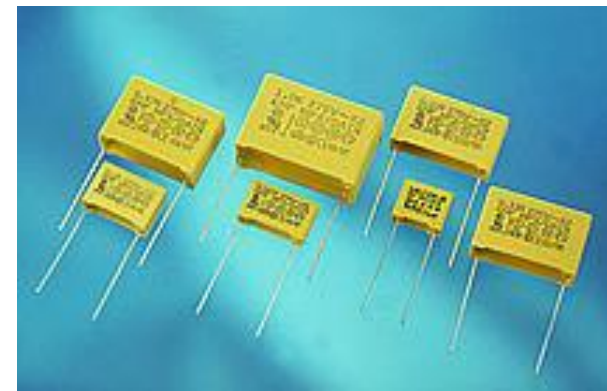
Note: IEC 62368-1 also accommodates legacy components!

4.1.1 Application of requirements and acceptance of materials, components and subassemblies

Components and subassemblies that comply with IEC 60950-1 or IEC 60065 are acceptable as part of equipment covered by this standard *without further evaluation other than to give consideration to the appropriate use of the component or subassembly in the end-product.*



1.5.6 - Capacitors



Change:

- Continuing with modifications made in Amendment 1, adds further detail to Table 1C and the accompanying Rules to closer align with IEC 62368-1 and work done to update the requirements for capacitors.
- During the last set of Amendment 1 revisions, some needed details were left out which made the requirements incomplete and difficult to apply.

Impact: Minor. Intent is clarify application, not impose new requirements.



1.5.6 - Capacitors

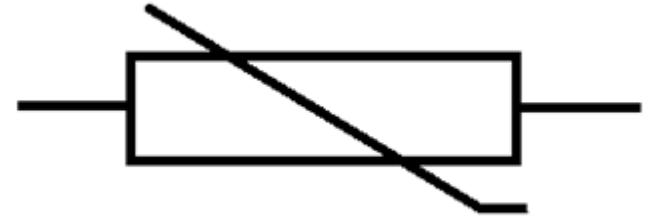
- Table 1C Revisions
- Table 1C Rules
- Table 1D Revisions – Indicated references to Table 5B, 5C (Electric Strength test values)

Table 1C – Capacitor ratings according to IEC 60384-14

Capacitor subclass according to IEC 60384-14	RATED VOLTAGE of the capacitor V r.m.s.	TYPE TEST impulse voltage of the capacitor kV peak	TYPE TEST r.m.s voltage of the capacitor kV r.m.s
Y1	Up to and including 500	8	4
Y2	Over 150 up to and including 300	5	1,5
Y4	Up to and including 150	2,5	0,9
X1	Up to and including 760	4 ^a	-
X2	Up to and including 760	2,5 ^a	-



1.5.9.4 & Annex Q - VDRs



Change:

- Clarifies requirements for use of VDRs & GDTs in series that aligns with more comprehensive revisions being made to IEC 62368-1 resulting from task group work within IEC TC108 HBSDT (108/441/INF).
- Changes only address VDRs & GDTs bridging **Basic** Insulation in Pluggable Type A.
 - Pluggable B & Perm. Connected Equipment already covered...
- Does not address bridging of **Double** or **Reinforced** Insulation, which requires further TC108 study.

Impact: Minor, since the content reflects common practice currently followed during certification.



1.5.9.4

For [Pluggable Equipment Type A], it is permitted to bridge BASIC INSULATION by a VDR in series with a GDT provided that:

- the VDR complies with the requirements of Annex Q; and
- the GDT complies with:

- the electric strength test for BASIC INSULATION; and
- the external CLEARANCE and CREEPAGE DISTANCE requirements for BASIC INSULATION.

Compliance is checked by inspection and, if necessary, by measurement and test.



Annex Q

Change (cont.):

- Annex Q includes updated references and material based on Am 1 to IEC 61051-2.
 - Although existing Annex Q references IEC 61051-2, some information was missing needed to determine whether a VDR meets ITE applications. This additional detail has been identified and added to Edition No. 2 of IEC 62368-1 - so now it is being added to IEC 60950-1 to allow for more effective use of Annex Q.
 - Includes provision that VDR case/enclosure needs to comply with Needle Flame or V-1.

Impact: Considerable, potentially, since there have been some problems to date identifying compliant/suitable VDRs. However, more VDR manufacturers are beginning to certify to the latest IEC 61051-2 standard.



Annex Q

A VDR shall comply with IEC 61051-2, whether a FIRE ENCLOSURE is provided or not, taking into account all of the following:

– Preferred climatic categories (2.1.1 of IEC 61051-2:1991):

- lower category temperature: – 10 °C
- upper category temperature: + 85 °C
- duration of damp heat, steady state test: 21 days.

– Maximum continuous voltage

- at least 1,25 times the rated voltage of the equipment or
- at least 1,25 times the upper voltage of the rated voltage range.

– Combination pulse (Table I group 1 of IEC 61051-2:1991 including Amendment 1:2009).

For the test, a combination pulse is selected from 2.3.6 in IEC 61051-2:1991, Amendment 1: 2009. The test consists of 10 positive pulses or 10 negative pulses, each having a shape of 1,2/50 µs for voltage and 8/20 µs for current.

For the selection, AC MAINS SUPPLY voltage and overvoltage category, see Table G.1.



Annex Q (con't)

The body of the VDR shall comply with the needle flame according to IEC 60695-11-5, with the following test severities:

- duration of application of the test flame: 10 s;
- after flame time: 5 s.

If the body of the VDR complies with V-1 CLASS MATERIAL, the needle flame test does not need to be performed.



2.5 – LPS & PTC Devices



Change:

- In **Table 2B**, *Limits for power source without an OCPD*, the ‘note d’ for measurement of I_{sc} and S are modified for PTC devices to allow a 60s measurement instead of 5s.
- This change was added since some of the PTC devices used in ITE would trip too soon under the 5s criteria, considering the need to accommodate T_{ma} and the fact that PTC devices are temperature dependent.

Impact: Minor. Intent to allow more flexibility choosing components.



2.5 – LPS & PTC

- Table 2B

TABLE 2B

Simulated faults in a regulating network, required according to item c) above, are applied under the above maximum measured values of I_{sc} or S .

Table 2B – Limits for power sources without an overcurrent protective device

Output voltage * (U_{oc})		Output current ** (I_{sc}) A	Apparent power ** (S) VA
V a.c.	V d.c.		
≤ 30	≤ 30	$\leq 8,0$	≤ 100
–	$30 < U_{oc} \leq 60$	$\leq 150/U_{oc}$	≤ 100

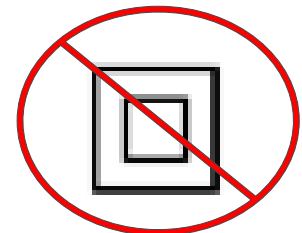
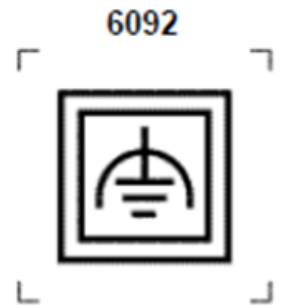
* U_{oc} : Output voltage measured in accordance with 1.4.5 with all load circuits disconnected. Voltages are for substantially sinusoidal a.c. and ripple free d.c. For non-sinusoidal a.c. and d.c. with ripple greater than 10 % of the peak, the peak voltage shall not exceed 42,4 V.
 ** I_{sc} : Maximum output current with any non-capacitive load, including a short-circuit.
 ** S (VA): Maximum output VA with any non-capacitive load.
 d Measurement of I_{sc} and S are made 5 s after application of the load if protection is by an electronic circuit and 60 s for a positive temperature coefficient device, and 60 s or in other cases.



2.6.2 – Functional Earthing

Change:

- In 2011 a new symbol was added to IEC 60417:
 - **IEC 60417-6092**, Class II equipment with functional earthing (grounding)
- It is the present intent of TC108 that this new symbol **6092** is to be used with equipment incorporating functional earthing.
 - The traditional double insulation symbol **cannot** be marked on such equipment.
 - Current Am2 allows **either** IEC 60417-6092 **or** IEC 60417-5018.



2.6.2 – Functional Earthing

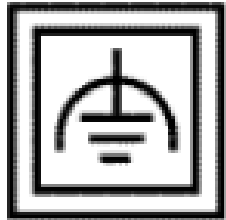
Change (cont.):

- For **IEC 60065** and **62368-1**, it was decided by IEC TC108 to modify the wording in the **IEC 60065** and **62368-1** FDISs to reflect only allowing symbol **6092** to be marked on equipment with Functional Earthing. However, since IEC 60950-1 had already passed FDIS when the decision was made, the changes could not be made to it - an Informational Document (INF) is planned to clarify the current intent of IEC TC108 for IEC 60950-1.

Impact: Minor, since limited number of products affected. Products w/**Functional Earthing** should be marked with the new **FE** symbol.



6092



Class II equipment with functional earthing; Class II equipment with functional grounding (US)

To identify a piece of class II equipment with the functional earthing (grounding).

5018



Functional earthing; functional grounding (US)

To identify a functional earthing (grounding) terminal, for example, of a specially designed earthing (grounding) system to avoid causing malfunction of the equipment.

2.9.2 – Humidity Conditioning



Change:

- Adds conditions for *tropical conditions*.

For equipment designated for use in tropical conditions, the time duration shall be 120 h at a temperature of (40 ± 2) °C and a relative humidity of (93 ± 3) %.

- *120 h vs. 48 h; 40 C vs. 20-30 C*

Impact: Minor. Added to allow for application in IEC standard any National Differences that specify need to consider tropical conditions.



4.2.11 – Rotating Solid Media

Note - Although not formally indicated as a change in Amendment. No. 2, the August 2012 **Corrigendum 1** for Amendment No. 1 of IEC 60950-1, Ed. 2 removed sub-clause **4.2.11** from Am 1. Therefore, it also is no longer in Am 2.

- **4.2.11** attempted to address potential mechanical hazards and injury to persons due to rotating solid media breaking apart



4.3.8 - Batteries



Change:

- IEC TC108 made a commitment to the IECEE Certification Management Committee (CMC) of the CB Scheme to add a reference to **IEC 62133**, Ed. 2 once the 62133 standard was revised to incorporate some needed changes.
- As a result, there now is a reference to IEC 62133 for *portable secondary sealed cells and batteries (other than button) containing alkaline or other non-acid electrolyte*, which includes Lithium-Ion.



IECEE - What's New



Please click on the bar to have more details of the new item.

IECEE Archives of previous "What's new" items

2011-12-13:CLARIFICATION OF THE CURRENT DECISION IECEE-ACAG/1398/PDSH (Batteries)

The CMC agreed that ACAG/1398/PDSH shall apply for all other products falling outside the scope of TC 108

Excerpt from the Minutes of the 2011 CMC meeting of Istanbul:

The CMC agreed with the Chairman statement that Item 16.3 - Battery Packs - under section 8.3 f) of the PAC Report PAC/1597/RCMC was also covered by the discussion under this Item.

Between 1 may 2011 and 2012 the CTL test schedule can be used to test the differences between UL1642 and IEC62133 in order to meet the full IEC62133.

After 1 May 2012 the IEC62133 shall be used.

Please [click here](#) to view the table listing the types of batteries

4.3.8 Batteries

NOTE 1 Requirements for markings or instructions are given in 1.7.13.

NOTE 2 Requirements for overcurrent protection are given in 3.1.1 and 5.3.1.

NOTE 3 Requirements for stationary batteries (such as large secondary batteries installed in a fixed installation and external to the equipment) are given in IEC 60896-21, IEC 60896-22 and EN 50272-2.

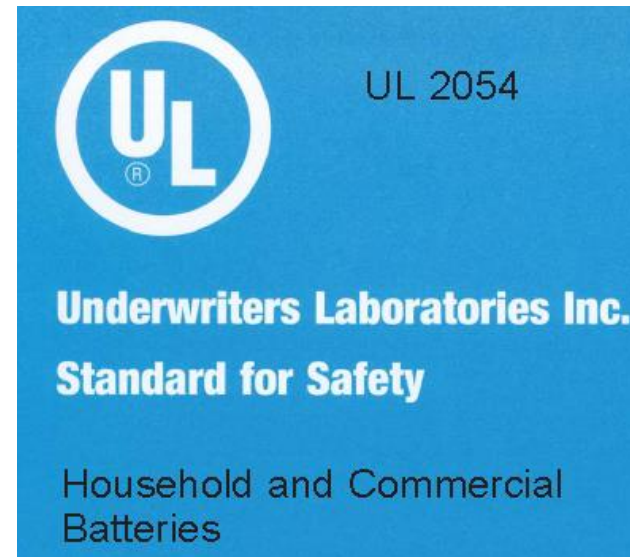
Portable secondary sealed cells and batteries (other than button) containing alkaline or other non-acid electrolyte shall comply with IEC 62133.



4.3.8 - Batteries

Impact: Potentially Considerable

- To comply with IEC 60950-1, portable secondary sealed cells and batteries (other than button) containing alkaline or other non-acid electrolyte, including Li-Ion batteries, will need to comply with IEC 62133, Ed. 2 (2012) as a component requirement.



Batteries – CAN & US National Differences

In Canada/U.S., for CSA/UL 60950-1, the THC has proposed a series of National Differences.

- **1.1.3: Battery backup systems** that are not an integral part of **stationary equipment**, such as provided in separate cabinets, are subjected to the Standard for *Batteries for Use in Light Electric Rail (LER) Applications and Stationary Applications, UL 1973*.
- **4.3.8: Portable** secondary sealed cells and batteries (other than button) containing alkaline or other non-acid electrolyte are required to comply with either (a) IEC 62133 and applicable parts of Annex M of IEC 62368-1, Edition No. 2, or (b) UL 2054 and 4.3.8.
- **4.3.8:** Battery packs with secondary sealed cells and batteries (other than button) containing alkaline or other non-acid electrolyte and used in **stationary equipment** are required to comply with either IEC 62133, UL 2054 or UL 1973. Such battery packs that rely on solid-state circuits and software controls as safeguards shall comply with UL 1973 requirements for System Safety Analysis (5.7) and Protective Circuit and Controls (5.8) or similar requirements.



Batteries – CAN & US National Differences

Status:

- Proposal was supported during first (Preliminary) round of Public Comment and now will proceed to formal SCC/CSA TSC and ANSI/UL STP voting stage. Expected to be accepted.

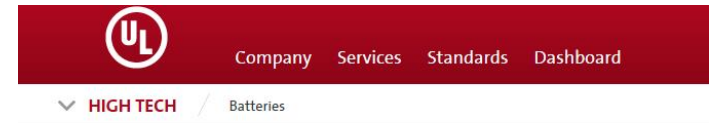
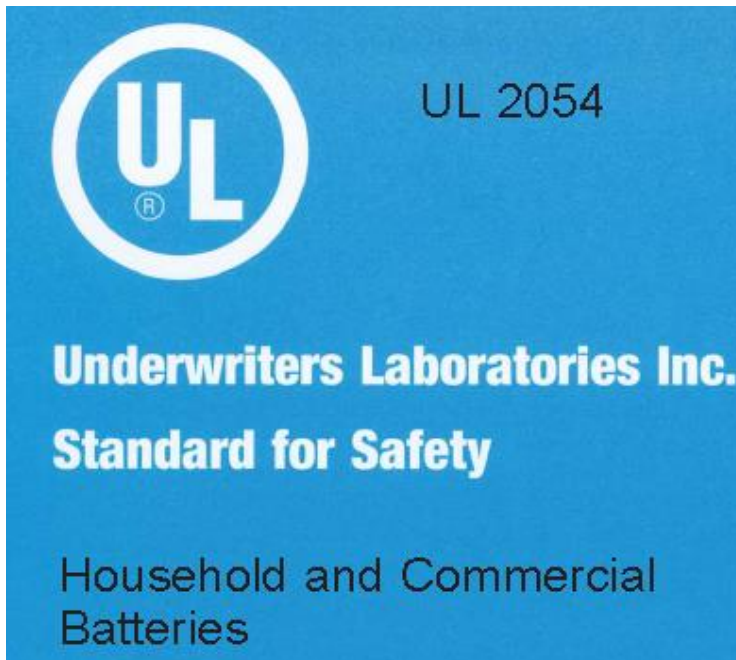
Impact: Potentially Considerable

- Continuing the component UL 2054 requirement for portable applications, along with allowing IEC 62133 & Annex M of IEC 62368-1 as an option, was considered a suitable transitional position towards IEC 62133 in Canada and the U.S. considering the long history of the UL 2054 component requirement.
- Energy storage systems and Battery Packs/Shelves for Stationary Equipment are not formally covered in the Scope of the Standard, so the proposed ND is consistent with current UL application practice supported by the existing “constructions not specifically covered” provision in 1.3.4 of IEC 60950-1.



UL Services - Batteries, incl. Cells & Battery packs - <http://industries.ul.com/high-tech/batteries>

- UL 2054: UL/CUL
- IEC 62133: IECEE CB Scheme (BATT)
- CTIA
- Many others...



Batteries

Services for small batteries.

Mobile devices have become essential tools for business and leisure, and the safety, efficiency and reliability of the batteries that power portable products are key to the continuing growth of this market. UL's established expertise in safety science and over 30 years of experience in battery performance testing help the industry foster innovation and boost confidence in battery quality.

We test batteries to UL Standards and many key international, national and regional regulations, including:

- UL 1642 Lithium Cell
- UL 2054 Alkaline Cell or Lithium/Alkaline Packs
- UL 1989 Standby Batteries

4.4.5 - Protection Against Moving Fan Blades

Change:

- Sub-clause 4.4.5 restructured and rewritten to more clearly cover the fan blade requirements that were added to IEC 60950-1 in Amendment No. 1 of Edition No. 2.
- There were some unintended implications related to how the requirements were being applied, so additional clarifications were needed, such as making clear a marking is not needed if a suitable fan guard is provided.

Impact: Minor. More clearly specifies intended application.



7.4.1 – CATV



Change:

- Now allows for similar protection of circuits (classified as TNV-1) in 7.4.1 as is currently allowed in 7.3 - such circuits do not need to be subjected to **voltage surge** test in 7.4.2 or **impulse** test in 7.4.3.
- For exception to apply,
 - the circuit must be TNV-1,
 - the earthed side of the circuit must be connected to the coaxial cable screen, and
 - the installation instructions require the coaxial cable to be connected to the building installation.

Impact: Potentially Considerable. For manufacturers making equipment for connection to cable distribution networks, additional design options may be possible.



MORE ANALYSIS:

UL/IEC 60950-1, Ed. No. 2, Am. No. 2 – Certification Impact Analysis



CERTIFICATION IMPACT ANALYSIS: (UL) IEC 60950-1, EDITION No. 2, AMENDMENT No. 2 Safety of Information Technology Equipment

Technical Editor: Thomas M. Burke
Principal Engineer – ICT/High-Tech Industry Sector
UL LLC

This analysis is intended to identify and analyze the impact of notable differences between the latest versions of the IEC and UL standards for Safety of Information Technology Equipment (ITE) and their predecessors. In particular, the Second Amendment to IEC 60950-1 Second Edition is being analyzed and compared to its predecessors, mainly IEC 60950-1 Second Edition, Amendment No. 1 and UL 60950-1 Second Edition.

Amendment No. 2 to IEC 60950-1 Second Edition was published in **May 2013**. The corresponding revisions to CSA CC2.2 No. 60950-1/UL 60950-1, Second Edition, likely will be published by mid-year 2014, and this Analysis will be updated accordingly as associated National Differences advance through the standards development processes.

This analysis will permit persons already familiar with IEC 60950-1 and UL 60950-1 to become familiar with the likely impact on ITE of the latest IEC and UL ITE Safety Standards. Other select observations are included that may be of interest to the reader. This analysis will be updated as additional information on the application of the new Standards becomes known.

**Status: CB Scheme, Europe, North America,
etc.**

IEC 60950-1, Ed 2, Am 2

- Published May 2013

Informationsteknologiudstyr – Sikkerhed – Del 1: Generelle krav

Information technology equipment – Safety –
Part 1: General requirements

Europe: EN 60950-1, Ed 2, Am 2

- Published H2 2013

North America: CSA/UL 60950-1, Ed 2, Am 2

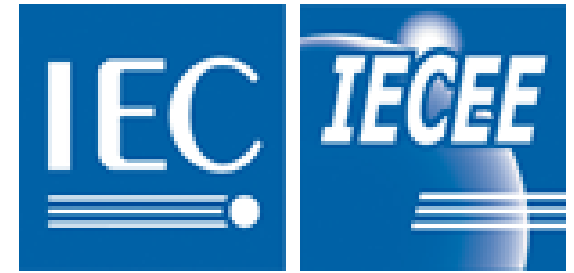
- THC active as of September 2013
- STP review in progress H1 2014
- **Target publication date → Q4 2014**

Other regions

- Under development



Status



IECEE CB Scheme, OFF

- Active
- Ed 2, Am 2 **TRF** & **Test Equipment List** available from IECCEE/IEC



Transition: from 60950-1 to 62368-1

Likely Transition: Legacy AV/ITE Standards → IEC 62368-1

Likely Transition Scenario...

- Latest **IEC 60950-1 (Ed 2 Am 2)** -- > published May 2013
- **Therefore,**
 - **Europe:** Final version **EN 60950-1** published in H2 2013
 - Effective date (**DOW**) - > **July 2, 2016**
 - **CAN/US:** Final versions of **CSA/UL 60950-1** published in **Q4 2014**
 - **UL 60950-1 Effective Date** likely to be aligned with Europe...



Likely Transition: Legacy AV/ITE Standards → IEC 62368-1

Likely Transition Scenario (cont.)...

- **IEC 62368-1, Ed 2** published February 2014...
- **Therefore,**
 - **Europe: EN 62368-1** published in H1 2014
 - Effective date (**DOW**) - > **June 20, 2019**
 - **CAN/US:** Final versions of **CSA/UL 62368-1** published in **Q4 2014**
 - **UL 62368-1 Effective Date** likely to be aligned with Europe...



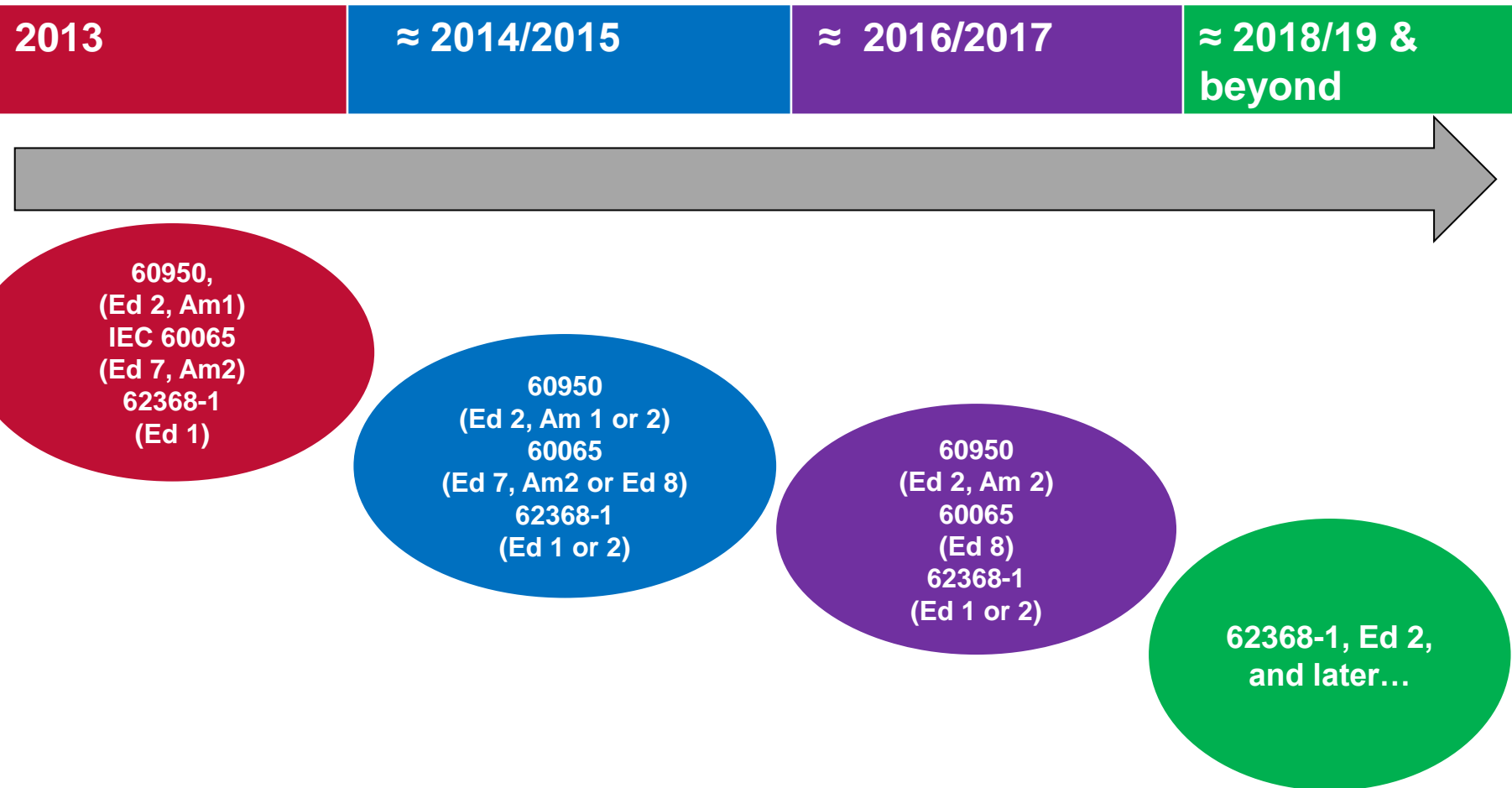


So, for *new* certifications in EU & NA,


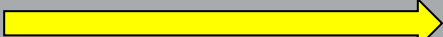
2016: Am. 2 CSA/UL/EN/IEC 60950-1 Ed 2
to be required
(for ITE equipment),

2019: CSA/UL/EN/IEC 62368-1, Ed 2
to be *the* required standard
(for AV & ICT equipment)...

Anticipated Transition Scenario



Likely EU/NA Transition (subject to change) : Legacy AV/ICT Standards → 62368-1

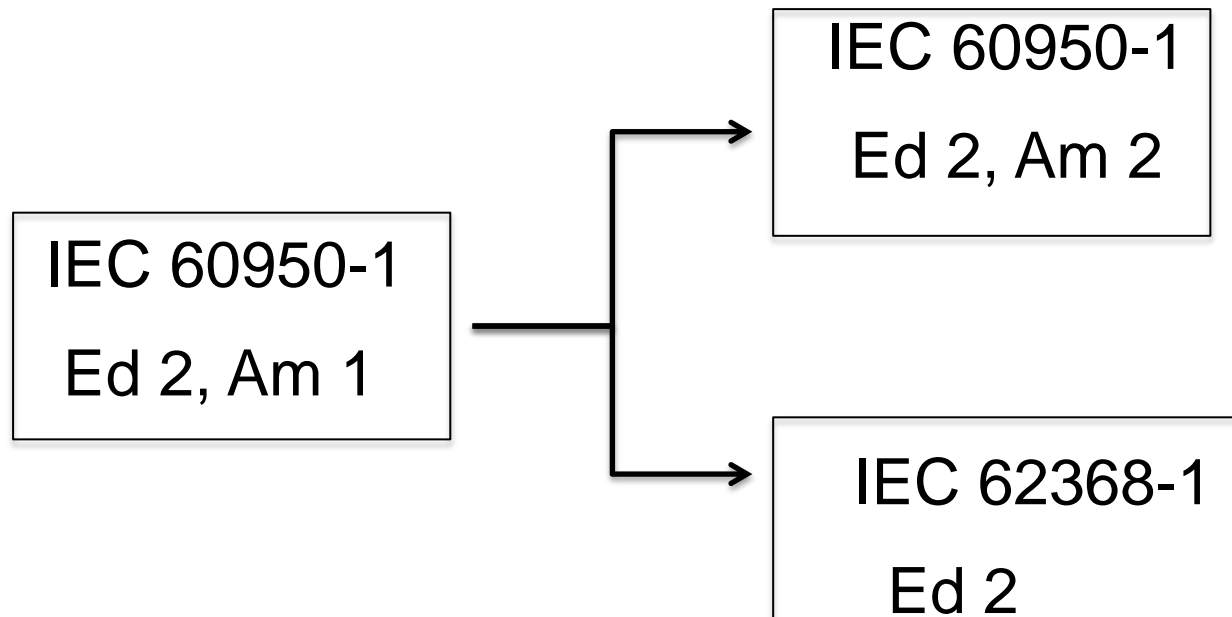
Year	2012	2013	2014	2015	2016	2017	2018	2019 ++	
IEC	IEC 60065, Ed 7, Am 2 (2010)								
			IEC 60065, Ed 8 (Q2, '14?)						
	IEC 60950-1, Ed 2, Am 1 (2009)								
			IEC 60950-1, Ed 2, Am 2 (May, 2013)						
	IEC 62368-1, Ed 1 (2010-01)								
			IEC 62368-1, Ed 2 (Feb., 2014)						
EU	EN 60065, Ed 7, Am2								
				EN 60065, Ed 8 (Q2, '14?)					
	EN 60950-1, Ed 2, Am 1								
			EN 60950-1, Ed 2, Am 2 (2013)						
				EN 62368-1, Ed 2 (Q3, '14?)					
CAN/ US	UL 60065, Ed 7								
					UL 60065, Ed 8 (Q1, '15?)				
	CSA/UL 60950-1, Ed 2, Am1 (2011)								
				CSA/UL 60950-1, Ed 2, Am2 (Q3, '14)					
		CSA/UL 62368-1, Ed 1 (2012)							
				CSA/UL 62368-1, Ed 2 (Q3, '14)					



Manufacturer's Decision



Important Decision on Transition, either:



Manufacturer's Decision



Factors to consider:

- ✓ Analysis of impact of new 62368-1 standard on company's product line & designs...
- ✓ Product manufacturing life...
- ✓ CB certificates validity due to product changes, national requirements, etc...
- ✓ Training needs & time frame needed to prepare...
- ✓ Test equipment needs...
- ✓ Component/Supply Chain transition...



Components



Remember: *IEC 62368-1 accommodates legacy components!*

4.1.1 Application of requirements and acceptance of materials, components and subassemblies:

Components and subassemblies that comply with IEC 60950-1 or IEC 60065 are acceptable as part of equipment covered by this standard *without further evaluation other than to give consideration to the appropriate use of the component or subassembly in the end-product.*

Provision should ease transition & implementation!



Sample Strategy: New vs. Existing Products



New Products (submitted for investigation 2014 and beyond)

- Products out of production by 2018:
 - ✓ **60950-1** (w/62368-1 gap analysis?)
- Products in production through 2018 & beyond:
 - ✓ **62368-1** (w/complementary 60950-1?)

Sample Strategy: New vs. Existing Products



Existing Products (as of 2014)

- If planned to be out of production by 2018:
 - ✓ **Renew 60950-1 CB** (w/62368-1 gap analysis?)
- If in production through 2018 & beyond:
 - ✓ **Shift to 62368-1 CB Certificate** (w/complementary 60950-1?)



Why should manufacturers consider starting transition now in 2014?

Manufacturer/OEM Marketing Opportunities:

- Early Adopter claiming rights

Potential Cost savings:

- Alternative design/construction methods allowed by new standard via performance options = potential design/manufacturing cost savings.
- Early planning during the transition cycle - minimize costs during the formal transition period

Ability to introduce new technology to market more quickly:

- Reduced need to wait for changes to standards since fewer prescriptive requirements
- Fewer interpretations needed since more performance-based requirements
- Generic HBSE provision (4.1.5) allowed for “constructions not specifically covered...”



How can UL help?



Evaluations of Products to 62368-1

- Options include,
 - Concurrent with current active project
 - With previously certified product (to 60065 or 60950)
 - Independent of previous certifications
- Deliverables
 - Gap Report - no additional testing beyond current project testing
 - Gap Report + TRF - no additional testing beyond current project testing
 - Gap report + TRF with additional testing for 62368-1
 - Certification to 62368-1

Training to 62368-1

- Existing on-line courses and materials
- Private/custom training



Why UL?



UL LLC has experience applying Ed. No. 1 of IEC 62368-1 & CSA/UL 62368-1 to the following products:

- Amplifier
- Computers – tablet, notebook, desk top & servers
- Displays & TVs
- Power Supplies (SMPS)
- Power Distribution Units (PDU)
- Printers
- Projector
- Scanner
- Others



Why UL?



UL LLC has already provided certifications (UL, CB, etc.) and customized projects (e.g., gap analysis) in **AP, EU & NA** for:

- ODMs/OEMs
- Component manufacturers
- Brand owners

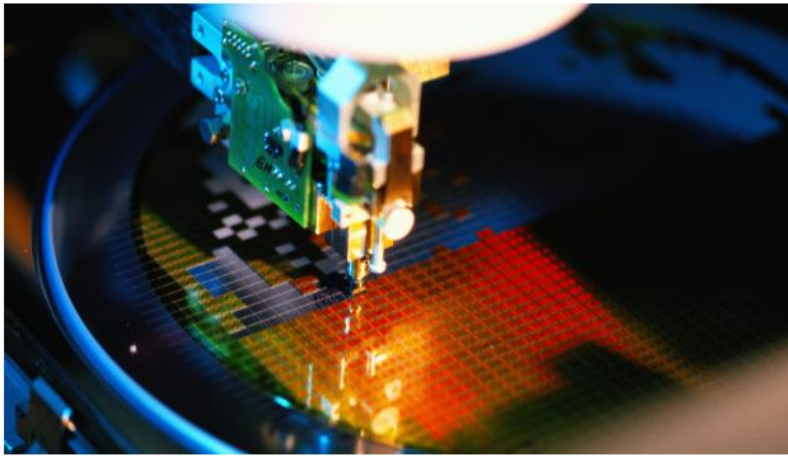


Knowledge Exchange & Training Opportunities

<http://industries.ul.com/high-tech>

 [Company](#) [Services](#) [Standards](#) [Dashboard](#)

▼ **HIGH TECH** / Hazard-Based Standard



Hazard-Based Standard

IEC 62368-1: new safety requirements for audio and video, information, and communication technology equipment.

Safety standards for high-tech products over the next five years will be shifting from prescriptive rules to a new hazard-based concept that emphasizes safety design in the early product development phase. Through our active involvement in the development of IEC 62368-1, UL is uniquely positioned to assist manufacturers to understand, prepare for and comply with the standard.

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Update - Edition No. 2 of IEC 62368-1

Thomas Burke, PE

Principal Engineer, ICT/High Tech at UL LLC

Top Contributor

Hello HBSE/62368-1 Group,

In an earlier post we mentioned that the Final Draft International Standard (FDIS) for Edition No 2 of IEC 62368-1 had been issued for vote.

In the last week the IEC has announced that the vote was successful, by ...

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Q&A



*UL thanks you for your time
& business!*