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(IEC 62368-1:2023, MOD)

STANDARD FOR SAFETY

Audio/Video, Information and
Communication Technology Equipment
– Part 1: Safety Requirements

UL Standard for Safety for Audio/Video, Information and Communication Technology Equipment – Part 1: Safety Requirements, UL 62368-1

Fourth Edition, Dated July 31, 2025

Summary of Topics

This new Fourth edition of ANSI/UL 62368-1 dated July 31, 2025 is an adoption of IEC 62368-1, Audio/video, information and communication technology equipment – Part 1: Safety requirements (Fourth Edition, issued May 2023). Please note that the national difference document incorporates all of the U.S. national differences for UL 62368-1.

The new and revised requirements are substantially in accordance with Proposal(s) on this subject dated November 8, 2024.

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This ANSI/UL Standard for Safety consists of the Fourth Edition.

The most recent designation of ANSI/UL 62368-1 as an American National Standard (ANSI) occurred on July 31, 2025. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, Title Page (front and back), or the Preface. The National Difference Page and IEC Foreword are also excluded from the ANSI approval of IEC-based standards.

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Bibliography

Preface

This is the harmonized CSA Group and ULSE standard for Audio/video, information and communication technology equipment – Part 1: Safety requirements. It is the fourth edition of CSA C22.2 No. 62368-1 and the fourth edition of UL 62368-1. This edition of CSA C22.2 No. 62368-1 supersedes the previous edition published on December 13, 2019. This edition of UL 62368-1 supersedes the previous edition published on December 13, 2019.

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This Standard is considered suitable for use for conformity assessment within the stated scope of the Standard.

This standard was reviewed by the CSA Subcommittee on Safety of Electronic Equipment within the Field of Audio/Video, Information, and Communication Technology, under the jurisdiction of the CSA Technical Committee on Consumer and Commercial Products and the CSA Strategic Steering Committee on Requirements for Electrical Safety, and has been formally approved by the CSA Technical Committee. This standard has been developed in compliance with Standards Council of Canada requirements for National Standards of Canada. It has been published as a National Standard of Canada by CSA Group.

Application of Standard

Where reference is made to a specific number of samples to be tested, the specified number is to be considered a minimum quantity.

Note: Although the intended primary application of this standard is stated in its scope, it is important to note that it remains the responsibility of the users of the standard to judge its suitability for their particular purpose.

Level of Harmonization

This standard adopts the IEC text with national differences.

This standard is published as an equivalent standard for CSA Group and ULSE.

An equivalent standard is a standard that is substantially the same in technical content, except as follows: Technical national differences are allowed for codes and governmental regulations as well as those recognized as being in accordance with NAFTA Article 905, for example, because of fundamental climatic, geographical, technological, or infrastructural factors, scientific justification, or the level of protection that the country considers appropriate. Presentation is word for word except for editorial changes.

All national differences from the IEC text are included in the CSA Group and ULSE versions of the standard. While the technical content is the same in each organization's version, the format and presentation may differ.

Reasons for Differences From IEC

Differences from the IEC are being added in order to address safety and regulatory situations present in the US and Canada.

Interpretations

The interpretation by the standards development organization of an identical or equivalent standard is based on the literal text to determine compliance with the standard in accordance with the procedural rules of the standards development organization. If more than one interpretation of the literal text has been identified, a revision is to be proposed as soon as possible to each of the standards development organizations to more accurately reflect the intent.

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There are five types of National Differences as noted below. The difference type is noted on the first line of the National Difference in the standard. The standard may not include all types of these National Differences.

DR – These are National Differences based on the **national regulatory requirements**.

D1 – These are National Differences which are based on **basic safety principles and requirements**, elimination of which would compromise safety for consumers and users of products.

D2 – These are National Differences from IEC requirements based on existing **safety practices**. These requirements reflect national safety practices, where empirical substantiation (for the IEC or national requirement) is not available or the text has not been included in the IEC standard.

DC – These are National Differences based on the **component standards** and will not be deleted until a particular component standard is harmonized with the IEC component standard.

DE – These are National Differences based on **editorial comments or corrections**.

Each national difference contains a description of what the national difference entails. Typically one of the following words is used to explain how the text of the national difference is to be applied to the base IEC text:

Addition / Add - An addition entails adding a complete new numbered clause, subclause, table, figure, or annex. Addition is not meant to include adding select words to the base IEC text.

Modification / Modify - A modification is an altering of the existing base IEC text such as the addition, replacement or deletion of certain words or the replacement of an entire clause, subclause, table, figure, or annex of the base IEC text.

Deletion / Delete - A deletion entails complete deletion of an entire numbered clause, subclause, table, figure, or annex without any replacement text.

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FOREWORD

INTERNATIONAL ELECTROTECHNICAL COMMISSION

AUDIO/VIDEO, INFORMATION AND COMMUNICATION TECHNOLOGY EQUIPMENT – Part 1: Safety requirements

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.

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6) All users should ensure that they have the latest edition of this publication.

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IEC 62368-1 has been prepared by IEC technical committee TC 108: Safety of electronic equipment within the field of audio/video, information technology and communication technology. It is an International Standard.

This fourth edition cancels and replaces the third edition published in 2018. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) new table with requirements for external circuits;
- b) revision of requirements for openings in fire enclosures;
- c) revision of requirements for liquid filled components;

d) revision of battery charging requirements.

The text of this International Standard is based on the following documents:

Draft	Report on voting
108/800/FDIS	108/804/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts in the IEC 62368 series, published under the general title *Audio/video, information and communication technology equipment*, can be found on the IEC website.

The "in some countries" notes regarding differing national practices are contained in the following clauses, subclauses and tables:

[0.2.1](#), Clause [1](#), [3.3.8.1](#), [3.3.8.3](#), [4.1.15](#), [4.7.3](#), [5.4.2.3.2.4](#), [5.4.2.5](#), [5.4.5.1](#), [5.4.10.2.1](#), [5.4.10.2.2](#), [5.4.10.2.3](#), [5.5.2.1](#), [5.5.6](#), [5.6.4.2.1](#), [5.6.8](#), [5.7.6](#), [5.7.7.1](#), [8.5.4.2.3](#), [10.5.3](#), [10.6.1](#), [F.3.3.4](#), [F.3.3.6](#), [Y.4.1](#), [Y.4.5](#), [Table 12](#), [Table 13](#) and [Table 38](#).

In this document, the following print types or formats are used:

- requirements proper and normative annexes: in roman type;
- compliance statements and test specifications: *in italic type*;
- notes/explanatory matter: in smaller roman type;
- normative conditions within tables: in smaller roman type;
- terms that are defined in [3.3](#): **bold**.

In figures and tables, if colour is available:

- green colour denotes a class 1 energy source;
- yellow colour denotes a class 2 energy source;
- red colour denotes a class 3 energy source.

A comparison of terms introduced in this document that are different from other existing IEC documents is given in Annex [W](#).

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

NOTE Explanatory information related to IEC 62368-1 is contained in IEC TR 62368 2. It provides rationale together with explanatory information related to this document.

IMPORTANT – The "colour inside" logo on the cover page of this document indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

DV.1 DE *Modification to add the following to the IEC Foreword:*

The numbering system in the standard uses a space instead of a comma to indicate thousands and uses a comma instead of a period to indicate a decimal point. For example, 1 000 means 1,000 and 1,01 means 1.01.

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INTRODUCTION

0 Principles of this product safety standard

0.1 Objective

This part of IEC 62368 is a product safety standard that classifies energy sources, prescribes SAFEGUARDS against those energy sources, and provides guidance on the application of, and requirements for, those SAFEGUARDS.

The prescribed SAFEGUARDS are intended to reduce the likelihood of pain, injury and, in the case of fire, property damage.

The objective of the introduction is to help designers to understand the underlying principles of safety in order to design safe equipment. These principles are informative and not an alternative to the detailed requirements of this document.

0.2 Persons

0.2.1 General

This document describes SAFEGUARDS for the protection of three kinds of persons: the ORDINARY PERSON, the INSTRUCTED PERSON, and the SKILLED PERSON. Unless otherwise specified in this document, the requirements for an ORDINARY PERSON apply. This document assumes that a person will not intentionally create conditions or situations that could cause pain or injury.

NOTE 1 In Australia, the work conducted by an instructed person or skilled person can require formal licensing from regulatory authorities.

NOTE 2 In Germany, a person can only be regarded as an instructed person or a skilled person if certain legal requirements are fulfilled.

0.2.2 Ordinary person

ORDINARY PERSON is the term applied to all persons other than INSTRUCTED PERSONS and SKILLED PERSONS. ORDINARY PERSONS include not only users of the equipment, but also all persons who can possibly have access to the equipment or who could be in the vicinity of the equipment. Under NORMAL OPERATING CONDITIONS or ABNORMAL OPERATING CONDITIONS, ORDINARY PERSONS should not be exposed to parts comprising energy sources capable of causing pain or injury. Under a SINGLE FAULT CONDITION, ORDINARY PERSONS should not be exposed to parts comprising energy sources capable of causing injury.

0.2.3 Instructed person

INSTRUCTED PERSON is a term applied to persons who have been instructed and trained by a SKILLED PERSON, or who are supervised by a SKILLED PERSON, to identify energy sources that can cause pain (see [Table 1](#)) and to take precautions to avoid unintentional contact with or exposure to those energy sources. Under NORMAL OPERATING CONDITIONS, ABNORMAL OPERATING CONDITIONS or SINGLE FAULT CONDITIONS, INSTRUCTED PERSONS should not be exposed to parts comprising energy sources capable of causing injury.

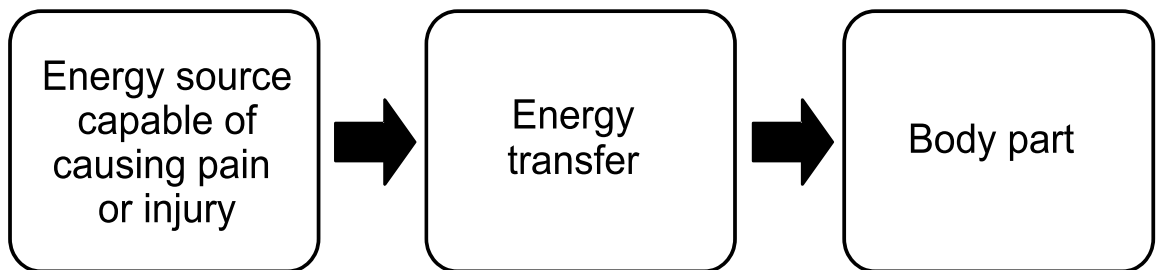
0.2.4 Skilled person

SKILLED PERSON is a term applied to persons who have training or experience in the equipment technology, particularly in knowing the various energies and energy magnitudes used in the equipment. SKILLED PERSONS are expected to use their training and experience to recognize energy sources capable of causing pain or injury and to take action for protection from injury from those energies. SKILLED PERSONS should also be protected against unintentional contact or exposure to energy sources capable of causing injury.

0.3 Model for pain and injury

An energy source that causes pain or injury does so through the transfer of some form of energy to or from a body part.

This concept is represented by a three-block model (see [Figure 1](#)).



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Figure 1
Three block model for pain and injury

This safety standard specifies three classes of energy sources defined by magnitudes and durations of source parameters relative to the body responses to those electrical and thermal energy sources (see [Table 1](#)). Source parameters relative to responses to COMBUSTIBLE MATERIAL, mechanical energy sources and radiation energy sources are specified based on experience and basic safety standards.

Table 1
Response to energy class

Energy source	Effect on the body	Effect on combustible materials
Class 1	Not painful, but can be detectable	Ignition not likely
Class 2	Painful, but not an injury	Ignition possible, but limited growth and spread of fire
Class 3	Injury	Ignition likely, rapid growth and spread of fire

The energy threshold for pain or injury is not constant throughout the population. For example, for some energy sources, the threshold is a function of body mass; the lower the mass, the lower the threshold, and vice-versa. Other body variables include age, state of health, state of emotions, effect of drugs, skin characteristics, etc. Furthermore, even where outward appearances otherwise appear equal, individuals differ in their thresholds of susceptibility to the same energy source.

The effect of duration of energy transfer is a function of the specific energy form. For example, pain or injury from thermal energy can be very short (1 s) for high skin temperature, or very long (several hours) for low skin temperature.

Furthermore, the pain or injury can occur some considerable time after the transfer of energy to a body part. For example, it is possible that pain or injury from some chemical or physiological reaction does not manifest itself for days, weeks, months, or years.

0.4 Energy sources

Energy sources are addressed by this document, together with the pain or injury that results from a transfer of that energy to the body, and the likelihood of property damage that results from fire escaping the equipment.

An electrical product is connected to an electrical energy source (for example, the MAINS), an external power supply unit, or a BATTERY. An electrical product uses the electrical energy to perform its intended functions.

In the process of using electrical energy, the product transforms the electrical energy into other forms of energy (for example, thermal energy, kinetic energy, optical energy, audio energy, electromagnetic energy, etc.). Some energy transformations can be a deliberate part of the product function (for example, moving parts of a printer, images on a visual display unit, sound from a speaker, etc.). Some energy transformations can be a by-product of the product function (for example, heat dissipated by functional circuits, X-radiation from a cathode-ray tube, etc.).

Some products can use energy sources that are non-electrical energy sources such as moving parts or chemicals. The energy in these other sources can be transferred to or from a body part, or can be transformed into other energy forms (for example, chemical energy can be converted to electrical energy through a BATTERY, or a moving body part transfers its kinetic energy to a sharp edge).

Examples of the types of energy forms and the associated injuries and property damage addressed in this document are in [Table 2](#).

Table 2
Examples of body response or property damage related to energy sources

Forms of energy	Examples of body response or property damage	Clause
Electrical energy (for example, energized conductive parts)	Pain, fibrillation, cardiac arrest, respiratory arrest, skin burn, or internal organ burn	5
Thermal energy (for example, electrical ignition and spread of fire)	Electrically-caused fire leading to burn-related pain or injury, or property damage	6
Chemical reaction (for example, electrolyte, poison)	Skin damage, organ damage, or poisoning	7
Kinetic energy (for example, moving parts of equipment, or a moving body part against an equipment part)	Laceration, puncture, abrasion, contusion, crush, amputation, or loss of a limb, eye, ear, etc.	8
Thermal energy (for example, hot ACCESSIBLE parts)	Skin burn	9
Radiated energy (for example, electromagnetic energy, optical energy, acoustic energy)	Loss of sight, skin burn, or loss of hearing	10

0.5 Safeguards

0.5.1 General

Many products necessarily use energy capable of causing pain or injury. Product design cannot eliminate such energy use. Consequently, such products should use a scheme that reduces the likelihood of such energy being transferred to a body part. The scheme that reduces the likelihood of energy transfer to a body part is a SAFEGUARD (see [Figure 2](#)).



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Figure 2
Three block model for safety

A SAFEGUARD is a device or scheme or system that:

- is interposed between an energy source capable of causing pain or injury and a body part, and
- reduces the likelihood of transfer of energy capable of causing pain or injury to a body part.

NOTE SAFEGUARD mechanisms against transfer of energy capable of causing pain or injury include:

- attenuating the energy (reduces the value of the energy); or
- impeding the energy (slows the rate of energy transfer); or
- diverting the energy (changes the energy direction); or
- disconnecting, interrupting, or disabling the energy source; or
- enveloping the energy source (reduces the likelihood of the energy from escaping); or
- interposing a barrier between a body part and the energy source.

A SAFEGUARD can be applied to the equipment, to the local installation, to a person or can be a learned or directed behaviour (for example, resulting from an INSTRUCTIONAL SAFEGUARD) intended to reduce the likelihood of transfer of energy capable of causing pain or injury. A SAFEGUARD can be a single element or a set of elements.

Generally, this document uses an order of preference for providing SAFEGUARDS based on the requirements given in ISO/IEC Guide 51 as follows:

- EQUIPMENT SAFEGUARDS are always useful, since they do not require any knowledge or actions by persons coming into contact with the equipment;
- INSTALLATION SAFEGUARDS are useful when a safety characteristic can only be provided after installation (for example, the equipment shall be bolted to the floor to provide stability);
- behavioural SAFEGUARDS are useful when the equipment requires an energy source to be ACCESSIBLE.

In practice, SAFEGUARD selection accounts for the nature of the energy source, the intended user, the functional requirements of the equipment, and similar considerations.

0.5.2 Equipment safeguard

An EQUIPMENT SAFEGUARD may be a BASIC SAFEGUARD, a SUPPLEMENTARY SAFEGUARD, a DOUBLE SAFEGUARD, or a REINFORCED SAFEGUARD.

0.5.3 Installation safeguard

INSTALLATION SAFEGUARDS are not controlled by the equipment manufacturer, although in some cases, INSTALLATION SAFEGUARDS may be specified in the equipment installation instructions.

Generally, with respect to equipment, an INSTALLATION SAFEGUARD is a SUPPLEMENTARY SAFEGUARD.

NOTE For example, the SUPPLEMENTARY SAFEGUARD providing protective earthing is located partly in the equipment and partly in the installation. The SUPPLEMENTARY SAFEGUARD providing PROTECTIVE EARTHING is not effective until the equipment is connected to the PROTECTIVE EARTHING of the installation.

Requirements for INSTALLATION SAFEGUARDS are not addressed in this document. However, this document does assume some INSTALLATION SAFEGUARDS, such as PROTECTIVE EARTHING, are in place and are effective.

0.5.4 Personal safeguard

A PERSONAL SAFEGUARD may be a BASIC SAFEGUARD, a SUPPLEMENTARY SAFEGUARD, or a REINFORCED SAFEGUARD.

Requirements for PERSONAL SAFEGUARDS are not addressed in this document. However, this document does assume that PERSONAL SAFEGUARDS are available for use as specified by the manufacturer.

0.5.5 Behavioural safeguards

0.5.5.1 Introduction to behavioural safeguards

In the absence of an EQUIPMENT, INSTALLATION, or PERSONAL SAFEGUARD, a person can use a specific behaviour as a SAFEGUARD to avoid energy transfer and consequent injury. A behavioural SAFEGUARD is a voluntary or instructed behaviour intended to reduce the likelihood of transfer of energy to a body part.

Three kinds of behavioural SAFEGUARDS are specified in this document. Each kind of behavioural SAFEGUARD is associated with a specific kind of person. An INSTRUCTIONAL SAFEGUARD is usually addressed to an ORDINARY PERSON, can may also be addressed to an INSTRUCTED PERSON or a SKILLED PERSON. A PRECAUTIONARY SAFEGUARD is used by an INSTRUCTED PERSON. A SKILL SAFEGUARD is used by a SKILLED PERSON.

As an EQUIPMENT SAFEGUARD provides protection for all persons, it is preferred above a behavioural SAFEGUARD. However, in certain situations a PRECAUTIONARY SAFEGUARD or a SKILL SAFEGUARD is accepted as a replacement of an EQUIPMENT SAFEGUARD.

0.5.5.2 Instructional safeguard

An INSTRUCTIONAL SAFEGUARD is a means of providing information, describing the existence and location of an energy source capable of causing pain or injury, and is intended to invoke a specific behaviour on the part of a person to reduce the likelihood of transfer of energy to a body part (see Annex [E](#)).

An INSTRUCTIONAL SAFEGUARD may be a visual indicator (symbols or words or both) or an audible message, as applicable to the expected use of the product.

When accessing locations where the equipment needs to be energized to perform a service activity, an INSTRUCTIONAL SAFEGUARD can be considered acceptable protection to bypass an EQUIPMENT SAFEGUARD such that the person is made aware of how to avoid contact with a class 2 or class 3 energy source.

If EQUIPMENT SAFEGUARDS would interfere with or prohibit the equipment function, an INSTRUCTIONAL SAFEGUARD may replace an EQUIPMENT SAFEGUARD.

If exposure to an energy source capable of causing pain or injury is essential to the correct functioning of equipment, an INSTRUCTIONAL SAFEGUARD may be used to ensure protection of persons instead of another SAFEGUARD. Consideration should be given as to whether the INSTRUCTIONAL SAFEGUARD should use a PERSONAL SAFEGUARD.

Provision of an INSTRUCTIONAL SAFEGUARD does not result in an ORDINARY PERSON becoming an INSTRUCTED PERSON (see [0.5.5.3](#)).

0.5.5.3 Precautionary safeguard (used by an instructed person)

A PRECAUTIONARY SAFEGUARD is the training and experience or supervision of an INSTRUCTED PERSON by a SKILLED PERSON to use precautions to protect the INSTRUCTED PERSON against class 2 energy sources. PRECAUTIONARY SAFEGUARDS are not specifically prescribed in this document but are assumed to be effective when the term INSTRUCTED PERSON is used.

During equipment servicing, it is possible that an INSTRUCTED PERSON will need to remove or defeat an EQUIPMENT SAFEGUARD. In this case, an INSTRUCTED PERSON is expected to then apply precaution as a SAFEGUARD to avoid exposure to class 2 energy sources.

0.5.5.4 Skill safeguard (used by a skilled person)

A SKILL SAFEGUARD is the education, training, knowledge and experience of the SKILLED PERSON that is used to protect the SKILLED PERSON against class 2 or class 3 energy sources. SKILL SAFEGUARDS are not specifically prescribed in this document but are assumed to be effective when the term SKILLED PERSON is used.

During equipment servicing, it is possible that a SKILLED PERSON will need to remove or defeat an EQUIPMENT SAFEGUARD. In this case, a SKILLED PERSON is expected to then apply skill as a SAFEGUARD to avoid injury.

0.5.6 Safeguards during ordinary or instructed person service conditions

During ORDINARY PERSON or INSTRUCTED PERSON service conditions, SAFEGUARDS for such persons can be applicable. Such SAFEGUARDS may be EQUIPMENT SAFEGUARDS, PERSONAL SAFEGUARDS, or INSTRUCTIONAL SAFEGUARDS.

0.5.7 Equipment safeguards during skilled person service conditions

During SKILLED PERSON service conditions, EQUIPMENT SAFEGUARDS should be provided to protect against the effects of a body's involuntary reaction (for example, startle) that might cause unintentional contact with a class 3 energy source located outside the view of the SKILLED PERSON.

NOTE This SAFEGUARD typically applies in large equipment, where the SKILLED PERSON needs to partially or wholly enter between two or more class 3 energy source locations while servicing.

0.5.8 Examples of safeguard characteristics

[Table 3](#) lists some examples of safeguard characteristics.

Table 3
Examples of safeguard characteristics

Safeguard	Basic safeguard	Supplementary safeguard	Reinforced safeguard
EQUIPMENT SAFEGUARD: a physical part of an equipment	Effective under NORMAL OPERATING CONDITIONS	Effective in the event of failure of the BASIC SAFEGUARD	Effective under NORMAL OPERATING CONDITIONS and in the event of a SINGLE FAULT CONDITION elsewhere in the equipment
	Example: BASIC INSULATION	Example: SUPPLEMENTARY INSULATION	Example: REINFORCED INSULATION
	Example: normal temperatures below ignition temperatures	Example: FIRE ENCLOSURE	Not applicable
INSTALLATION SAFEGUARD: a physical part of a man-made installation	Effective under NORMAL OPERATING CONDITIONS	Effective in the event of failure of an equipment BASIC SAFEGUARD	Effective under NORMAL OPERATING CONDITIONS and in the event of a SINGLE FAULT CONDITION elsewhere in the equipment
	Example: wire size	Example: overcurrent protective device	Example: socket outlet
PERSONAL SAFEGUARD: a physical device worn on the body	In the absence of any EQUIPMENT SAFEGUARD, effective under NORMAL OPERATING CONDITIONS	Effective in the event of failure of an equipment BASIC SAFEGUARD	In the absence of any EQUIPMENT SAFEGUARD, effective under NORMAL OPERATING CONDITIONS and in the event of a SINGLE FAULT CONDITION elsewhere in the equipment
	Example: gloves	Example: insulating floor mat	Example: electrically-insulated glove for handling live conductors
INSTRUCTIONAL SAFEGUARD: a voluntary or instructed behaviour intended to reduce the likelihood of transfer of energy to a body part	In the absence of any EQUIPMENT SAFEGUARD, effective under NORMAL OPERATING CONDITIONS	Effective in the event of failure of an equipment BASIC SAFEGUARD	Only effective on an exceptional basis, when providing all appropriate SAFEGUARDS would prevent the intended functioning of the equipment
	Example: INSTRUCTIONAL SAFEGUARD to disconnect telecommunication cable before opening the cover	Example: after opening a door, an INSTRUCTIONAL SAFEGUARD against hot parts	Example: INSTRUCTIONAL SAFEGUARD of hot parts in an office photocopier, or a continuous roll paper cutter on a commercial printer

0.6 Electrically-caused pain or injury (electric shock)

0.6.1 Models for electrically-caused pain or injury

Electrically-caused pain or injury can occur when electrical energy capable of causing pain or injury is transferred to a body part (see [Figure 3](#)).

Electrical energy transfer occurs when there are two or more electrical contacts to the body:

- the first electrical contact is between a body part and a conductive part of the equipment;
- the second electrical contact is between another body part and
 - earth, or
 - another conductive part of the equipment.

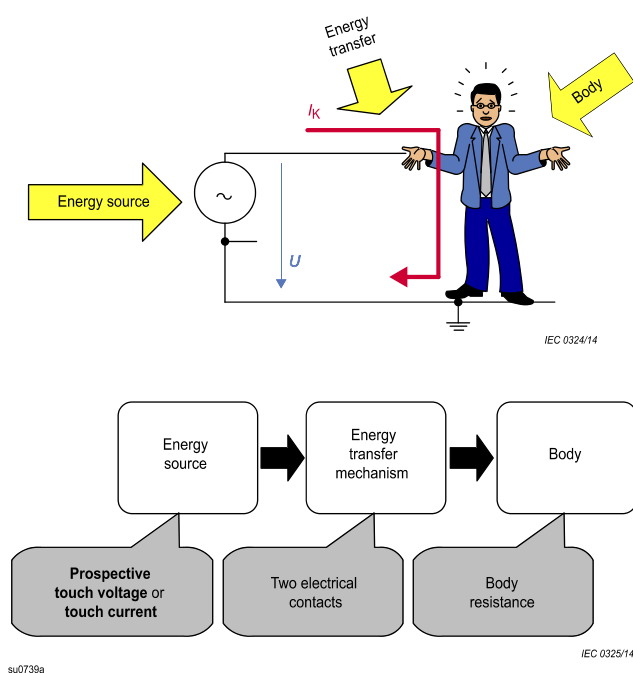


Figure 3
Schematic and model for electrically-caused pain or injury

Depending on the magnitude, duration, wave shape, and frequency of the current, the effect on the human body varies from undetectable to detectable to painful to injurious.

0.6.2 Models for protection against electrically-caused pain or injury

One or more SAFEGUARDS are interposed between an electrical energy source capable of causing pain or injury and a body part to protect against electrically-caused pain or injury (see [Figure 4](#)).

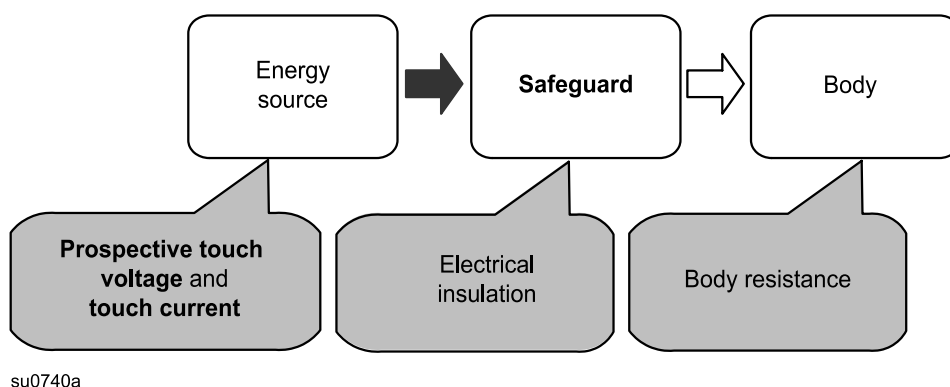


Figure 4
Model for protection against electrically-caused pain or injury

Protection against electrically-caused pain is provided under NORMAL OPERATING CONDITIONS and ABNORMAL OPERATING CONDITIONS. For such protection, under NORMAL OPERATING CONDITIONS and ABNORMAL OPERATING CONDITIONS, a BASIC SAFEGUARD is interposed between an electrical energy source capable of causing pain and an ORDINARY PERSON.

The most common BASIC SAFEGUARD against an electrical energy source capable of causing pain is electrical insulation (also known as BASIC INSULATION) interposed between the energy source and a body part.

Protection against electrically-caused injury is provided under NORMAL OPERATING CONDITIONS, ABNORMAL OPERATING CONDITIONS, and SINGLE FAULT CONDITIONS. For such protection, under NORMAL OPERATING CONDITIONS and ABNORMAL OPERATING CONDITIONS, both a BASIC SAFEGUARD and a SUPPLEMENTARY SAFEGUARD are interposed between an electrical energy source capable of causing injury and an ORDINARY PERSON (see [4.3.2.4](#)), or an INSTRUCTED PERSON (see [4.3.3.3](#)). In the event of a failure of either SAFEGUARD, the other SAFEGUARD becomes effective. The SUPPLEMENTARY SAFEGUARD against an electrical energy source capable of causing injury is placed between the BASIC SAFEGUARD and a body part. A SUPPLEMENTARY SAFEGUARD may be additional electrical insulation (SUPPLEMENTARY INSULATION) or a protectively earthed conductive barrier or other construction that performs the same function.

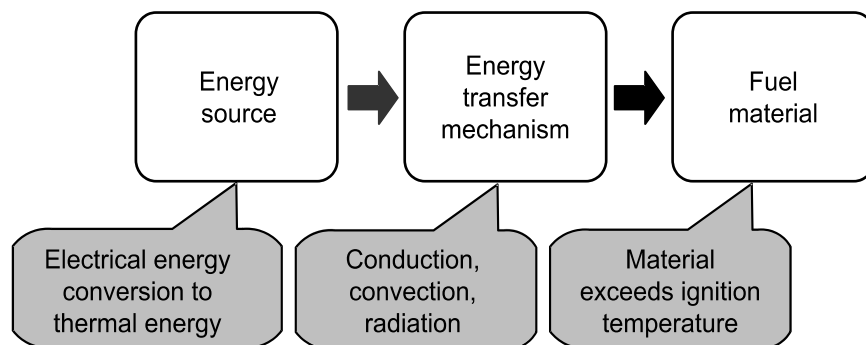
Another SAFEGUARD against an electrical energy source capable of causing injury is electrical insulation (also known as DOUBLE INSULATION or REINFORCED INSULATION) placed between the energy source and a body part.

Likewise, a REINFORCED SAFEGUARD may be placed between an electrical energy source capable of causing injury and a body part.

0.7 Electrically-caused fire

0.7.1 Models for electrically-caused fire

Electrically-caused fire is due to conversion of electrical energy to thermal energy (see [Figure 5](#)), where the thermal energy heats a fuel material followed by ignition and combustion.



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Figure 5
Model for electrically-caused fire

Electrical energy is converted to thermal energy either in a resistance or in an arc and is transferred to a fuel material by conduction, convection, or radiation. As the fuel material heats, it can cause ignition and combustion.

into gases, liquids and solids. When the gas is at its ignition temperature, the gas can be ignited by an ignition source. When the gas is at its spontaneous ignition temperature, the gas ignites by itself. Both result in fire.

0.7.2 Models for protection against electrically-caused fire

The BASIC SAFEGUARD against electrically-caused fire (see [Figure 6](#)) is that the temperature of a material, under NORMAL OPERATING CONDITIONS and ABNORMAL OPERATING CONDITIONS, does not cause the material to ignite.

The SUPPLEMENTARY SAFEGUARD against electrically-caused fire reduces the likelihood of ignition or, in the case of ignition, reduces the likelihood of spread of fire.

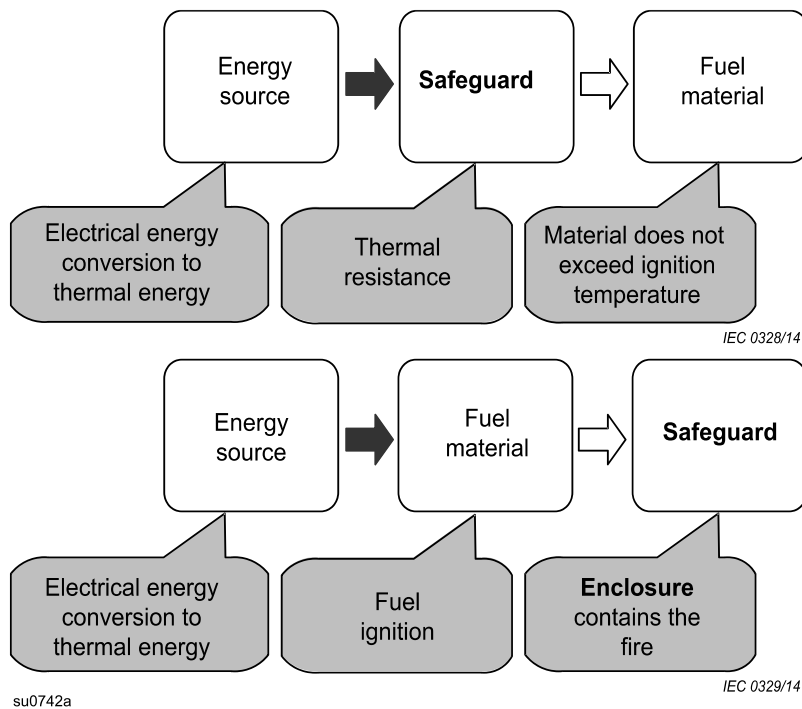


Figure 6
Models for protection against fire

0.8 Injury caused by hazardous substances

Injury caused by HAZARDOUS SUBSTANCES is due to a chemical reaction with a body part. The extent of injury by a given substance depends on both the magnitude and duration of exposure and on the body part susceptibility to that substance.

The BASIC SAFEGUARD against injury caused by HAZARDOUS SUBSTANCES is containment of the material.

SUPPLEMENTARY SAFEGUARDS against injury caused by HAZARDOUS SUBSTANCES may include:

- a second container or a spill-resistant container;
- containment trays;

- tamper-proof screws to prevent unauthorized access;
- INSTRUCTIONAL SAFEGUARDS.

National and regional regulations govern the use of and exposure to HAZARDOUS SUBSTANCES used in equipment. These regulations do not enable a practical classification of HAZARDOUS SUBSTANCES in the manner in which other energy sources are classified in this document. Therefore, energy source classifications are not applied in Clause [7](#).

0.9 Mechanically-caused injury

Mechanically-caused injury is due to kinetic energy transfer to a body part when a collision occurs between a body part and an equipment part. The kinetic energy is a function of the relative motion between a body part and ACCESSIBLE parts of the equipment, including parts ejected from the equipment that collide with a body part.

Examples of kinetic energy sources are:

- body motion relative to sharp edges and corners;
- part motion due to rotating or other moving parts, including pinch points;
- part motion due to loosening, exploding, or imploding parts;
- equipment motion due to instability;
- equipment motion due to wall, ceiling, or rack mounting means failure;
- equipment motion due to handle failure;
- part motion due to an exploding BATTERY;
- equipment motion due to cart or stand instability or failure.

The BASIC SAFEGUARD against mechanically-caused injury is a function of the specific energy source. BASIC SAFEGUARDS may include:

- rounded edges and corners;
- an ENCLOSURE to prevent a moving part from being ACCESSIBLE;
- an ENCLOSURE to prevent expelling a moving part;
- a SAFETY INTERLOCK to control access to an otherwise moving part;
- means to stop the motion of a moving part;
- means to stabilize the equipment;
- robust handles;
- robust mounting means;
- means to contain parts expelled during EXPLOSION or implosion.

The SUPPLEMENTARY SAFEGUARD against mechanically-caused injury is a function of the specific energy source. SUPPLEMENTARY SAFEGUARDS may include:

- INSTRUCTIONAL SAFEGUARDS;
- instructions and trainings;
- additional ENCLOSURES or barriers;
- SAFETY INTERLOCKS.

The REINFORCED SAFEGUARD against mechanically-caused injury is a function of the specific energy source. REINFORCED SAFEGUARDS may include:

- extra thick glass on the front of a CRT;
- rack slide-rails and means of support;
- SAFETY INTERLOCK.

0.10 Thermally-caused injury (skin burn)

0.10.1 Models for thermally-caused injury

Thermally-caused injury can occur when thermal energy capable of causing injury is transferred to a body part (see [Figure 7](#)).

Thermal energy transfer occurs when a body touches a hot equipment part. The extent of injury depends on the temperature difference, the thermal mass of the object, rate of thermal energy transfer to the skin, and duration of contact.

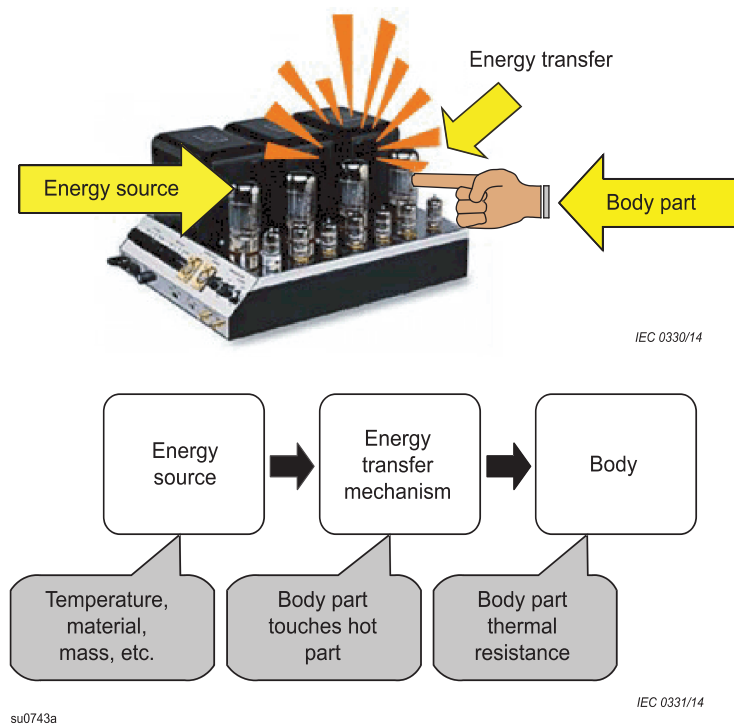
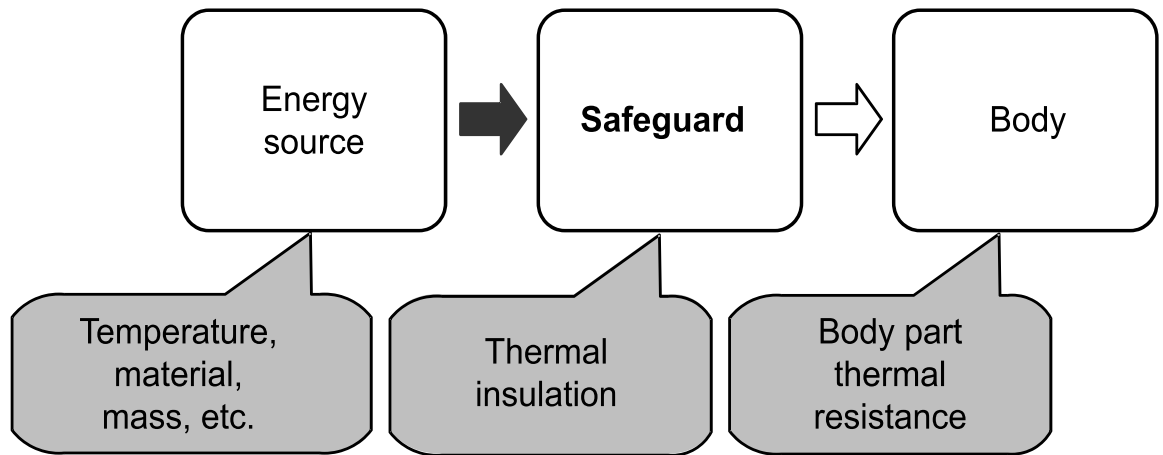


Figure 7
Schematic and model for thermally-caused injury

Depending on the temperature, contact duration, material properties, and mass of the material, the perception of the human body varies from warmth to heat that can result in pain or injury (burn).

0.10.2 Models for protection against thermally-caused pain or injury

One or more SAFEGUARDS are interposed between a thermal energy source capable of causing pain or injury and an ORDINARY PERSON (see [Figure 8](#)).



su0744a

Figure 8
Model for protection against thermally-caused injury

Under NORMAL OPERATING CONDITIONS and ABNORMAL OPERATING CONDITIONS, protection is used against thermally-cause pain. For such protection, a BASIC SAFEGUARD is interposed between a thermal energy source capable of causing pain and an ORDINARY PERSON.

Under NORMAL OPERATING CONDITIONS, ABNORMAL OPERATING CONDITIONS and SINGLE FAULT CONDITIONS, protection is used against thermally-caused injury. For such protection, a BASIC SAFEGUARD and a SUPPLEMENTARY SAFEGUARD are interposed between a thermal energy source capable of causing injury and an ORDINARY PERSON.

The BASIC SAFEGUARD against a thermal energy source capable of causing pain or injury is thermal insulation placed between the energy source and a body part. In some cases, a BASIC SAFEGUARD against a thermal energy source capable of causing pain or injury can be an INSTRUCTIONAL SAFEGUARD identifying the hot parts and how to reduce the likelihood of injury. In some cases, a BASIC SAFEGUARD reduces the likelihood of a non-injurious thermal energy source from becoming a thermal energy source capable of causing pain or injury.

Examples of such BASIC SAFEGUARDS are:

- control of electrical energy being converted to thermal energy (for example, a THERMOSTAT);
- heat sinking, etc.

The SUPPLEMENTARY SAFEGUARD against a thermal energy source capable of causing injury is thermal insulation placed between the energy source and a body part. In some cases, a SUPPLEMENTARY SAFEGUARD against a thermal energy source capable of causing pain or injury can be an INSTRUCTIONAL SAFEGUARD identifying the hot parts and how to reduce the likelihood of injury.

0.11 Radiation-caused injury

Radiation-caused injury within the scope of this document is generally attributed to one of the following energy transfer mechanisms:

- heating of a body organ caused by exposure to non-ionising radiation, such as the highly localised energy of a laser impinging on the retina; or
- auditory injury caused by over stimulation of the ear by excessive peaks or sustained loud sound, leading to physical or nerve damage; or
- X-radiation; or
- UV radiation.

Radiated energy is transferred by impingement of wave emission upon a body part.

The BASIC SAFEGUARD against radiation-caused injury is containment of the energy within an ENCLOSURE that is opaque to the radiated energy.

There are several SUPPLEMENTARY SAFEGUARDS against radiation-caused injury. The SUPPLEMENTARY SAFEGUARDS can include SAFETY INTERLOCKS to disconnect power to the generator, tamper-proof screws to prevent unauthorized access, etc.

The BASIC SAFEGUARD against auditory injury is to limit the acoustic output level of personal music players and their associated headphones and earphones.

Examples of SUPPLEMENTARY SAFEGUARDS against auditory pain and injury are the provision of warnings and information advising the user how to use the equipment correctly.

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AUDIO/VIDEO, INFORMATION AND COMMUNICATION TECHNOLOGY EQUIPMENT – Part 1: Safety requirements

1 Scope

This part of IEC 62368 is applicable to the safety of electrical and electronic equipment within the field of audio, video, information and communication technology, and business and office machines with a RATED VOLTAGE not exceeding 600 V. This document does not include requirements for performance or functional characteristics of equipment.

NOTE 1 Examples of equipment within the scope of this document are given in Annex [A](#).

NOTE 2 A RATED VOLTAGE of 600 V is considered to include equipment rated 400/690 V.

Explanatory information related to this document is contained in IEC TR 62368-2. It provides rationale together with explanatory information that can be helpful to apply to this document.

This document is also applicable to:

- components and subassemblies intended for incorporation in this equipment. Such components and subassemblies need not comply with every requirement of this document, provided that the complete equipment, incorporating such components and subassemblies, does comply;
- external power supply units intended to primarily supply equipment within the scope of this document;
- accessories intended to be used with equipment within the scope of this document;
- large equipment installed in RESTRICTED ACCESS AREAS. For equipment having large machinery aspects, additional requirements can apply; and
- equipment to be used in tropical regions.

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.

This document harmonizes with IEC 61140 and gives consideration to the electrical installation by properly interfacing with the common safety aspects of the installation.

Each installation can have particular requirements. In addition, requirements for protection of the OUTDOOR EQUIPMENT against the effects of direct lightning strikes are not covered by this document.

NOTE 3 For information on this subject, see IEC 62305-1.

This document assumes a maximum altitude of 2 000 m unless otherwise specified by the manufacturer.

Additional requirements for equipment having the capability to supply or receive DC power over commonly used communication cables, such as USB or Ethernet (PoE), are given in IEC 62368-3. IEC 62368-3 does not apply to:

- equipment supplying or receiving power using proprietary connectors; or
- equipment using a proprietary protocol to enable the power transfer.

This document specifies SAFEGUARDS for ORDINARY PERSONS, INSTRUCTED PERSONS, and SKILLED PERSONS. Additional requirements can apply for equipment that is clearly designed or intended for use by children or specifically attractive to children.

NOTE 4 In Australia, the work conducted by an INSTRUCTED PERSON or a SKILLED PERSON can require formal licensing from regulatory authorities.

NOTE 5 In Germany, in many cases a person can only be regarded as an INSTRUCTED PERSON or a SKILLED PERSON if certain legal requirements are fulfilled.

This document does not apply to:

- equipment with non-self-contained hazardous moving parts, such as robotic equipment;

NOTE 6 For requirements related to robotic equipment in an industrial environment, see IEC 60204-1, IEC 60204-11, ISO 10218-1 and ISO 10218-2.

- personal care robots, including mobile servant robots, physical assistant robots, and person carrier robots;

NOTE 7 For requirements related to personal care robots, see ISO 13482.

- power supply systems that are not an integral part of the equipment, such as motor-generator sets, BATTERY backup systems and distribution transformers;
- equipment to be used in wet areas indoors.

This document does not address:

- manufacturing processes except for ROUTINE TESTS;
- injurious effects of gases released by thermal decomposition or combustion;
- disposal processes;
- effects of transport (other than as specified in this document);
- effects of storage of materials, components, or the equipment itself;
- the likelihood of injury from particulate radiation such as alpha particles and beta particles;
- the use of the equipment in oxygen-enriched or EXPLOSIVE atmospheres;
- the likelihood of thermal injury due to radiated or convected thermal energy;
- the likelihood of injury due to flammable liquids;
- the use of the equipment in oxygen-enriched or EXPLOSIVE atmospheres;
- exposure to chemicals other than as specified in Clause [7](#);

- electrostatic discharge events;
- exposure to electromagnetic fields;
- environmental aspects; or
- requirements for functional safety, except for those related to WORK CELLS.

NOTE 8 For specific functional and software safety requirements of electronic safety-related systems (for example, protective electronic circuits), see IEC 61508-1.

1DV.1 DR Add Clauses 1DV.1.1 to 1DV.1.3:

1DV.1.1 This standard is applicable to equipment designed to be installed in accordance with the Canadian Electrical Code (CE Code), Part I, CSA C22.1:21; the National Electrical Code (NEC), NFPA 70-2023; and the National Electrical Safety Code, IEEE C2 2017.

1DV.1.2 The standard is applicable to equipment, when identified by a marking or instruction [see Annex [DVK](#) (Annex [DVA](#), Clause 1 entry)], designed to be installed in accordance with Article 645 of the National Electrical Code, NFPA 70-2023, and the Standard for the Protection of Information Technology Equipment, NFPA 75-2020.

1DV.1.3 See Annex [DVA](#) for requirements and references to regulatory requirements that apply to this equipment, as applicable.

1DV.2 D2 Add Clauses 1DV.2.1 to 1DV.2.5:

1DV.2.1 This standard includes additional requirements for equipment used for entertainment purposes intended for installation in general patient care areas of health care facilities. See Annex [DVB](#).

1DV.2.2 This standard includes additional requirements for equipment intended for mounting under cabinets. See Annex [DVC](#).

1DV.2.3 Additional requirements for equipment with DC power transfer through communication cables and ports are given in IEC 62368-3. IEC 62368-3 Clause 5 for DC power transfer at ES1 or ES2 voltage levels is considered informative. IEC 62368-3 Clause 6 for remote power feeding telecommunication (RFT) circuits is considered normative (see ITU K.50). Alternatively, equipment with RFT circuits are given in either UL 2391 or CSA/UL 60950-21. RFT-C circuits are not permitted unless the RFT-C circuit complies with RFT-V limits ($\leq 200V$ per conductor to earth).

1DV.2.4 This standard does not cover Modular Data Centers (MDCs), only the information and communication technology equipment contained within.

NOTE In the U.S., Modular Data Centers are covered by UL 2755, Standard for Modular Data Centers.

1DV.2.5 This standard does not apply to industrial additive manufacturing equipment (industrial 3D printers). See UL 2011, Outline of Investigation for Machinery.

NOTE 1: For more information, see Annex [DVA](#) (1), including information on non-industrial additive manufacturing equipment covered by this standard.

NOTE 2: In Canada, refer to CSA C22.2 No. 301, Industrial Electrical Machinery.

1DV.3 DR *Modify Clause 1 by replacing Note 3 with the following:*

NOTE 3 For information on this subject, see IEC 62305-1, NFPA 780 or CSA B72.

1DV.4 DC *Modify Clause 1 by adding the following paragraph and Notes:*

Battery backup systems that are not an integral part of stationary AV and ICT equipment, such as provided in separate cabinets, are subject to additional requirements in an appropriate standard for battery backup systems, such as UL 1973, Standard for Batteries for Use in Stationary and Motive Auxiliary Power Applications.

NOTE 9DV: See Figures 1.1 and 1.2 of UL 1973 for more information on battery systems and modules covered by UL 1973, which can consist of both low voltage (class ES or ES2) and high voltage (class ES3) subsystems, battery management, thermal management, and related features and safeguards. When interconnected with AV, IT, and CT Equipment such battery backup systems typically serve as a short-term substitution of the mains supply during power outages and similar disturbances.

Stationary standby batteries having a capacity greater than 3.6 MJ (1 kWh) and installed per Article 480, Stationary Standby Batteries, of the National Electrical Code, NFPA 70-2023, are subjected to additional requirements in an appropriate standard for stationary standby batteries, such as UL 1989:2023.

Energy storage systems (ESS) having a capacity greater than 3.6 MJ (1 kWh) that are stand-alone or interactive with other electric power production sources, and that are installed per Article 706, Energy Storage Systems, of the National Electrical Code, NFPA 70-2023, are subjected to additional requirements in an appropriate standard for energy storage systems, such as UL 9540:2023.

Note 10DV: See Article 100 of NFPA 70-2023 for definitions of Stationary Standby Battery and Energy Storage System (ESS).

Note 11DV: The design, construction, installation, commissioning, operation, maintenance, and decommissioning of stationary energy storage systems (ESS), including mobile and portable ESS installed in a stationary situation, and the storage of lithium metal or lithium-ion batteries, are covered by NFPA 855, Standard for the Installation of Stationary Energy Storage Systems.

1DV.5 DC *Add Clause 1DV.5.1:*

1DV.5.1 Power Distribution Equipment and Subassemblies

1DV.5.1.1 This standard also is applicable to power distribution subassemblies connected to a mains used to distribute power entirely within a system of equipment also covered by this standard, such as power distribution units (PDUs) in the form of cord-connected power strips and shelves with multiple power outlets (receptacles) and intended to be installed in system racks, cabinets, home entertainment centers, etc.

1DV.5.1.2 For equipment covered by this standard that incorporates components and subassemblies that perform a power distribution and control function covered by other standards, such as panelboards, load transfer equipment, or uninterruptible power systems utilized in power conditioners and computer power centers, this standard only

may be used for investigation of safety for those aspects not covered by the other standards.

1DV.5.1.3 This standard also does not apply to stand-alone equipment used for distribution of mains power that is covered by individual power distribution equipment standards.

1DV.5.1.4 Based on the specific function, the following requirements are applicable to the stand-alone distribution equipment or apply additionally to power distribution subassemblies and components of equipment covered by this standard, as described in Clauses [1DV.5.1.1](#) to [1DV.5.1.3](#):

- For Industrial Control Equipment, see CSA C22.2 No. 14 and UL 508;
- For Panelboards, see CSA C22.2 No. 29 and UL 67;
- For Switchboards, see CSA C22.2 No. 244 and UL 891;
- For Transfer Switch Equipment, see CSA C22.2 No. 178.1 and UL 1008;
- For Uninterruptible Power Systems, see CSA C22.2 No. 107.3 and UL 1778;
- For Power Distribution Centers for Communications Equipment, see UL 1801; and
- For other forms of power distribution units for general applications, such as:
 - Relocatable Power Taps, see CSA C22.2 No. 308 and UL 1363;
 - Cord-connected Surge Protective Devices, see CSA C22.2 No. 269.3 and UL 1449; and
 - Furniture Power Distribution Units, see CSA C22.2 No. 308 and UL 962A.

NOTE 1 It is assumed that power distribution equipment covered by the scope of this standard is interconnected to the "outlet" of a "branch circuit" as defined in Section 0 of the CE Code, Part I, and Article 100 of the NEC. In the case of cord-connected equipment, the outlet is the receptacle associated with the building wiring. In the case of permanently connected equipment, the outlet is the interface between the branch circuit conductors associated with the building wiring and the input terminals, pressure connectors, or leads associated with the power distribution equipment covered in whole or part by this standard.

NOTE 2 The following are common definitions of the hardware with related functions that require additional investigation to the appropriate Canadian and U.S. standards:

- Industrial Control Panel: An assembly of two or more components consisting of one of the following:
 - power circuit components only, such as motor controllers, overload relays, fused disconnect switches, and circuit breakers;
 - control circuit components only, such as pushbuttons, pilot lights, selector switches, timers, switches, control relays; or
 - a combination of power and control circuit components.

These components, with associated wiring and terminals, are mounted on or contained within an enclosure or mounted on a subpanel. The industrial control panel does not include the controlled equipment.

- Panelboard: a single panel or group of panel units designed for assembly in the form of a single panel, including buses and automatic overcurrent devices, and equipped with or without switches for the control of light, heat, or

power circuits; designed to be placed in a cabinet or cutout box placed in or against a wall, partition, or other support; and accessible only from the front.

– Switchboard: a large single panel, frame, or assembly of panels on which are mounted, on the face, back, or both, switches, overcurrent and other protective devices, buses, and usually instruments. Switchboards are generally accessible from the rear as well as from the front and are not intended to be installed in cabinets.

– Transfer switch: an automatic or nonautomatic device for transferring one or more load conductor connections from one power source to another.

– Uninterruptible Power Supply: a power supply used to provide alternating current power to a load for some period of time in the event of a power failure.

1DV.6 DC Add Clause 1DV.6.1:

1DV.6.1 Fault-Managed (Class 4) Power Systems

This standard does not apply to active components of a fault-managed (Class 4) power system as defined in Article 726, Class 4 Fault-Managed Power Systems, of the National Electrical Code, NFPA 70-2023.

NOTE In the U.S., components that actively manage power within a Class 4 system are covered by UL 1400-1, Outline for Fault-Managed Power Systems — Part I: General Requirements. In accordance with the Informational Note No. 1 of NEC Section 726.1 (Scope), “Class 4 fault-managed power systems consist of a Class 4 power transmitter and a Class 4 power receiver connected by a Class 4 cabling system. These systems are characterized by monitoring the circuit for faults and controlling the source current to ensure the energy delivered into any fault is limited. Class 4 systems differ from Class 1, Class 2, and Class 3 systems in that they are not limited for power delivered to an appropriate load. They are current limited for faults between the Class 4 transmitter and Class 4 receiver.”

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60027-1, *Letter symbols to be used in electrical technology – Part 1: General*

IEC 60038, *IEC standard voltages*

IEC 60068-2-6, *Environmental testing – Part 2-6: Tests – Test Fc: Vibration (sinusoidal)*

IEC 60068-2-11, *Basic environmental testing procedures – Part 2-11: Tests – Test Ka: Salt mist*

IEC 60068-2-78, *Environmental testing – Part 2-78: Tests – Test Cab: Damp heat, steady state*

IEC 60073, *Basic and safety principles for man-machine interface, marking and identification – Coding principles for indicators and actuators*

IEC TR 60083, *Plugs and socket-outlets for domestic and similar general use standardized in member countries of IEC*

IEC 60085, *Electrical insulation – Thermal evaluation and designation*

IEC 60086-4, *Primary batteries – Part 4: Safety of lithium batteries*

IEC 60086-5, *Primary batteries – Part 5: Safety of batteries with aqueous electrolyte*

IEC 60107-1:1997, *Methods of measurement on receivers for television broadcast transmissions – Part 1: General considerations – Measurements at radio and video frequencies*

IEC 60112, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*

IEC 60127 (all parts), *Miniature fuses*

IEC 60127-8, *Miniature fuses – Part 8: Fuse resistors with particular overcurrent protection*

IEC 60227-1, *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V – Part 1: General requirements*

IEC 60227-2:1997¹, *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V – Part 2: Test methods*

IEC 60227-2:1997/AMD1:2003

¹ This publication was withdrawn and replaced with IEC 63294:2021.

IEC 60243-1, *Electric strength of insulating materials – Test methods – Part 1: Tests at power frequencies*

IEC 60245-1, *Rubber insulated cables – Rated voltages up to and including 450/750 V – Part 1: General requirements*

IEC 60268-1:1985, *Sound system equipment – Part 1: General*

IEC 60268-1:1985/AMD1:1988

IEC 60268-1:1985/AMD2:1988

IEC 60309 (all parts), *Plugs, socket-outlets and couplers for industrial purposes*

IEC 60317 (all parts), *Specifications for particular types of winding wires*

IEC 60317-0-7:2017, *Specifications for particular types of winding wires – Part 0-7: General requirements – Fully insulated (FIW) zero-defect enamelled round copper wire*

IEC 60317-43, *Specifications for particular types of winding wires – Part 43: Aromatic polyimide tape wrapped round copper wire, class 240*

IEC 60317-56, *Specifications for particular types of winding wires – Part 56: Solderable fully insulated (FIW) zero-defect polyurethane enamelled round copper wire, class 180*

IEC 60320 (all parts), *Appliance couplers for household and similar general purposes*

IEC 60320-1, *Appliance couplers for household and similar general purposes – Part 1: General requirements*

IEC 60332-1-2, *Tests on electric and optical fibre cables under fire conditions – Part 1-2: Test for vertical flame propagation for a single insulated wire or cable – Procedure for 1 kW pre-mixed flame*

IEC 60332-1-3, *Tests on electric and optical fibre cables under fire conditions – Part 1-3: Test for vertical flame propagation for a single insulated wire or cable – Procedure for determination of flaming droplets/particles*

IEC 60332-2-2, *Tests on electric and optical fibre cables under fire conditions – Part 2-2: Test for vertical flame propagation for a single small insulated wire or cable – Procedure for diffusion flame*

IEC 60384-14:2013, *Fixed capacitors for use in electronic equipment – Part 14: Sectional specification – Fixed capacitors for electromagnetic interference suppression and connection to the supply mains*
IEC 60384-14:2013/AMD1:2016

IEC 60417, *Graphical symbols for use on equipment*, available at <http://www.graphical-symbols.info/equipment>

IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*
IEC 60529:1989/AMD1:1999
IEC 60529:1989/AMD2:2013

IEC 60664-1:2020, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 60664-3, *Insulation coordination for equipment within low-voltage systems – Part 3: Use of coating, potting or moulding for protection against pollution*

IEC 60691:2015, *Thermal-links – Requirements and application guide*

IEC 60695-2-11, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end-products (GWEPT)*

IEC 60695-10-2, *Fire hazard testing – Part 10-2: Abnormal heat – Ball pressure test method*

IEC 60695-10-3, *Fire hazard testing – Part 10-3: Abnormal heat – Mould stress relief distortion test*

IEC 60695-11-5:2016, *Fire hazard testing – Part 11-5: Test flames – Needle-flame test method – Apparatus, confirmatory test arrangement and guidance*

IEC 60695-11-10, *Fire hazard testing – Part 11-10: Test flames – 50 W horizontal and vertical flame test methods*

IEC 60695-11-20:2015, *Fire hazard testing – Part 11-20: Test flames – 500 W flame test methods*

IEC TS 60695-11-21, *Fire hazard testing – Part 11-21: Test flames – 500 W vertical flame test method for tubular polymeric materials*

IEC 60728-11:2016, *Cable networks for television signals, sound signals and interactive services – Part 11: Safety*

IEC 60730 (all parts), *Automatic electrical controls for household and similar use*

IEC 60730-1:2022, *Automatic electrical controls – Part 1: General requirements*

IEC 60738-1:2022, *Thermistors – Directly heated positive temperature coefficient – Part 1: Generic specification*

IEC 60747-5-5:2020, *Semiconductor devices – Part 5-5: Optoelectronic devices – Photocouplers*

IEC 60825-1:2014, *Safety of laser products – Part 1: Equipment classification and requirements*

IEC 60825-2, *Safety of laser products – Part 2: Safety of optical fibre communication systems (OFCs)*

IEC 60825-12, *Safety of laser products – Part 12: Safety of free space optical communication systems used for transmission of information*

IEC 60851-3:2009, *Winding wires – Test methods – Part 3: Mechanical properties*

IEC 60851-3:2009/AMD1:2013

IEC 60851-3:2009/AMD2:2019

IEC 60851-5:2008, *Winding wires – Test methods – Part 5: Electrical properties*

IEC 60851-5:2008/AMD1:2011

IEC 60851-5:2008/AMD2:2019

IEC 60884-1, *Plugs and socket-outlets for household and similar purposes – Part 1: General requirements*

IEC 60896-11, *Stationary lead-acid batteries – Part 11: Vented types – General requirements and methods of tests*

IEC 60896-21:2004, *Stationary lead-acid batteries – Part 21: Valve regulated types – Methods of test*

IEC 60896-22, *Stationary lead-acid batteries – Part 22: Valve regulated types – Requirements*

IEC 60906-1, *IEC system of plugs and socket-outlets for household and similar purposes – Part 1: Plugs and socket-outlets 16 A 250 V a.c.*

IEC 60906-2, *IEC system of plugs and socket-outlets for household and similar purposes – Part 2: Plugs and socket-outlets 15 A 125 V a.c. and 20 A 125 V a.c.*

IEC 60947-1, *Low-voltage switchgear and controlgear – Part 1: General rules*

IEC 60947-5-5, *Low-voltage switchgear and controlgear – Part 5-5: Control circuit devices and switching elements – Electrical emergency stop device with mechanical latching function*

IEC 60990:2016, *Methods of measurement of touch current and protective conductor current*

IEC 60998-1, *Connecting devices for low-voltage circuits for household and similar purposes – Part 1: General requirements*

IEC 60999-1, *Connecting devices – Electrical copper conductors – Safety requirements for screw-type and screwless-type clamping units – Part 1: General requirements and particular requirements for clamping units for conductors from 0,2 mm² up to 35 mm² (included)*

IEC 60999-2, *Connecting devices – Electrical copper conductors – Safety requirements for screw-type and screwless-type clamping units – Part 2: Particular requirements for clamping units for conductors above 35 mm² up to 300 mm² (included)*

IEC 61051-1, *Varistors for use in electronic equipment – Part 1: Generic specification*

IEC 61051-2:2021, *Varistors for use in electronic equipment – Part 2: Sectional specification for surge suppression varistors*

IEC 61056-1, *General purpose lead-acid batteries (valve-regulated types) – Part 1: General requirements, functional characteristics – Methods of test*

IEC 61056-2, *General purpose lead-acid batteries (valve-regulated types) – Part 2: Dimensions, terminals and marking*

IEC 61058-1:2016, *Switches for appliances – Part 1: General requirements*

IEC 61204-7, *Low-voltage switch mode power supplies – Part 7: Safety requirements*

IEC 61260-1:2014, *Electroacoustics – Octave-band and fractional-octave-band filters – Part 1: Specifications*

IEC 61293, *Marking of electrical equipment with ratings related to electrical supply – Safety requirements*

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