



[CSA/UL/EN] IEC 62368-1 Overview

Tom Burke, P.E.
*Principal Product Safety Engineer,
Consumer & Enterprise Tech Equipment
UL LLC*

thomas.m.burke@ul.com

June 7, 2017

The background of the slide is a light gray color with a repeating pattern of the text 'U_L' enclosed in thin gray circles, arranged in a grid.

Introduction

Topics

- ☐ Introduction
- ☐ Background
- ☐ Overview of the Standard
- ☐ Transition Update
- ☐ Edition No. 3 Update
- ☐ PLCs
- ☐ UL Services



T. Burke Active Bio

Member of UL's technical team driving our knowledge- and certification-based services for the global industry transition to the IEC 62368-1 hazard-based standard for safety of AV & ICT equipment.

- ✓ IEC TC108 (Safety of AV & ICT Equipment) - U.S. Delegate;
- ✓ IEC TC108 Interpretation Panel (for IEC 62368-1; IEC 60950-1; IEC 60065);
- ✓ ANSI/USNC Technical Advisory Group (TAG), TC108;
- ✓ IECEE Committee of Testing Laboratories (CTL), ETF2 - Technical Advisor;
- ✓ CAN/US Technical Harmonization Committee for CSA/UL 62368-1;
- ✓ U.S.: UL Standards Technical Panel, ANSI/UL 60950-1 & 62368-1;
- ✓ Canada: CSA Integrated Subcommittee CSC/IEC/TC108;
- ✓ NFPA Technical Committee for Electronic Computer Systems, NFPA 75 (Data Centers)



Objective

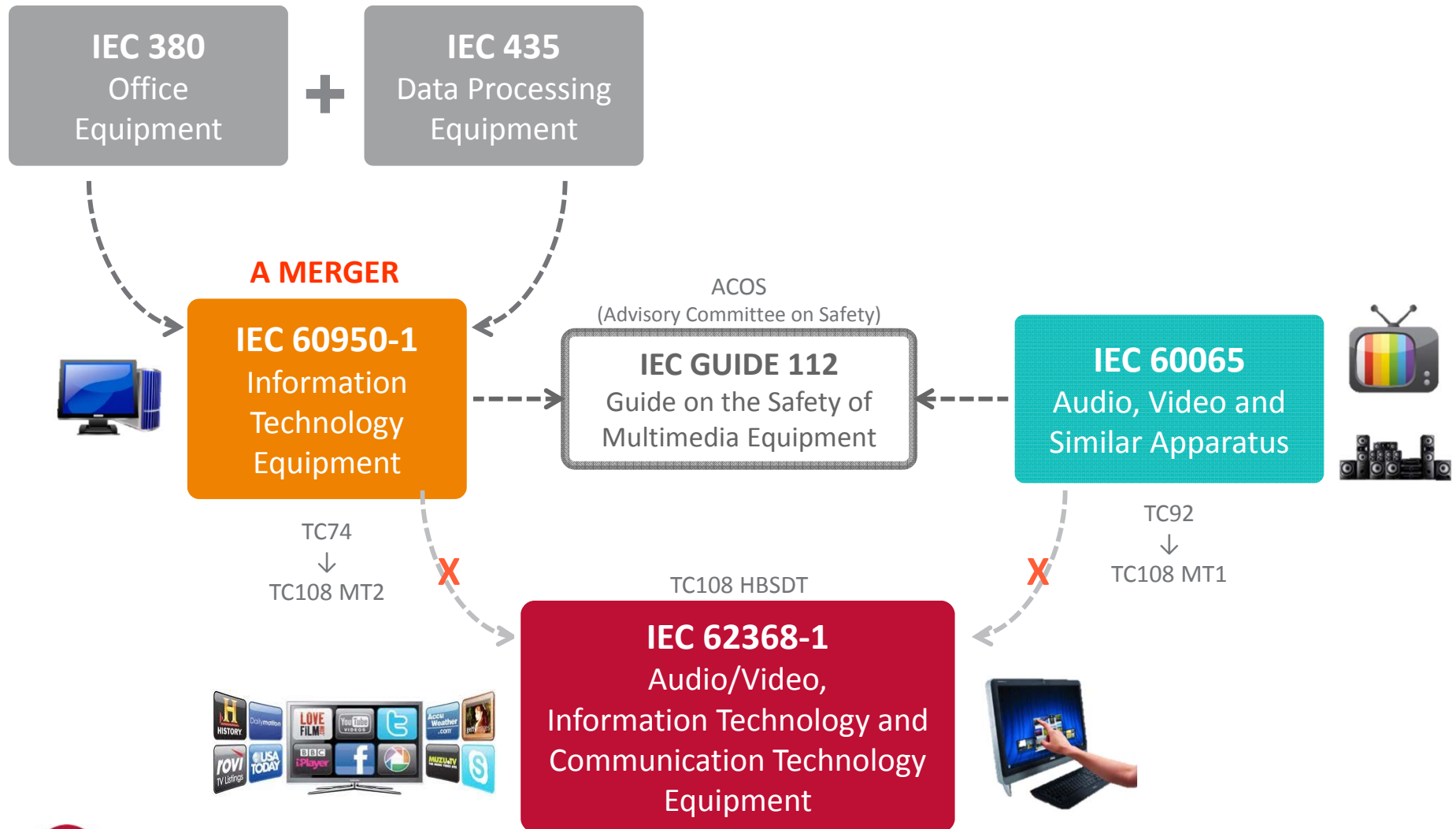
Provide **PSMA Safety & Compliance Committee** members with an introduction to IEC 62368-1, and the latest transition updates, in preparation for the power source industry transition from IEC 60950-1 to 62368-1.



The background of the slide is a light gray color with a repeating pattern of the text 'U_L' enclosed in thin gray circles, arranged in a grid.

Background

Evolution

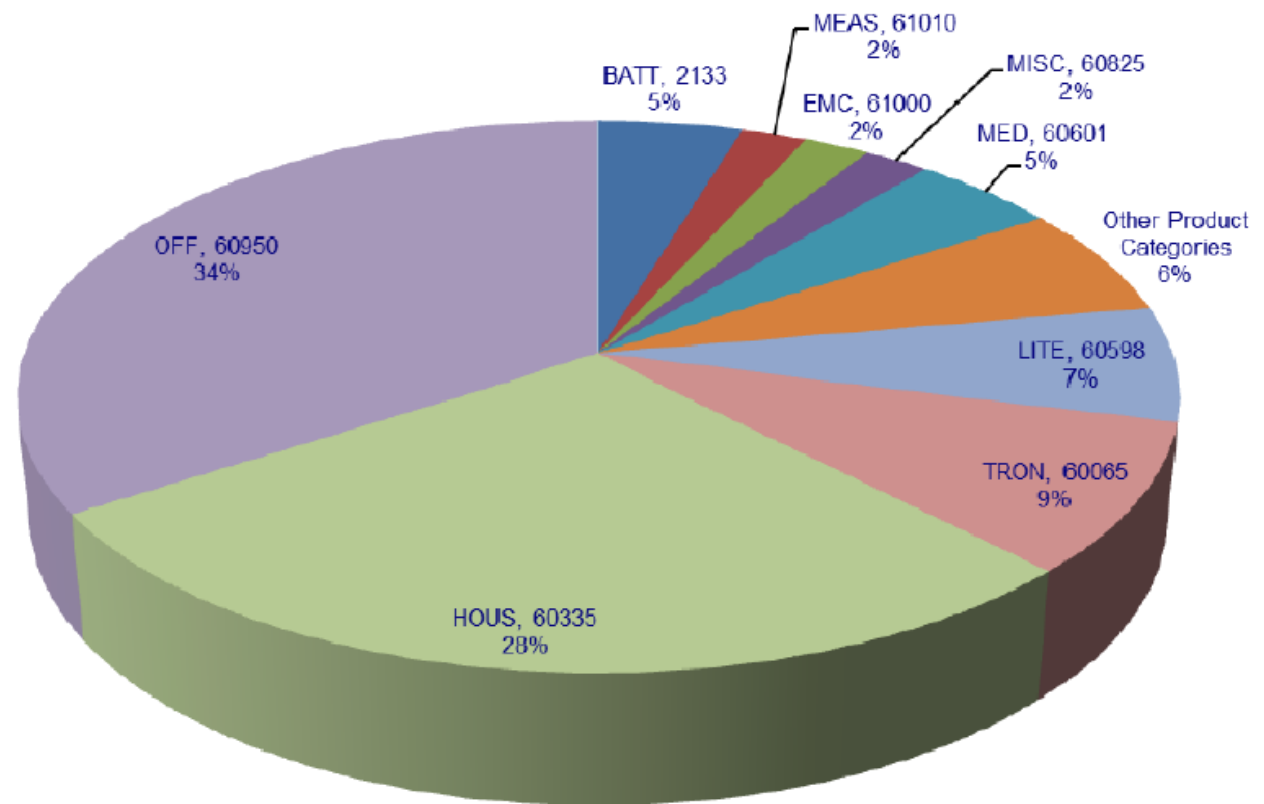


IECEE CB Scheme: 2013 - 2016

Top 10 Product Categories in the last 4 years
(2013, 2014, 2015 and 2016)

**OFF & TRON 43% CB
Scheme!**

41k+ certificates...



Courtesy of IECEE

Publication History/Status

❖ **Formal TC108 effort on 62368-1 began in year 2002.**

Edition No. 1

- IEC 62368-1, Ed. 1: January 2010
- EU: Ed. 1 not adopted.
- *CAN/US: CSA/UL 62368-1, Ed 1: February 2012*

Edition No. 2

- IEC 62368-1, Ed. 2: February 2014
- *EU: EN 62368-1, Ed 2: August 2014*
- *CAN/US: CSA/UL 62368-1, Ed 2: December 2014*





IEC 62368-1

Edition 2.0 2014-02

INTERNATIONAL STANDARD

NORME INTERNATIONALE



Audio/video, information and communication technology equipment –
Part 1: Safety requirements

Équipements des technologies de l'audio/vidéo, de l'information et de la
communication –
Partie 1: Exigences de sécurité

EUROPEAN STANDARD

EN 62368-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

August 2014

ICS 33.160.01; 35.020

English Version

Audio/video, information and communication technology
equipment - Part 1: Safety requirements
(IEC 62368-1:2014 , modified)

Équipements des technologies de l'audio/vidéo, de
l'information et de la communication - Partie 1: Exigences
de sécurité
(CEI 62368-1:2014 , modifiée)

Einrichtungen für Audio/Video, Informatik
Kommunikationstechnik - Teil 1: Sicherheitsanforderungen
(IEC 62368-1:2014 , modifiziert)

This European Standard was approved by CENELEC on 2014-06-20. CENELEC members are bound to comply with the CEN/ISO Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without a vote.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



UL 62368-1

STANDARD FOR SAFETY

Audio/video, information and communication
technology equipment – Part 1: Safety
requirements



Essential Reference Document

IEC Technical Report (TR) 62368-2, *Audio/video, information and communication technology equipment – Part 2: Explanatory information related to IEC 62368-1*

- Provides for individual clauses/sub-clauses,
 - Source,
 - Purpose &
 - Rationale
- Essential since documents the TC decisions and allows future users of the Standard to know the sources and background behind published content.



INTRODUCTION

0 Principles of this product safety standard

0.1 Objective

This part
against th
SAFEGUARD

The pres
property

The obje
safety in
detailed r

0.2 Per

0.2.1 G

This stan
INSTRUCTED
condition

NOTE In
regulatory a

0.2.2 O

ORDINARY P
PERSONS i
equipmen
OPERATING
of causin
comprisin

410

CAN/CSA C22.2 NO. 62368-1-14 ♦ UL 62368-1

Annex W (informative) Comparison of terms introduced in this standard

W.1 General

This standard introduces new safety terms associated with the new safety concepts

This annex identifies the relevant terms in this standard and, where different, of equivalent IEC/TC 64⁵ basic safety publications and other relevant safety publications

Terms not in the tables below are either the same or substantially the same as in IEC 60664-1:2007

⁵ IEC/TC 64: Electrical installations and protection against electric shock. Click on the IEC website for details by TC 64.

W.2 Comparison of terms

In the tables below, the text quoted from an IEC standard is in normal font. Remarks are in *italic font*.

Table W.1 – Comparison of terms and definitions in IEC 60664-1:2007 and IEC 62368-1

IEC 60664-1:2007 terms	IEC 62368-1 terms
3.2 clearance shortest distance in air between two conductive parts	3.3.12.1 CLEARANCE shortest distance in air between two conductive parts
3.3 creepage distance shortest distance along the surface of a solid insulating material between two conductive parts	3.3.12.2 CREEPAGE DISTANCE shortest distance along the surface of a solid insulating material between two conductive parts
3.4 solid insulation solid insulating material interposed between two conductive parts	3.3.5.5 SOLID INSULATION solid insulating material placed between two conductive parts or between a conductive part and a body part
3.5 working voltage highest r.m.s. value of the a.c. or d.c. voltage across any	3.3.14.9 WORKING VOLTAGE highest voltage across any particular insulation that can



TECHNICAL REPORT

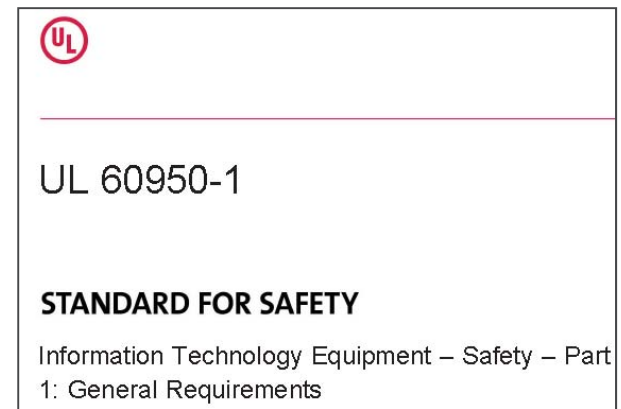
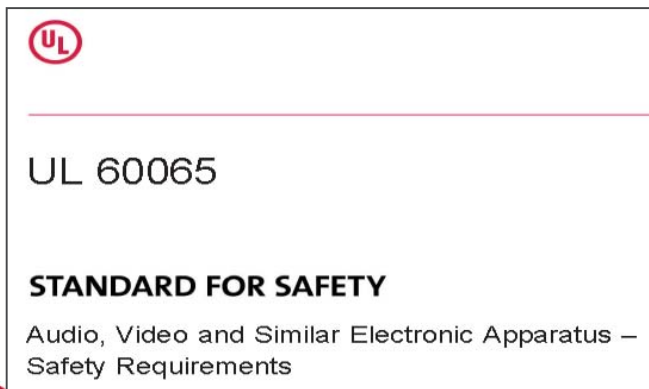
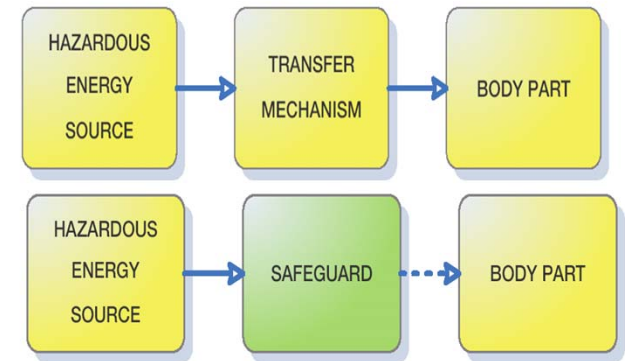


Audio/video, information and communication technology equipment –
Part 2: Explanatory information related to IEC 62368-1



What is it?

- A **hazard-based** standard.
- A performance-oriented standard.
- Covers Scopes (but not a merger) of previous (legacy) standards:
 - **IEC 60065**, Audio, Video & Similar Electronic Apparatus – Safety
 - **IEC 60950-1**, Information Technology Equipment – Safety



Hazard-based Safety Engineering

Hazard-based Safety Engineering (HBSE) is a safety science discipline formalized over the last 25 years.

- Key tool: **3 Block Models**

HBSE typically consists of

- (a) identifying **energy sources** in the product,
- (b) **classifying** the energy (e.g., Class 1) due to potential for causing injury or damage (harm),
- (c) identifying needed **safeguards** for protection from energy sources with the potential for causing injury or damage, and
- (d) **qualifying** the safeguards as effective.

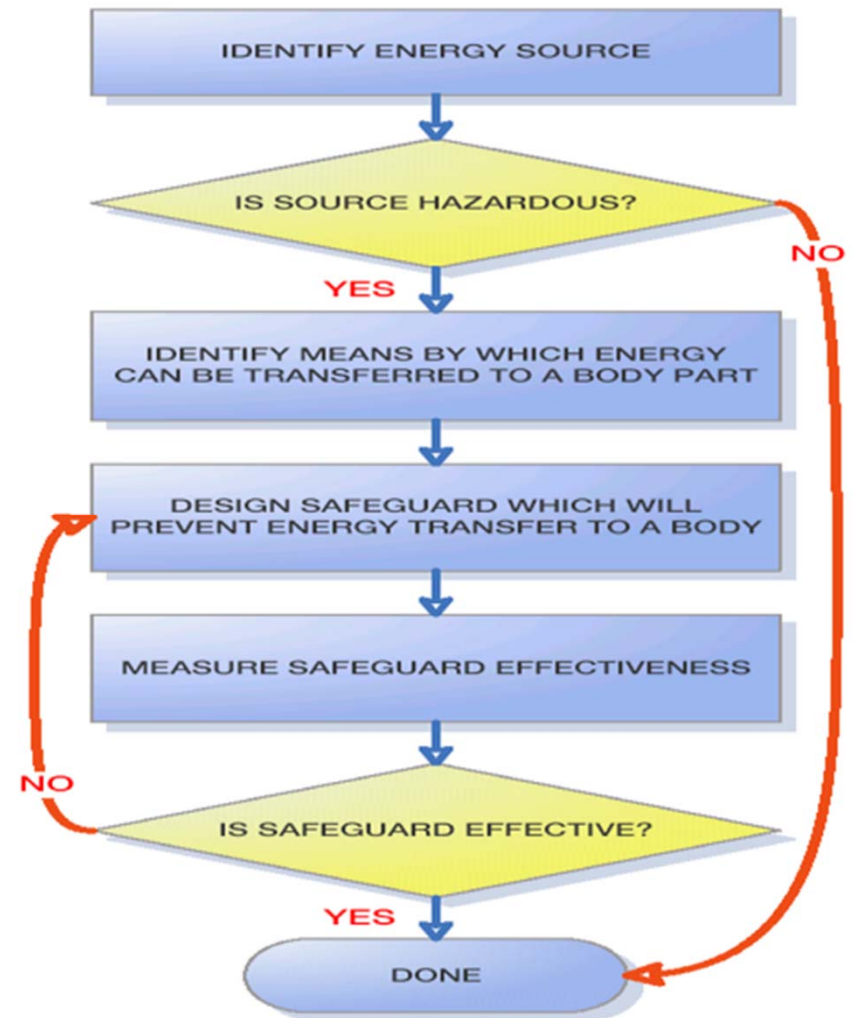


HBSE Application Process

Injury Model



Safety Model



What is it not?

Not a Risk-based Standard!

- Risk Analysis **not** required (aka, IEC 60601-1, Third Edition) during application & certification.
- Decision on application of requirements does **not** involve risk considerations...
- Some *Risk Analysis* was used by IEC TC108 at the technical committee level to develop the actual requirements, e.g., levels/limits associated with Class 1, 2 & 3...



The background of the slide is a light gray color with a repeating pattern of the text 'U_L' enclosed in thin gray circles, arranged in a grid.

Overview of the Standard

Structure of IEC 60950-1

- 0 Principles
- 1 General, incl. Scope, Terms, Components, etc.
- 2 Protection from hazards
- 3 Wiring, connections and supply
- 4 Physical requirements
- 5 Electrical requirements and simulated abnormal conditions
- 6 Connection to telecommunication networks
- 7 Connection to cable distribution systems

Annexes (partial listing)

- A – Tests for resistance to heat and fire
- B – Motor tests
- C – Transformers
- D – Measuring instruments for touch-current
- F – Measurement of clearances and creepage distances
- G – Alternative method for determining minimum clearances
- Q – Voltage dependent resistors
- T – Guidance on protection against ingress of water



Structure of IEC 62368-1

0 Principles

1 Scope

2 Normative references

3 Terms, definitions and abbreviations

4 General requirements

5 *Electrically-caused injury*

6 *Electrically-caused fire*

7 *Hazardous Substances*

8 *Mechanically-caused injury*

9 *Thermal-burn injury*

10 *Radiation*

Annexes (partial listing)

A – Examples of equipment within scope

B – Normal operating condition, abnormal operating condition, and single fault condition tests

F – Equipment markings, instructions and instructional safeguards

G – Components

M – Batteries and fuel cells

Q – Interconnection with building wiring

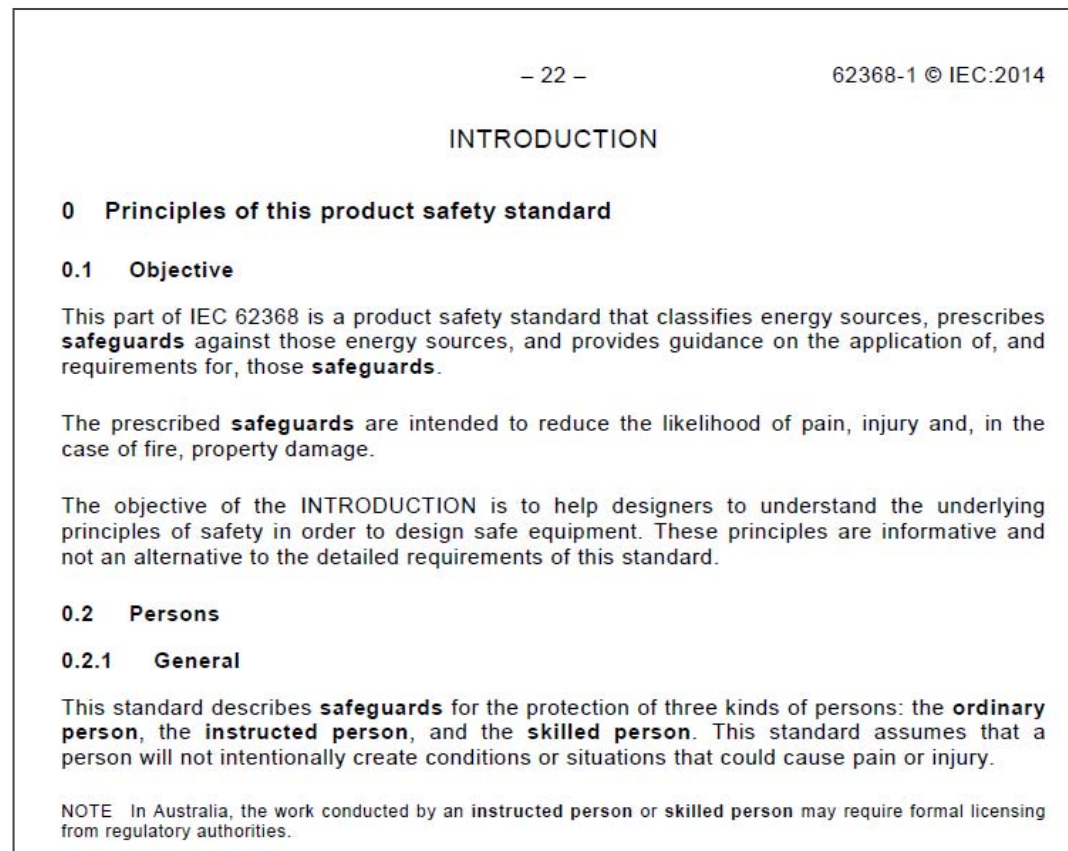
T – Mechanical strength tests

V – Determination of accessible parts



Clause 0 - Principles

- **Excellent primer** (backgrounder) on the principles and HBSE approach the Standard takes towards safety.
- Should be studied as part of the initial learning of the Standard.



Clause 1 – Scope (and Annex A, Examples)

- Scope similar to IEC 60065 & IEC 60950-1
- Includes sub-assemblies & components, ***including both internal & external power supplies.***
- Examples of products covered under scope provided in Annex A, essentially same examples as in IEC 60065 & 60950-1



Clause 3 – Terms, Definitions and Abbreviations



Valuable reference – Annex W (Informative) *Comparison of terms introduced in this standard.*

- Compares terms used in 62368-1 with, terms used in **IEC 60950-1** (ITE), IEC 60065 (AV), IEC 60664-1 (Insulation Coordination), IEC 61140 (Protection against electric shock), IEC 60728-11 (CATV), and IEC 62151 (Telecom).

Annex W
(informative)
Comparison of terms introduced in this standard

W.1 General

This standard introduces new safety terms associated with the new safety concepts.

This annex identifies the relevant terms in this standard and, where different, compare them to the equivalent IEC/TC 64² basic safety publications and other relevant safety publications.

Terms not in Table W.1 are either the same or substantially the same as in other IEC standards.

² IEC/TC 64: Electrical installations and protection against electric shock. Click on the IEC website for a list of publications issued by TC 64.

W.2 Comparison of terms

In Table W.1 below, the text quoted from an IEC standard is in normal font. Remarks about IEC 62368-1 are in *italic font*.

Table W.1 – Comparison of terms

IEC 60664-1:2007 terms	IEC 62368-1 terms
3.2 clearance shortest distance in air between two conductive parts	3.3.12.1 clearance shortest distance in air between two conductive parts
3.3	3.3.12.2



UL AND THE UL LOGO ARE TRADEMARKS

Clause 3 – Terms, Definitions & Abbreviations: Differences

IEC 60950-1	IEC 62368-1
User (Operator)	Ordinary Person
(Operator w/ limited training, e.g., allowed access to RAL)	Instructed Person
Service Person	Skilled Person
SELV (voltage based) LCC (current based)	ES1 (considers both voltage & current)
TNV e.g., TNV-1	External Circuit , with transient considerations e.g., ES1 with Table 16, ID Nos. 4, 6,7 etc.
Marking Instruction	Instructional Safeguard

Clause 4 – General Requirements

- Many same elements as **60950-1's** 1.3 (General Requirements, 1.4 (General Conditions – Tests) and 1.5 (Components)
- Includes general requirements, or points to Annexes, used throughout the Standard, such as,
 - Use of components (4.1.2)
 - Constructions not specifically covered (4.1.5)
 - Temperature measurements (4.1.10)
 - Markings & instructions (4.1.15)
 - Energy source classifications (4.2), protection against energy sources (4.3) and Safeguards (4.4).



4.1.1 - Components & Supply Chain (cont.)

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

Components & 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 eases transition & implementation...



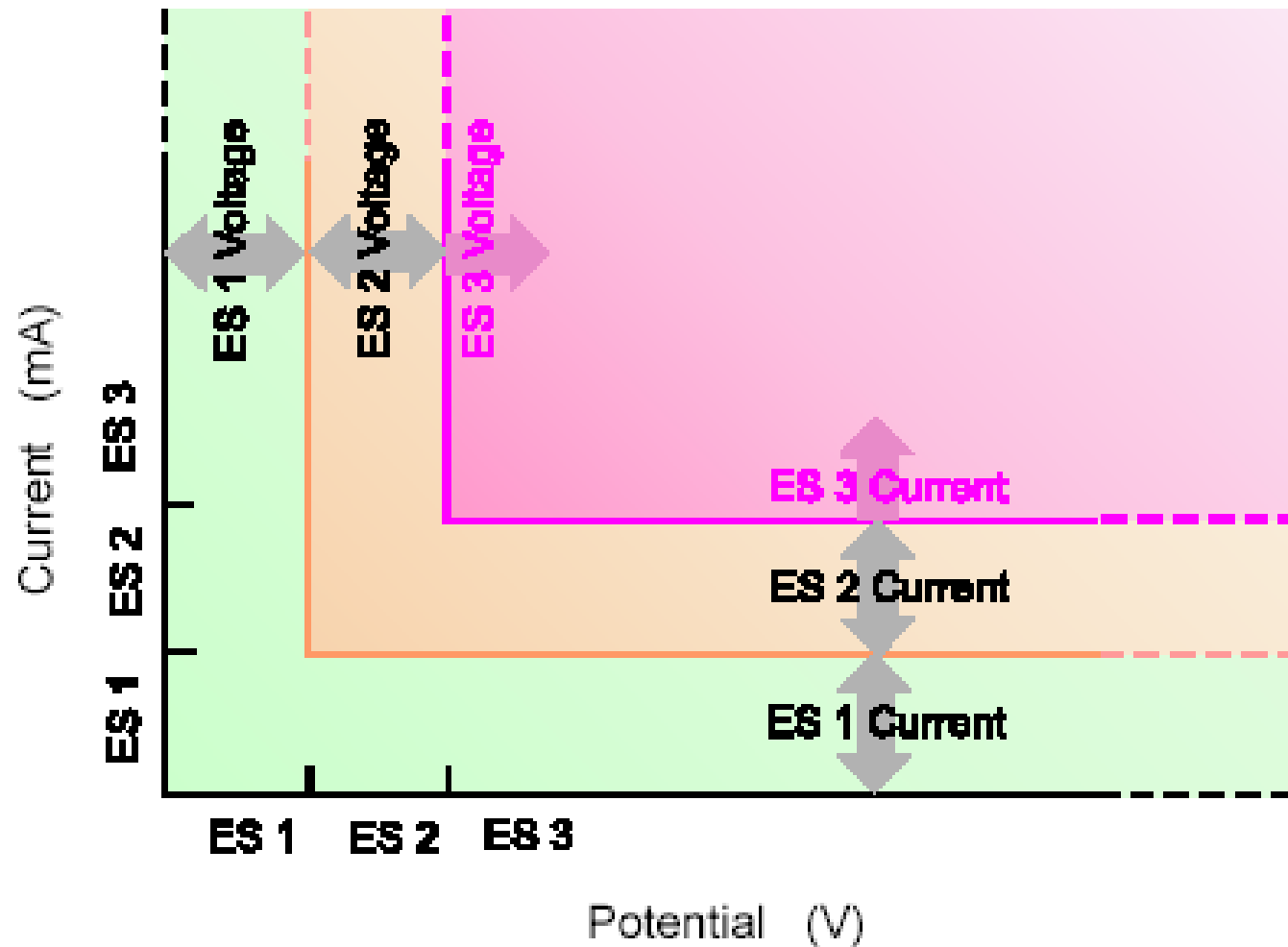
Clause 5 – Electrically-caused Injury

Includes many well known elements, but presented in a different way, including:

- Classification of energy sources (ES) (5.2)
- Levels of protection against hazardous energy sources (5.3)
- Insulation materials as safeguards, including clearances, creepage distances, solid insulation, and electric strength (5.4)
- Components as safeguards (5.5)
- Protective conductors (earthing & bonding) as safeguards (5.6)
- Touch voltage, Touch (leakage) current and protective conductor current (5.7)



Clause 5 – Electrically-caused Injury (cont.)



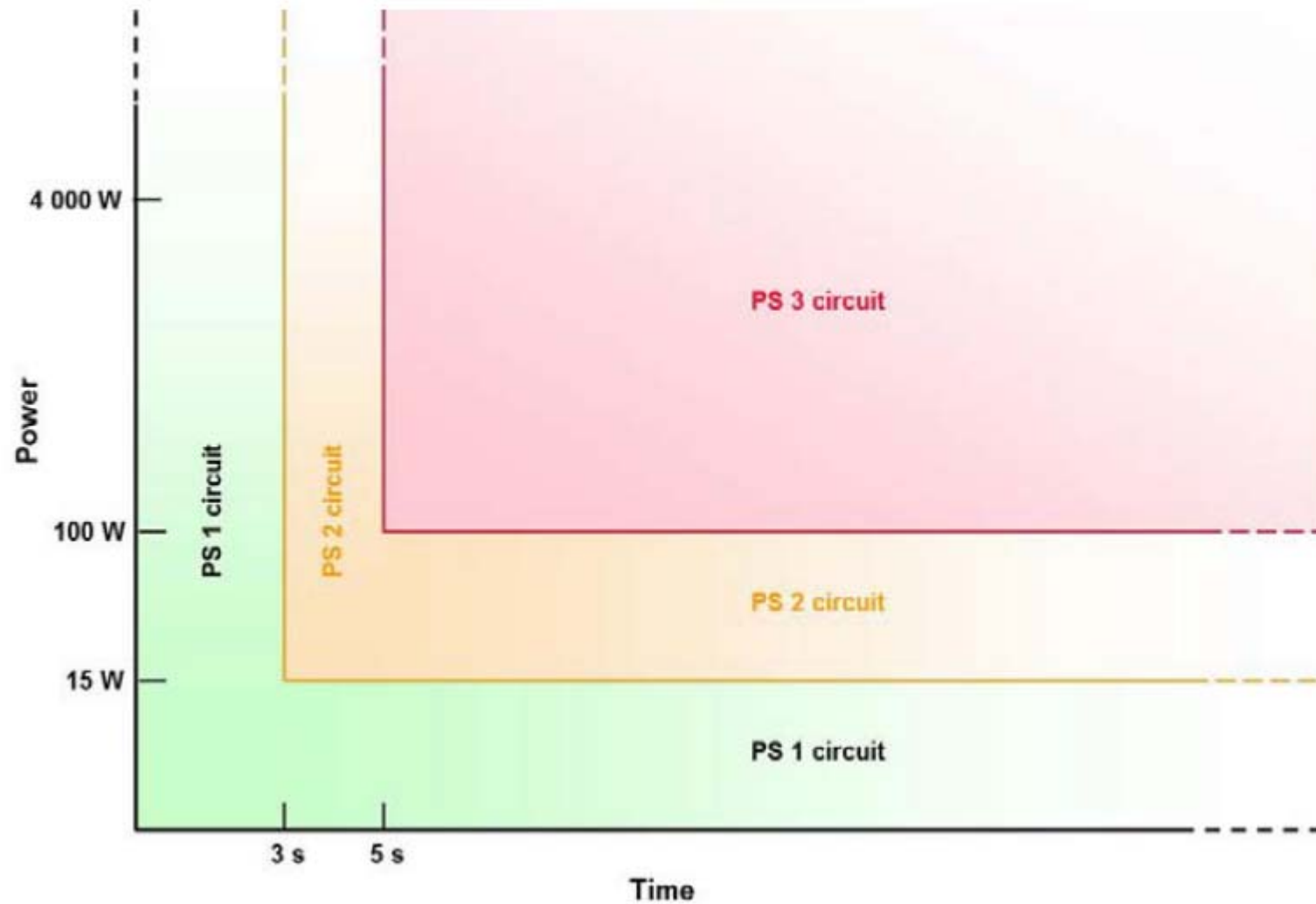
Clause 6 – Electrically-caused Fire

Includes many well known elements, and some new elements, presented in a different way, including:

- Classification of power sources (PS) and potential ignition sources (PIS) (6.2)
- Safeguarding under **normal** and **abnormal operating** conditions (6.3),
 - Determined via **Heating test**
- Safeguarding under **single fault conditions** (6.4)
 - Includes **Fire Enclosures**
- Miscellaneous requirements, like flammability of wiring (6.5), entry of foreign objects (6.6) and connection to secondary equipment (6.7)



Clause 6 – Electrically-caused Fire (cont.)



Clause 6 - Electrically-caused fire (cont.)

Potential Ignition Source (PIS):

Arcing PIS

(at contacts, terminations, points of single faults, etc.) [6.2.3.1]

PS2 or PS3, **and**

- >50V p or dc (measured after 3 s), **and**
- $V_p \times I_{rms} > 15$
(V_p = peak open circuit voltage; I_{rms} = measured rms current)

Resistive PIS [6.2.3.2]

PS2 or PS3, **and**

- > 15W after 30s (Normal operation); **or**
- >100W up to 30s (Single fault); **or**
- >15W after 30s (Single fault).



Clause 6 - Electrically-caused fire (cont.)

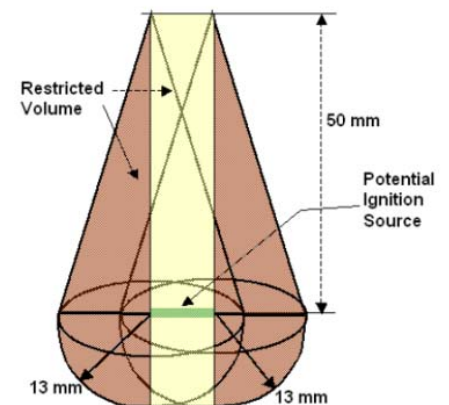
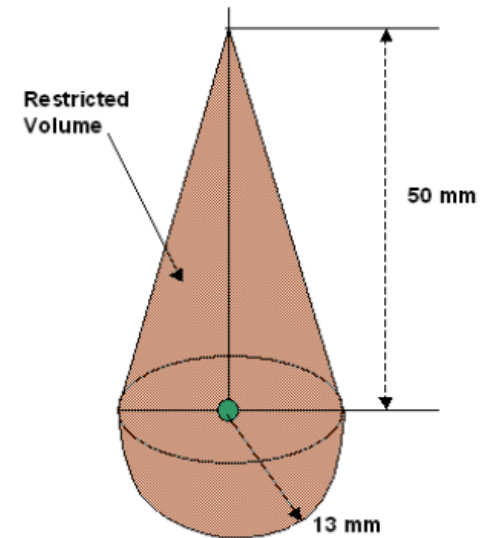
PS3:

Requirements for PS2 + Fire Enclosure [6.4.6]

Fire Enclosure:

- Constructional requirements, incl. material flammability & openings
- Application of **fire cones** (Fig 45 & 46 fire cones)
- Separation of **Fire Enclosure** from PIS

Standard	Criteria	Flame Rating
IEC 60950-1	> 18 Kg	5V
	< 18 Kg	V-1
IEC 62368-1	> 4000W	5V
	< 4000W	V-1



Clause 9 - Thermal Burn Injury

Includes well known elements, but presented in a different way, including:

- Classification of **thermal energy sources (TS)** (9.2)
 - Per Heating (Temperature) test
- Levels of protection against thermal energy sources (9.3)
- Requirements for safeguards (9.4)



Clause 9 - Thermal-burn injury (cont.)

9.2.6 Touch temperature levels

Table 38 – Touch temperature limits for accessible parts

	Accessible parts ^a	Maximum temperature (T_{max}) °C			
		Metal ^f	Glass, porcelain and vitreous material	Plastic and rubber	Wood
TS1	Handles, knobs, grips, etc., and external surfaces either held, touched or worn against the body in normal use (> 1 min) ^{b, c}	48	48	48	48
	Handles, knobs, grips, etc., and external surfaces held for short periods of time or touched occasionally (> 10 s and < 1 min) ^c	51	56	60	60
	Handle, knobs, grips etc., and external surfaces touched occasionally for very short periods (> 1 s and < 10 s) ^c	60	71	77	107
	External surfaces that need not be touched to operate the equipment (< 1 s) ^c	70 ^d	80 ^d	94 ^d	140
TS2	Handles, knobs, grips, etc., and external surfaces held in normal use (> 1 min) ^c	58	58	58	58
	Handles, knobs, grips, etc., and external surfaces held for short periods of time or touched occasionally (> 10 s and < 1 min) ^d	61	66	70	70
	Handle, knobs, grips etc., and external surfaces touched occasionally for very short periods (> 1 s and < 10 s) ^d	70	81	87	117
	External surfaces that need not be touched to operate the equipment (< 1 s) ^d	80 (100) ^e	90 (100) ^e	104	150
TS3	Higher than the TS2 limits				

Typically lower than allowed by 60950-1, but temps taken @ 25 C ambient, with no Tma (per IEC Guide 117 research basis) ...

Typical metal encased SMPS ...



Annexes – Overview of some key annexes

- **Annex B** (Normal operating condition, abnormal operating condition, and single-fault condition tests)
- **Annex F** (Equipment markings, instructions and instructional safeguards)
- **Annex G** (Components) - *allows for **transformers** complying with IEC 61204-7, IEC 61558-1, - 2 & 2-16, and IEC 61558-2-16...*
- **Annex M** (Batteries), *including cells & battery packs...*
- **Annex Q** (Interconnection with building wiring)
- **Annex T** (Mechanical strength tests)
- **Annex V** (Determination of accessible parts)



The background of the slide is a light gray color with a repeating pattern of the text 'U_L' enclosed in thin gray circles, arranged in a grid.

Transition Update

Adoption Status: Other Regions/Countries?

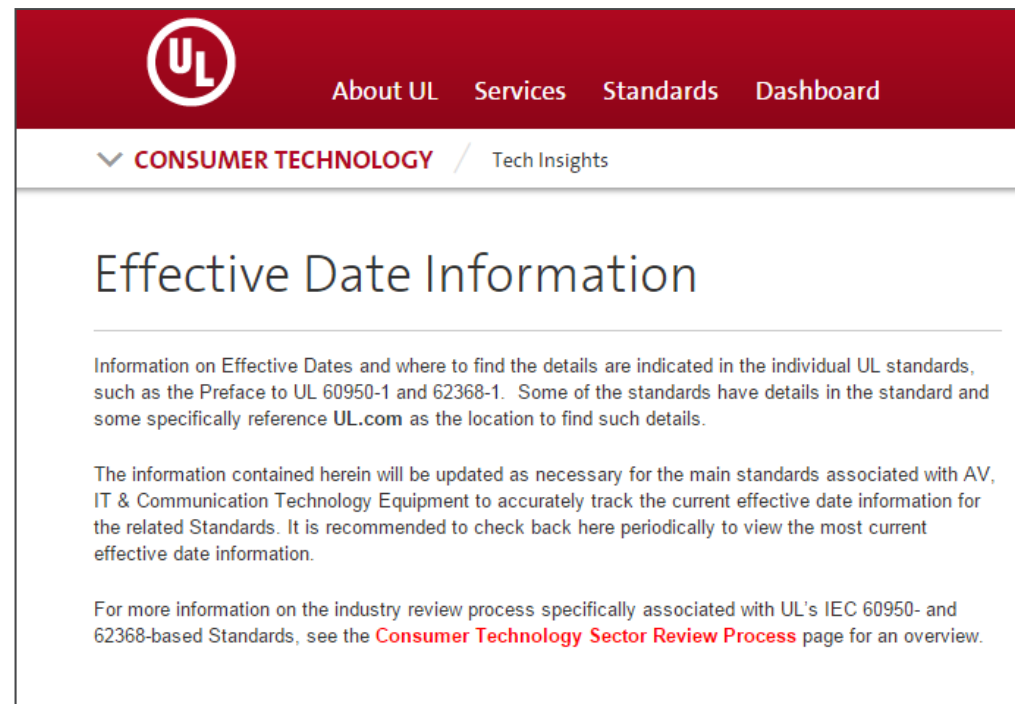
- **China:** Under study...
- **Japan:** Under study...
- **Korea:** Under study...
- **Mexico:** Voluntary NMX-I-62368-1-NYCE-2015 (maybe initial movement towards tri-national within few years...)
- **South America:** Under study...
- **Australia/NZ:** Out for public comment...
- **South Africa:** Under study...
- **Others?**



UL Announced Formal Transition Dates

US (UL) *Effective Date* – New Products: **June 20, 2019**

- ✓ Soft Transition: No formal Industry File Review (IFR) of existing certifications since harmonization driven...



Effective Date Information:

Audio/Video, Information & Communication Technology Equipment

	Standard	Title	Date of Publication (latest revisions*)	Date of Withdrawal (DOW) of previous standards (Effective Dates)	Active Requirement Effective Dates (REDs) (Individual requirements subject to Industry Review)	IEC Correlation	Notes
Hazard Based Standard	UL 62368-1, Ed. 2	AV, Information & Communication Technology Equipment	December 1, 2014	June 20, 2019	None	IEC 62368-1, Ed. 2	To supersede UL 60065 & UL 60950-1
Legacy Standards	UL 60065, Ed. 8	Audio/Video Equipment	September 30, 2015	November 17, 2017	None	IEC 60065, Ed. 8	Superseded Standards: UL 469, 813, 1492, 6500.
	UL 60950-1, Ed. 2	Information Technology Equipment	October 14, 2014	July 2, 2016	None	IEC 60950-1, Ed. 2, Am. 2	Superseded Standards: UL 114, 478, 1459, 1950, 60950.
	UL 60950-21, Ed. 1	Remote Power Feeding	April 23, 2007	April 23, 2007	None	IEC 60950-21, Ed. 1	
	UL 60950-22, Ed. 1	Outdoor ITE	December 19, 2011	December 19, 2011	None	IEC 60950-22, Ed. 1	
	UL 60950-23, Ed. 1	Large Data Storage Equipment	April 23, 2007	April 23, 2007	None	IEC 60950-23, Ed. 1	

*as indicated on Title Page.

UL Effective Date is one established by Underwriters Laboratories Inc. and is not part of the ANSI approved standard.

These dates also are used for the C-UL Mark Program.



EU Announced Formal Transition Dates

CENELEC *Date of Withdrawal (DOW)* of Legacy Standards (EN 60065/ EN 60950-1):

- ⊖ ~~June 20, 2019~~ (original);
- December 20, 2020 (adjusted per corrigendum @ Dec '16 meeting)
- **However**, per active Official Journal (OJ) of the EU (*July 8, 2016*), date of cessation of presumption of conformity of superseded standards (60065 & 60950-1) with the essential requirements of the relevant Union legislation (**LVD & RED**) remains - ***June 20, 2019...***

Cenelec	EN 62368-1:2014 Audio/video, information and communication technology equipment - Part 1: Safety requirements (IEC 62368-1:2014, modified) IEC 62368-1:2014 (Modified)	This is the first publication	EN 60065:2014 + A1:2015 + A:2014 EN 60950-1:2006 + A11:2009 + A12:2011 + A1:2010 + A2:2013 Note 2.1	20.6.2019
	EN 62368-1:2014/AC:2015	This is the first publication		
	EN 62368-1:2014/AC:2015	This is the first publication		
	EN 62368-1:2014/AC:2015	This is the first publication		



UL AND THE UL LOGO ARE

Recent EU Activity on EN 62368-1 Ed. No. 2

Important for component/PS manufacturers!

- **CENELEC** also agreed to remove the **legacy component** provision in **4.1.1** from Ed. No. 2 (effective **Dec. 20, 2020**).
 - Legacy component provision also will be removed from Ed. No. 3 of EN 62368-1, even if IEC TC108 keeps it in.
- In EU, after **Dec. 20, 2020**, EN 60065 & EN 60950-1 certified components no longer will be permitted in equipment investigated to EN 62368-1 w/o additional investigation.
- However, formal TC108X amendment process only beginning.



Recent EU Activity on EN 62368-1 Ed. No. 2

If DOW/Date of Cessation extended, and announced in the EU Official Journal (OJ):

- ✓ Manufacturers have option to transition from EN 60065 or EN 60950-1 to Ed. No. 3 of EN 62368-1 directly, bypassing Ed. No. 2 of EN 62368-1.
- ✓ **By December 20, 2020**, manufacturers would need to transition to either, Ed. 2 or Ed 3 of EN 62368-1.



Ed. No. 3 of IEC 62368-1: Publication Schedule

- Current Stage (May 2017) → *Committee Draft (CD)*
- Next Stage (Q2 2017) → *Committee Draft for Vote (CDV)*, with 3 month voting period.
 - Vote & Comments to be discussed at next IEC TC108 meeting in Toronto, Canada (**October 2017**).
- Followed by → *Final Draft International Standard (FDIS)* if vote successful.

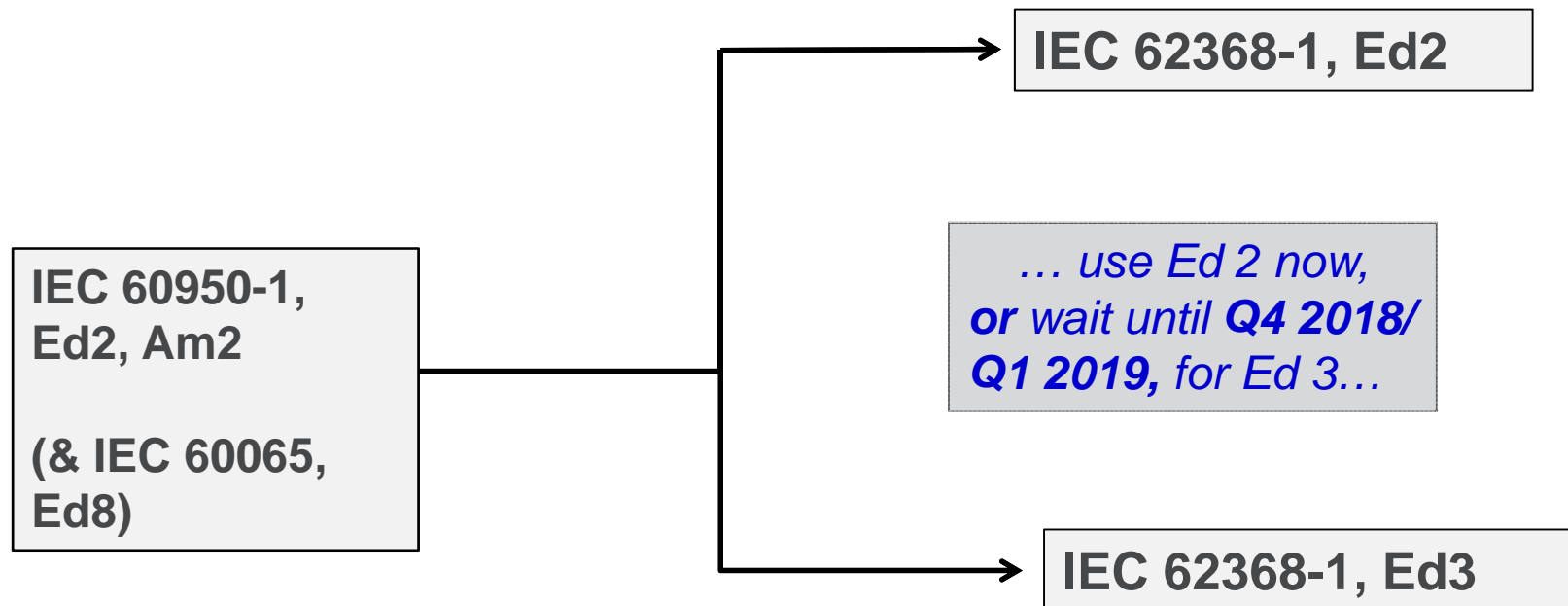
Target Publication Date → Q3 2018



Manufacturer's Decision



Bottom Line -> Important **Decision** needed by **manufacturers** on transition from legacy standards, 60065 & 60950-1, to 62368-1....





Edition No. 3 Update (impacting power supplies)

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

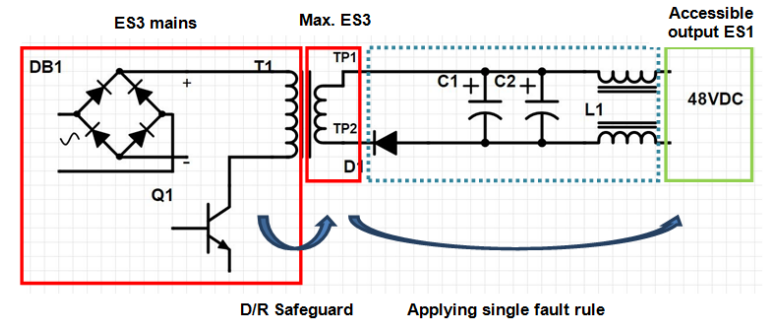


Clause 5 (Electric Shock)

- Refinement of requirements for **Clearances**, incl. new prescriptive option (**Annex X**) *based on* 60950-1 Tables.
- New requirements (within Annex G) for enameled **Fully Insulated Wire (FIW)**, also known a *Zero Defect Wire*.



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



Clause 5 (Electric Shock)

- New material on **interconnected ES3/ES2/ES1** circuits in secondary circuits of **SMPs** (similar to 60950-1 approach).
- **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



- **IEC 60950-21** (RFT) requirements 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...



The background of the slide is a light gray color with a repeating pattern of the letters 'UL' inside circles, arranged in a grid.

Programmable (Logic) Controllers

Power Supplies: ICT vs. PLC

ICT Power Supply

- *Home, Business & Commercial*
- UL/IEC 60950-1, or UL/IEC 62368-1
- IECEE CB Scheme: OFF

PLC Power Supply

- *Industrial*
- UL 61010-1 & UL 61010-2-201
(previously, UL 508 & UL 61131-2)
- IECEE CB Scheme: INDA, MEAS

Dual (Complementary) Certification Available...

White Paper & Training info. available via UL.com...



The background of the slide is a repeating pattern of the UL Services logo, which consists of the letters 'UL' inside a circle. This pattern is rendered in a light gray color across the entire slide area.

UL Services

Example 62368-1 Services

- Evaluation of a previously certified equipment to 62368-1, with informal report or gap analysis from 60950-1.
- Certification of a previously certified equipment to 62368-1, including CB and/or UL.
- Concurrent Certification (62368-1 & 60950-1) of new equipment, including CB and/or UL.
- Similar investigations/certifications, as requested.
- More advanced **Knowledge-based Services...**



Advisory Services

Public Training/Workshops/Seminar

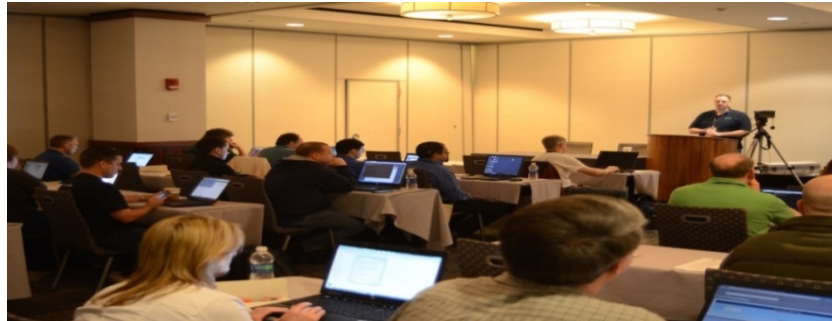
- Events that involve multiple mixed customer or industry contacts where UL provides information related to standards, product testing, and other related subjects. Events typically conducted in person in a classroom type setting



Advisory Services

Private Training

- Customized training based on customers unique design, product, and/or supply chain. Content can be specific and customized to needs of client
- Examples
 - Customer A-2 full days onsite at customer location, classroom style, similar to public workshop in content delivery,
 - Customer B-Thirteen 1.5hr modules conducted over 13 weeks, onsite at customer, fee based
 - Customer C-1.5 days, Day 1 general clause overview, Day 2 (half day) hands on with customer device



UL AND THE UL LOGO ARE TRADEMARKS OF UL LLC © 2017. ALL RIGHTS RESERVED.

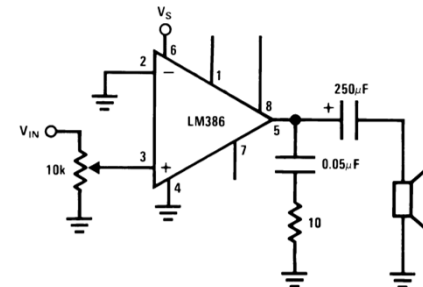
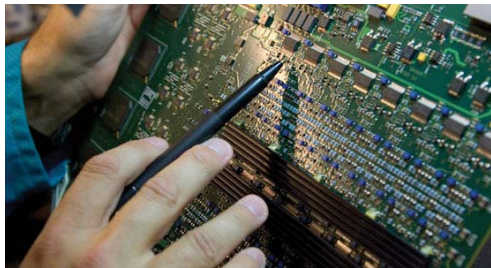
Advisory Services

Gap Analysis

- Process of reviewing existing product report and providing a construction review based evaluation to compare to the UL/IEC 62368 standard. Does not come with any testing although the project can be customized to include relevant testing. Suggested minimal requirement if training is not in the budget

Impact Analysis/Construction Review

- Process of reviewing new design or construction of upcoming product to UL/IEC 62368 standard. May include minimal testing if requested and fully customizable to need.



UL Knowledge Services:

<https://lms.ulknowledgeservices.com>

Designing for Compliance to IEC 62368-1 2nd Edition

Description

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. This interactive course helps current ITE and Audio Video manufacturers gain the expertise they need design to the new requirements listed in the international IEC 62368-1 standard and corresponding standard for North America, UL/CSA 62368-1.



The course is comprised of two separate training modules: an eLearning component and the instructor-led session. The eLearning component covers the basics of the standard and is completed in advance, enabling participants to maximize their in-class time with our UL expert. The instructor-led session digs deeper into the detailed technical content and features progressive knowledge checks and engaging interactions to help learners reinforce and apply the new concepts.

A final assessment is provided that requires participants to complete a detailed case scenario on their own and then review their solutions in class.

A copy the UL 62368 Standard is included with participant workshop materials (\$555.00 USD value).

Objectives

Upon completion of this course, participants should be able to:

- Explain the purpose of the standard and how it is used.
- Explain the Objective of Clause 0 – Introduction to Principles of Safety and provide an overview
- Describe the highlights of Clause 4 – General Requirements
- Explain how to classify the various types of energy sources addressed by the standard, prescribe safeguards against those energy sources and verify construction is in compliance with the applicable requirements
- Identify the tests and testing guidelines defined in the standard necessary to verify safeguard design is adequate.
- Explain the importance of Markings and Instructions and why they are relevant to the safety of the equipment
- Describe the certification process

Learning objectives will be measured by knowledge checks and a final comprehensive assessment requiring participants to review requirements, complete an analysis, map out and define safeguards between given energy sources and user and between sources.





Contact:

Michael Sakamoto

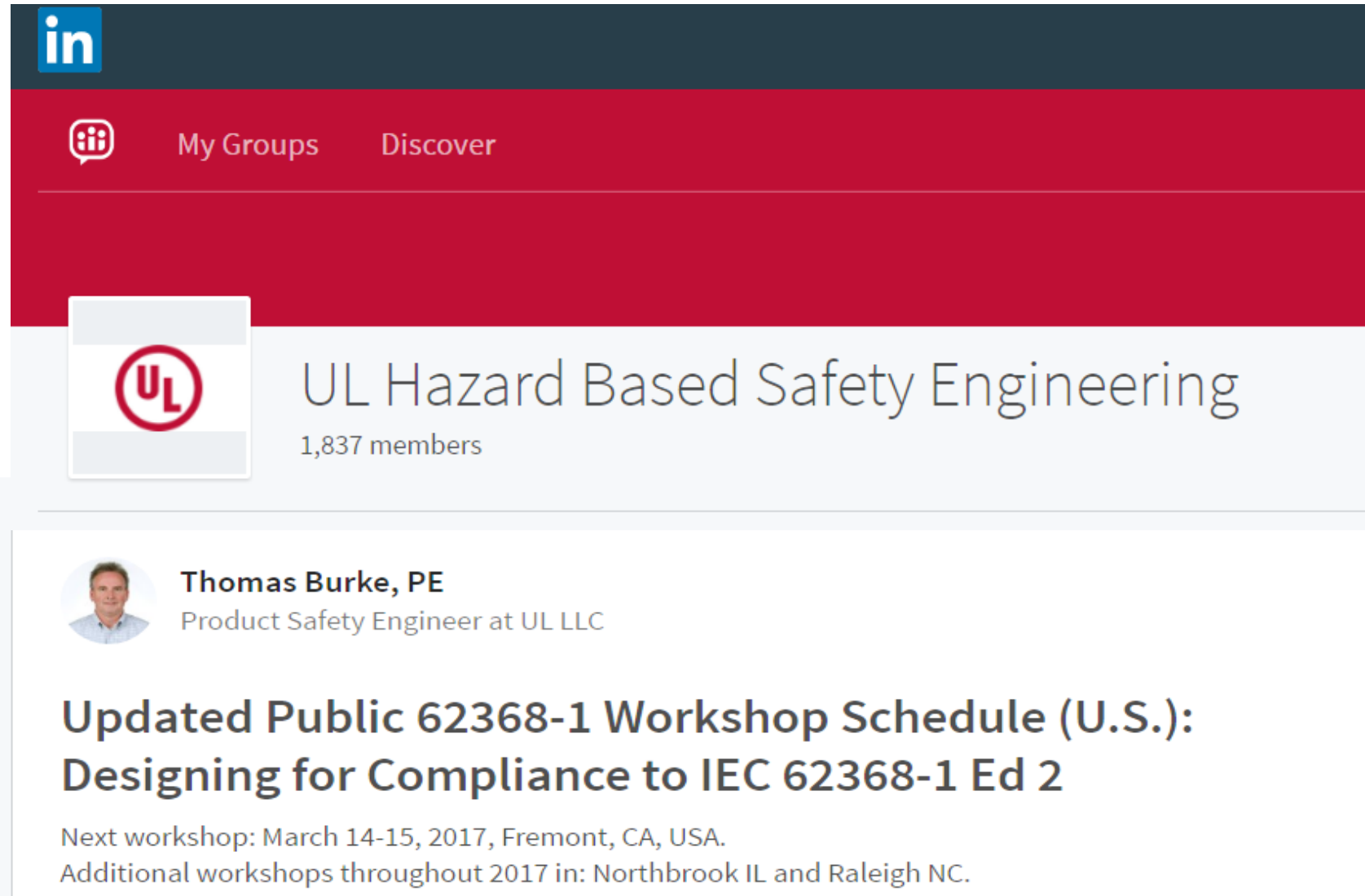
Business Development Manager (62368-1)

UL Consumer Technology Division

Michael.Sakamoto@ul.com

510-319-4161

LinkedIn UL HBSE Group: Ongoing 62368-1 Updates - Please Join !



The image shows a screenshot of the LinkedIn interface for the 'UL Hazard Based Safety Engineering' group. At the top, there is a dark blue header with the LinkedIn logo. Below this is a red navigation bar with icons for 'My Groups' and 'Discover'. The main content area features the group's profile picture, which is the UL logo, and the group name 'UL Hazard Based Safety Engineering' with '1,837 members' listed below it. A post by Thomas Burke, PE, is visible, with his profile picture and title 'Product Safety Engineer at UL LLC'. The post title is 'Updated Public 62368-1 Workshop Schedule (U.S.): Designing for Compliance to IEC 62368-1 Ed 2'. The post text mentions the next workshop on March 14-15, 2017, in Fremont, CA, USA, and additional workshops throughout 2017 in Northbrook IL and Raleigh NC.

UL Hazard Based Safety Engineering
1,837 members

Thomas Burke, PE
Product Safety Engineer at UL LLC

**Updated Public 62368-1 Workshop Schedule (U.S.):
Designing for Compliance to IEC 62368-1 Ed 2**

Next workshop: March 14-15, 2017, Fremont, CA, USA.
Additional workshops throughout 2017 in: Northbrook IL and Raleigh NC.



Q&A

Thank-you