Bilingual Safety Language in ITU-T Recommendations

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- IEC 60950-1 and IEC 62368-1 safety standard approaches
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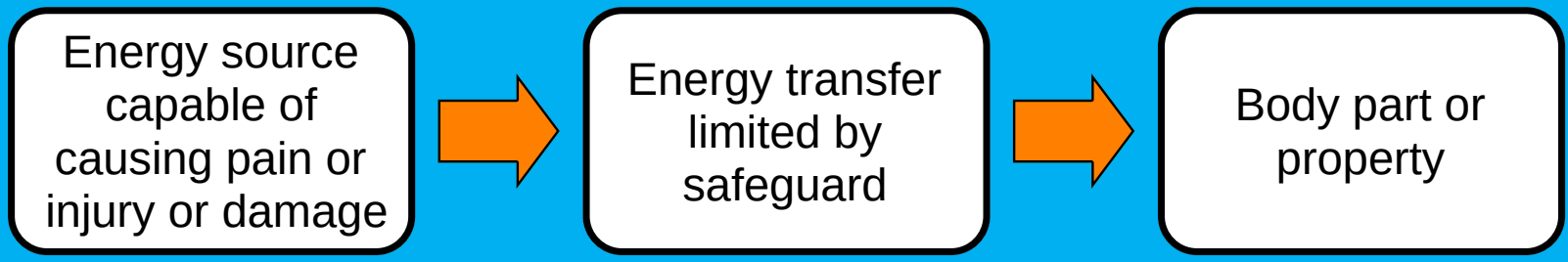
- Harmonizing ITU-T term and definition with those of both IEC 60950-1 and IEC 62368-1

IEC 60950-1 and IEC 62368-1 safety standard approaches

- IEC 60950-1:2005+AMD1:2009+AMD2:2013 CSV: *Information technology equipment - Safety – Part 1: General requirements* by IEC TC 108
  - Prescriptive basic requirements for the safety of information technology equipment.
- IEC 62368-1:2014: *Audio/video, information and communication technology equipment - Part 1: Safety requirements* by TC 108
  - Technology neutral approach to hazards by defining a three-block model.

IEC 62368-1 three block model



Energy is not always the hazard, it may be current or charge
The unsafeguarded “Energy” is classified into three levels

1. Not painful, but may be detectable or ignition not likely
2. Painful, but not an injury or ignition possible, but limited growth and spread of fire.
3. Injury or ignition likely, rapid growth and spread of fire.

Defined energy sources are: Electrical, Thermal (touch or fire), Chemical reaction, Kinetic and Radiated

Companion Standards

IEC 60950-21:2002: *Information technology equipment - Safety - Part 21: Remote power feeding*

IEC 62368-3 Ed. 1.0: Work in Progress: *Audio/video, information and communication technology equipment - Safety - Part 3: Remote power feeding*

IEC TR 62368-2:2015 : *Audio/video, information and communication technology equipment - Part 2: Explanatory information related to IEC 62368-1*

Terms - Persons

- **service person [IEC 60950-1]:** person having appropriate technical training and experience necessary to be aware of hazards to which that person may be exposed in performing a task and of measures to minimize the risks to that person or other persons

- **user [IEC 60950-1]:** any person, other than a service person.
  NOTE: The term user in this standard is the same as the term operator and the two terms can be interchanged

- **instructed person [IEC 62368-1]:** person instructed or supervised by a skilled person as to energy sources and who can responsibly use equipment safeguards and precautionary safeguards with respect to those energy sources
  Note 1 to entry: Supervised, as used in the definition, means having the direction and oversight of the performance of others.

- **ordinary person [IEC 62368-1]:** person who is neither a skilled person nor an instructed person

- **skilled person [IEC 62368-1]:** person with relevant education or experience to enable him or her to identify hazards and to take appropriate actions to reduce the risks of injury to themselves and others

We have user, ordinary person, instructed person, service person and skilled person

Terms – Safeguard (IEC 62368-1)

- **basic safeguard:** safeguard that provides protection under normal operating conditions and under abnormal operating conditions whenever an energy source capable of causing pain or injury is present in the equipment
- **double safeguard:** safeguard comprising both a basic safeguard and a supplementary safeguard
- **equipment safeguard:** safeguard that is a physical part of the equipment
- **installation safeguard:** safeguard that is a physical part of a man-made installation
- **instructional safeguard:** instruction invoking specified behaviour
- **personal safeguard:** personal protective equipment that is worn on the body and that reduces exposure to an energy source
  Note 1 to entry: Personal protective equipment (PPE) is a form of a personal safeguard. Examples are shields, goggles, gloves, aprons, face masks or breathing apparatus.
- **precautionary safeguard:** instructed person behaviour to avoid contact with or exposure to a class 2 energy source based on supervision or instructions given by a skilled person
- **reinforced safeguard:** single safeguard that is operational under: normal operating conditions; abnormal operating conditions; and single fault conditions
- **safeguard:** physical part or system or instruction specifically provided to reduce the likelihood of pain or injury, or, for fire, to reduce the likelihood of ignition or spread of fire
  Note 1 to entry: See 0.5 for further explanation of a safeguard.
- **skill safeguard:** skilled person behaviour to avoid contact with or exposure to a class 2 or class 3 energy source based on education and experience
- **supplementary safeguard:** safeguard applied in addition to the basic safeguard that is or becomes operational in the event of failure of the basic safeguard

Terms – Conditions (IEC 62368-1)

- **abnormal operating condition :** temporary operating condition that is not a normal operating condition and is not a single fault condition of the equipment itself
  Note 1 to entry: Abnormal operating conditions are specified in Clause B.3.
  Note 2 to entry: An abnormal operating condition may be introduced by the equipment or by a person.
  Note 3 to entry: An abnormal operating condition may result in a failure of a component, a device or a safeguard.
- **normal operating condition:** mode of operation that represents as closely as possible the range of normal use that can reasonably be expected
  Note 1 to entry: Unless otherwise stated, the most severe conditions of normal use are the most unfavourable default values as specified in Clause B.2.
  Note 2 to entry: Misuse is not covered by normal operating conditions. Instead, it is covered by abnormal operating conditions.
- **overload condition**: abnormal operating condition or single fault condition where the load stresses the equipment or circuit beyond normal operating conditions, but does not, immediately, result in a non-operating state
- **single fault condition :** condition of equipment with a fault under normal operating condition of a single safeguard (but not a reinforced safeguard) or of a single component or a device
  Note 1 to entry: Single fault conditions are specified in Clause B.4.

Terms - Access

- **operator access area [IEC 60950-1]:** part of the equipment to which, under normal operating conditions, one of the following applies: access can be gained without the use of a tool; the means of access is deliberately provided to the operator; the operator is instructed to enter regardless of whether or not a tool is needed to gain access. The terms "access" and "accessible", unless qualified, relate to an operator access area as defined above.
- **restricted access location [IEC 60950-1]:** location for equipment where both of the following apply: access can only be gained by service persons or by users who have been instructed about the reasons for the restrictions applied to the location and about any precautions that shall be taken; and access is through the use of a tool or lock and key, or other means of security, and is controlled by the authority responsible for the location
  NOTE The requirements for equipment intended for installation in restricted access locations are the same as for operator access areas, except as given in 1.7.14, 2.1.3, 4.5.4, 4.6.2 and 5.1.7.
- **service access area [IEC 60950-1]:**part of the equipment, other than an operator access area, where it is necessary for service persons to have access even with the equipment switched on
- **restricted access area [IEC 62368-1]:** area accessible only to skilled persons and instructed persons with the proper authorization
- **accessible [IEC 62368-1]:** touchable by a body part
  Note 1 to entry: A body part is represented by one or more of the probes specified in Annex V, as applicable.

Terms Cable and Enclosure

- **interconnecting cable [IEC 60950-1]:** cable used to: electrically connect an accessory to a unit of information technology equipment, interconnect units in a system, or connect a unit to a telecommunication network or to a cable distribution system. Such a cable may carry any type of circuit from one unit to another.
  NOTE A power supply cord for connection to the mains supply is not an interconnecting cable.

- **electrical enclosure [IEC 60950-1]:** part of the equipment intended to limit access to parts that may be at hazardous voltages or hazardous energy levels or are in TNV circuits
- **fire enclosure [IEC 60950-1]**: part of the equipment intended to minimize the spread of fire or flames from within

- **electrical enclosure [IEC 62368-1]:** enclosure intended as a safeguard against electrically-caused injury
  [SOURCE: IEC 60050 195:1998, 195-06-13, modified – the term safeguard has been used]
- **fire enclosure [IEC 62368-1]:** enclosure intended as a safeguard against the spread of fire from within the enclosure to outside the enclosure

Terms – Insulation-1

- **basic insulation [IEC 60950-1]:** insulation to provide basic protection against electric shock
- **basic insulation [IEC 62368-1]:** insulation to provide a basic safeguard against electric shock
  Note 1 to entry: This concept does not apply to insulation used exclusively for functional purposes.
- **double insulation [IEC 60950-1]:** insulation comprising both basic insulation and supplementary insulation
- **double insulation [IEC 62368-1]:** insulation comprising both basic insulation and supplementary insulation
  [SOURCE: IEC 60050-195, Amendment 1:2001, 195-06-08]
- **functional insulation [IEC 60950-1]:** insulation that is necessary only for the correct functioning of the equipment
  NOTE functional insulation by definition does not protect against electric shock. It may, however, reduce the likelihood of ignition and fire.
- **functional insulation [IEC 62368-1]:** insulation between conductive parts which is necessary only for the proper functioning of the equipment

Terms – Insulation-2

- **reinforced insulation [IEC 60950-1]:** single insulation system that provides a degree of protection against electric shock equivalent to double insulation under the conditions specified in this standard
  NOTE The term "insulation system" does not imply that the insulation has to be in one homogeneous piece. It may comprise several layers that cannot be tested as basic insulation and supplementary insulation.
- **reinforced insulation [IEC 62368-1]:** single insulation system that provides a degree of protection against electric shock equivalent to double insulation
- **solid insulation [IEC 60950-1]:** material that provides electrical insulation between two opposite surfaces, not along an outer surface
  NOTE The required properties of solid insulation are specified either as: the actual minimum distance through the insulation (see 2.10.5.2), or by other requirements and tests in this standard instead of a minimum distance.
- **solid insulation [IEC 62368-1]:** solid insulating material placed between two conductive parts or between a conductive part and a body part
- **supplementary insulation [IEC 60950-1]:** independent insulation applied in addition to basic insulation in order to reduce the risk of electric shock in the event of a failure of the basic insulation
- **supplementary insulation [IEC 62368-1]:** independent insulation applied in addition to basic insulation to provide a supplementary safeguard for fault protection against electric shock

Terms – Circuit -1

- **ELV circuit [IEC 60950-1]:** secondary circuit with voltages between any two conductors of the circuit, and between any one such conductor and earth (see 1.4.9), not exceeding 42,4 V peak, or 60 V d.c., under normal operating conditions, which is separated from hazardous voltage by basic insulation, and which neither meets all of the requirements for an SELV circuit nor meets all of the requirements for a limited current circuit
- **limited current circuit [IEC 60950-1]:** circuit that is so designed and protected that, under both normal operating conditions and single fault conditions, the current that can be drawn is not hazardous
  NOTE The limit values of currents under normal operating conditions and single fault conditions (see 1.4.14) are specified in 2.4.
- **primary circuit [IEC 60950-1]:** circuit that is directly connected to the AC mains supply It includes, for example, the means for connection to the AC mains supply, the primary windings of transformers, motors and other loading devices.
  NOTE Conductive parts of an interconnecting cable may be part of a primary circuit as stated in 1.2.11.6.
- **secondary circuit [IEC 60950-1]**: circuit that has no direct connection to a primary circuit and derives its power from a transformer, converter or equivalent isolation device, or from a battery
  NOTE Conductive parts of an interconnecting cable may be part of a secondary circuit as stated in 1.2.11.6.
- **external circuit [IEC 62368-1]:** electrical circuit that is external to the equipment and is not mains
  Note 1 to entry: An external circuit is classified as ES1, ES2 or ES3, and PS1, PS2, or PS3.

Terms – Circuit -2

- **SELV circuit [IEC 60950-1]:** secondary circuit that is so designed and protected that under normal operating conditions and single fault conditions, its voltages do not exceed a safe value
  NOTE 1 The limit values of voltages under normal operating conditions and single fault conditions (see 1.4.14) are specified in 2.2. See also Table 1A.
  NOTE 2 This definition of an SELV circuit differs from the term "SELV system" as used in IEC 61140
- **TNV-1 circuit [IEC 60950-1]:** TNV circuit whose normal operating voltages do not exceed the limits for an SELV circuit under normal operating conditions and on which overvoltages from telecommunication networks and cable distribution systems are possible
- **TNV-2 circuit [IEC 60950-1]:** TNV circuit whose normal operating voltages exceed the limits for an SELV circuit under normal operating conditions and which is not subject to overvoltages from telecommunication networks
- **TNV-3 circuit [IEC 60950-1]:** TNV circuit whose normal operating voltages exceed the limits for an SELV circuit under normal operating conditions and on which overvoltages from telecommunication networks and cable distribution systems are possible
- **TNV circuit [IEC 60950-1]:** circuit that is in the equipment and to which the accessible area of contact is limited and that is so designed and protected that, under normal operating conditions and single fault conditions (see 1.4.14), the voltages do not exceed specified limit values . A TNV circuit is considered to be a secondary circuit in the meaning of this standard.
  NOTE 1 The specified limit values of voltages under normal operating conditions and single fault conditions (see 1.4.14) are given in 2.3.1. Requirements regarding accessibility of TNV circuits are given in 2.1.1.1.
  NOTE 2 Conductive parts of an interconnecting cable may be part of a circuit as stated in 1.2.11.6. TNV circuits are classified as TNV-1 circuits, TNV-2 circuits and TNV-3 circuits as defined in 1.2.8.12, 1.2.8.13 and 1.2.8.14.
  NOTE 3 The voltage relationships between SELV and TNV circuits are shown in Table 1A.

Terms – Voltage and current

hazardous voltage [IEC 60950-1]: voltage exceeding 42,4 V peak, or 60 V d.c., existing in a circuit that does not meet the requirements for either a limited current circuit or a TNV circuit

limited current circuit [IEC 60950-1]: circuit that is so designed and protected that, under both normal operating conditions and single fault conditions, the current that can be drawn is not hazardous
NOTE The limit values of currents under normal operating conditions and single fault conditions (see 1.4.14) are specified in 2.4.

protective current rating [IEC 60950-1]: rating of an overcurrent protective device that is known or assumed to be in place to protect a circuit
NOTE Rules to determine the value of the protective current rating are in 2.6.3.3.

rated current [IEC 60950-1]: input current of the equipment as declared by the manufacturer

required withstand voltage [IEC 60950-1]: peak voltage that the insulation under consideration is required to withstand

telecommunication network transient voltage [IEC 60950-1]: highest peak voltage expected at the telecommunication network connection point of the equipment, arising from external transients on the network
NOTE The effect of transients from cable distribution systems is not taken into account.

mains transient voltage [IEC 60950-1]: highest peak voltage expected at the power input to the equipment, arising from external transients on the mains supply

mains transient voltage [IEC 62368-1]: highest peak voltage expected at the mains input to the equipment arising from external transients

protective current rating [IEC 62368-1]: current rating of an overcurrent protective device that is in the building installation or in the equipment to protect a circuit

rated current [IEC 62368-1]: input current of the equipment as declared by the manufacturer at normal operating conditions

required withstand voltage [IEC 62368-1]: peak voltage that the insulation under consideration is required to withstand

Terms - Remote

- **remote power feeding [IEC 60065]:** supply of power to apparatus via a cable network, for example a telecommunication network or a cable distribution network for antenna signals
- **RFT circuit [IEC 60950-21]:** remote feeding telecommunication circuit [IEC 60950-21]: a secondary circuit within the equipment, intended to supply or receive d.c. power via a telecommunication network at voltages exceeding the limits for tnv circuits, and on which overvoltages from telecommunication networks are possible
- **RFT-C circuit [IEC 60950-21]:** an rft circuit which is so designed and protected that under normal operating conditions and single fault conditions, the currents in the circuit do not exceed defined values
  NOTE The limit values of current under normal operating and single fault conditions are specified in 6.1
- **RFT-V circuit [IEC 60950-21]:** an rft circuit which is so designed and protected that under normal operating conditions and single fault conditions, the voltages are limited and the accessible area of contact is limited
  NOTE The limit values of voltage under normal operating and single fault conditions are specified in 6.2
- **RFT circuit, remote feeding (tele)communication circuit [Draft - IEC 62368-3]:** circuit within the equipment not connected to an a.c. mains, intended to supply or receive d.c. power via an ICT network at voltages exceeding the limits of ES2, and on which overvoltages from ICT networks are possible
  NOTE1 to entry: Communication signalling is not required to be present on an RFT circuit.
- **RFT-C circuit [Draft -IEC 62368-3]:** RFT circuit which is so designed and protected that under normal operating conditions and single fault conditions, the currents in the circuit do not exceed defined values
  NOTE 1 to entry: The limit values of current under normal operating conditions and single fault conditions are specified in 6.3.1.1.
- **RFT-V circuit [Draft - IEC 62368-3]:** RFT circuit which is so designed and protected that under normal operating conditions and single fault conditions, the voltages are limited and the accessible area of contact is limited
  NOTE 1 to entry: The limit values of voltage under normal operating conditions and single fault conditions are specified in 6.3.1.2.

Terms - Network

- **telecommunication network [IEC 60950-1]:** metallically terminated transmission medium intended for communication between equipment that may be located in separate buildings, excluding: the mains system for supply, transmission and distribution of electrical power, if used as a telecommunication transmission medium; cable distribution systems; SELV circuits connecting units of information technology equipment
  NOTE 1 The term telecommunication network is defined in terms of its functionality, not its electrical characteristics. A telecommunication network is not itself defined as being either an SELV circuit or a TNV circuit. Only the circuits in the equipment are so classified.
  NOTE 2 A telecommunication network may be: publicly or privately owned; subject to transient overvoltages due to atmospheric discharges and faults in power distribution systems; subject to longitudinal (common mode) voltages induced from nearby power lines or electric traction lines.
  NOTE 3 Examples of telecommunication networks are: a public switched telephone network; a public data network; an Integrated Services Digital Network (ISDN); a private network with electrical interface characteristics similar to the above.
- **telecommunication network transient voltage [IEC 60950-1]:** highest peak voltage expected at the telecommunication network connection point of the equipment, arising from external transients on the network
  NOTE The effect of transients from cable distribution systems is not taken into account.
- **information and communication technology (ICT) network [Draft-IEC 62368-3]:** metallically terminated transmission medium consisting of two conductors intended for communication between equipment that may be located in separate buildings, excluding: the mains system for supply, transmission and distribution of electrical power, if used as a communication transmission medium; dedicated HBES/BACS networks; external circuits using ES1 connecting units of audio/video, information and communication technology equipment
  NOTE 1 to entry: This may include twisted pairs, and may include circuits, which are subjected to transients as indicated in table 14 of IEC 62368-1 ID1 (assumed to be 1,5kV),
  NOTE 2 to entry: An ICT network may be: publicly or privately owned; subject to longitudinal (common mode) voltages induced from nearby power lines or electric traction lines,
  NOTE 3 to entry: Examples of ICT networks are: a public switched telephone network; a public data network; an Integrated Services Digital Network (ISDN); a private network with electrical interface characteristics similar to the above.
  NOTE 4 to entry: For information about circuit voltages and signals, which may be present, see Annex B of IEC 62949 (currently at CD stage).

Terms - Touch

- **hazardous live [IEC 60065]:** electrical condition of an object from which a hazardous touch current (electric shock) could be drawn
  Note 1 to entry: See 9.1.1.
- **touch current [IEC 60950-1]:** electric current through a human body when it touches one or more accessible parts
  NOTE touch current was previously included in the term "leakage current"
- **prospective touch voltage [IEC 62368-1]:** voltage between simultaneously accessible conductive parts when those conductive parts are not being touched
- **touch current [IEC 62368-1]:** electric current through a human body when body parts touch two or more accessible parts or one accessible part and earth

Terms - mains

- **mains supply [IEC 60950-1]:** power distribution system that is either an AC mains supply or a DC mains supply
- **mains [IEC 62368-1]:** a.c. or d.c. power distribution system (external to the equipment) that supplies operating power to the equipment and is PS3

  Note 1 to entry: Mains include public or private utilities and, unless otherwise specified in this standard, equivalent sources such as motor-driven generators and uninterruptible power supplies.

IEC 62368-1 Source Abbreviations

ES	Electrical energy source	**PS**	Power source
ES1	Electrical energy source class 1	**PS1**	Power source class 1
ES2	Electrical energy source class 2	**PS2**	Power source class 2
ES3	Electrical energy source class 3	**PS3**	Power source class 3
MS	Mechanical energy source	**RS**	Radiation energy source
MS1	Mechanical energy source class 1	**RS1**	Radiation energy source class 1
MS2	Mechanical energy source class 2	**RS2**	Radiation energy source class 2
MS3	Mechanical energy source class 3	**RS3**	Radiation energy source class 3
PIS	Potential ignition source	**TS**	Thermal energy source
arcing PIS	arcing Potential ignition source	**TS1**	Thermal energy source class 1
resistive PIS	resistive Potential ignition source	**TS2**	Thermal energy source class 2
		TS3	Thermal energy source class 3

Terms-IEC 62368-1 ES

- **electrical energy source (ES) [Mick]:** capacitive source with defined capacitance and charge voltage or prospective touch voltage and the touch current source with defined values for normal operation, abnormal operation, and single fault conditions or a pulsed source with defined values of voltage, current and pulse duration.
  NOTE – [IEC 62368-1] does not have a formal term and definition entry for ES. This definition is a summary of [IEC 62368-1] clause 5.2.
- **electrical energy source class 1, ES1 [Mick]:** class 1 energy source with levels not exceeding ES1 limits under normal operating conditions, abnormal operating conditions, single fault conditions of a component, device or insulation not serving as a safeguard and not exceeding ES2 limits under single fault conditions of a basic safeguard.
  NOTE 1 – [IEC 62368-1] does not have a formal term and definition entry for ES1. This definition is a summary of [IEC 62368-1] clause 5.2.
  NOTE 2 – ES1 may be accessible to an ordinary person, user, instructed person, service person or a skilled person. ES1 effects are; not painful on the body, but may be detectable and ignition of combustible materials not likely.
  NOTE 3 – ES1 parameter values are given in [IEC 62368-1] clause 5.2.
- **electrical energy source class 2, ES2 [Mick]:** class 2 energy source with levels not exceeding ES2 limits under normal operating conditions, abnormal operating conditions, and single fault conditions, but exceeding ES1 limits.
  NOTE 1 – [IEC 62368-1] does not have a formal term and definition entry for ES2. This definition is a summary of [IEC 62368-1] clause 5.2.
  NOTE 2 – ES2 may be accessible to an instructed person, service person or a skilled person. ES2 effects are; painful on the body, but not an injury Ignition of combustible materials possible, but limited growth and spread of fire
  NOTE 3 – ES2 parameter values are given in [IEC 62368-1] clause 5.2
- **electrical energy source class 3, ES3 [Mick]:** class 3 energy source with one or more parameters exceeding ES2 limits
  NOTE 1 – [IEC 62368-1] does not have a formal term and definition entry for ES3. This definition is a summary of [IEC 62368-1] clause 5.2.
  NOTE 2 – ES3 may be accessible to a service person or a skilled person. ES3 effects are; injury to the body and ignition of combustible materials likely with rapid growth and spread of fire.
  NOTE 3 – ES3 parameter values are given in [IEC 62368-1] clause 5.2

Terms-IEC 62368-1 PS

- **electrical power source (PS) [Mick]:** power source classed by the maximum delivered power values for a power source operating with a worse-case load and for a power source fault operating with the specified normal load
  NOTE 1 – [IEC 62368-1] does not have a formal term and definition entry for PS. This definition is a summary of [IEC 62368-1] clause 6.2.
- **electrical power source class 1 (PS1) [Mick]:** circuit where the power source does not exceed a defined limit values measured at specific times.
  NOTE 1 – [IEC 62368-1] does not have a formal term and definition entry for PS1. This definition is a summary of [IEC 62368-1] clause 6.2.
  NOTE 2 – The power available from external circuits described in Table 14, ID numbers 1 and 2, are considered to be PS1.
  NOTE 3 – Clause 6.2 values are 500 W <3 s and 15 W >3 s.
- **electrical power source class 2 (PS2) [Mick**]: circuit where the power source exceeds PS1 limits; and does not exceed a defined limit value measured after a specified time.
  NOTE 1 – [IEC 62368-1] does not have a formal term and definition entry for PS2. This definition is a summary of [IEC 62368-1] clause 6.2.
  NOTE 2 – Clause 6.2 values are 100 W >5 s.
- **electrical power source class 3 (PS3) [Mick**]**: circuit whose power source exceeds PS2 limits, or any circuit whose power source has not been classified.**
  NOTE 1 – [IEC 62368-1] does not have a formal term and definition entry for PS2. This definition is a summary of [IEC 62368-1] clause 6.2.

Terms-IEC 62368-1 PIS

- **potential ignition source (PIS):** location where electrical energy can cause ignition

- **arcing PIS :** circuit where the power source does not exceed a defined limit values measured at specific times. location where an arc may occur due to the opening of a conductor or a contact
  NOTE 1 An electronic protection circuit or additional constructional measures may be used to prevent a location from becoming an arcing PIS .
  NOTE 2 A faulty contact or interruption in an electric connection that may occur in conductive patterns on printed boards is considered to be within the scope of this definition.

- **resistive PIS**: location where a component may ignite due to excessive power dissipation

Remote powering definition example - 1

- **RFT circuit [IEC 60950-21]:** remote feeding telecommunication circuit [IEC 60950-21]: a secondary circuit within the equipment, intended to supply or receive d.c. power via a telecommunication network at voltages exceeding the limits for tnv circuits, and on which overvoltages from telecommunication networks are possible
- **RFT circuit, remote feeding (tele)communication circuit [Draft - IEC 62368-3]:** circuit within the equipment not connected to an a.c. mains, intended to supply or receive d.c. power via an ICT network at voltages exceeding the limits of ES2, and on which overvoltages from ICT networks are possible
  NOTE 1 to entry: Communication signalling is not required to be present on an RFT circuit.
- **RFT circuit [K.50]:** A circuit, other than SELV or TNV circuit, intended for the supply of power to equipment via a paired-conductor network, and which is so designed and protected that under normal operating and single fault conditions the voltages or currents do not exceed defined values. The circuit in the equipment that receives power from an RFT circuit is also considered to be an RFT circuit.

Remote powering definition example - 2

The main aims are

1. Incorporate both IEC 60950-1 terms (SELV and TNV) and IEC 62368-1 terms (ES and PS) to create a forward looking and backwards compatible definition

2. Capture operational conditions of IEC 60950-1 (normal operating and single fault conditions) and IEC 62368-1 (normal operating conditions, abnormal operating conditions, and single fault conditions)

3. Set the voltage range to cover ES2 and ES3 circuit (60 V and greater)

Remote powering definition example - 3

- **RFT circuit (remote feeding telecommunication circuit):** equipment circuit, without a direct mains connection or being a SELV or TNV service or PS1 circuit, intended to supply or receive d.c. power, at voltages, currents and powers that do not exceed defined values under specified operational conditions when connected to paired-conductor communications network on which overvoltages are possible
  NOTE 1: A telecommunications service is not required to be present on an RFT circuit.
  NOTE 2: Specified conditions include normal operating and single fault conditions and may include abnormal operating and safeguard failure conditions