

TECHNICAL SPECIFICATION

SPÉCIFICATION TECHNIQUE

Safety requirements for electrical equipment for measurement, control, and laboratory use –

General requirements for equipment intended to be used in educational establishments by children

Règles de sécurité pour appareils électriques de mesurage, de régulation et de laboratoire –

Règles générales pour appareils destinés à une utilisation dans les établissements scolaires par des enfants



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

SAFETY REQUIREMENTS FOR ELECTRICAL EQUIPMENT FOR MEASUREMENT, CONTROL, AND LABORATORY USE –

General requirements for equipment intended to be used in educational establishments by children

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Technical specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC/TS 62850, which is a technical specification, has been prepared by technical committee 66: Safety of measuring, control and laboratory equipment.

This first edition is based on the third edition (2010) of IEC 61010-1.

The text of this technical specification is based on the following documents:

Enquiry draft	Report on voting
66/456/DTS	66/475/RVC

Full information on the voting for the approval of this technical specification can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

In this Technical Specification, the following print types are used:

- requirements and definitions: in roman type;
- NOTES: in smaller roman type;
- *conformity and tests: in italic type;*
- terms used throughout this Technical Specification which have been defined in Clause 3: SMALL ROMAN CAPITALS.

Technical and major editorial changes from IEC 61010-1 are indicated as follows: added text is underlined (added text) and deleted text is struck out (~~deleted text~~). Minor editorial changes are not indicated.

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INTRODUCTION

Based on a TC 66 decision at the plenary meeting held in Everett on 2010-09-03, it was agreed that as an interim solution this document is to be published as a Technical Specification. This document publishes provisions pertaining to the use of this equipment by children in educational establishments which, if the provisions prove useful, are intended to be integrated into a future edition of IEC 61010-1. This publication will be reviewed in accordance with the rules of Part 1 of the ISO/IEC Directives where it is stated that a Technical Specification has to be reviewed within 3 years of its publication with the options of extension for another 3 years; conversion to an International Standard; or withdrawal.

This Technical Specification includes the following significant changes with respect to IEC 61010-1:2010, as well as other changes:

- a) a marking is added to indicate the age of CHILDREN by whom the equipment is intended to be used;
- b) accessibility requirements are enhanced to take into account the propensity of CHILDREN to insert foreign objects wherever they can;
- c) temperature limits have been decreased to take into account the greater sensitivity of a CHILD'S skin;
- d) mechanical access dimensions have been reduced to take into account the smaller dimensions of a CHILD'S body;
- e) limits for non-collimated optical radiation have been introduced;
- f) limits for ionizing radiation have been reduced;
- g) small detachable parts below certain dimensions have been prohibited;
- h) manufacturers are required to take into account the general unpredictability of the behaviour of CHILDREN.

Electrical equipment dealt with in this Technical Specification is used for teaching CHILDREN under the age of 16 in educational establishments.

CHILDREN are likely to poke objects and materials through apertures into the interior of electrical equipment. Consequently, more stringent criteria for access to HAZARDOUS LIVE conductors are required for educational establishment equipment than for general laboratory use. Moreover, the temperatures of parts that may be touched by CHILDREN should be lower than for equipment that is handled only by adults. Ergonomic considerations and mechanical RISKS need to be addressed with regard to the anthropomorphic dimensions of CHILDREN instead of adults. Requirements for equipment to be used by CHILDREN must also take into account REASONABLY FORESEEABLE MISUSE and the unpredictable behaviour of CHILDREN.

This Technical Specification addresses the safety requirements for equipment within the scope of IEC 61010 to be used by children between the ages of 3 and 16 in educational establishments, when supervised by the RESPONSIBLE BODY.

For certain types of equipment, these requirements will be supplemented or modified by the special requirements of one, or more than one, particular part 2 of the IEC 61010 series which must be read in conjunction with the requirements of this technical specification. In that case this IEC/TS 62850 is to be considered the alternative for IEC 61010-1.

SAFETY REQUIREMENTS FOR ELECTRICAL EQUIPMENT FOR MEASUREMENT, CONTROL, AND LABORATORY USE –

General requirements for equipment intended to be used in educational establishments by children

1 Scope and object

1.1 Scope

1.1.1 Equipment included in scope

~~This part of IEC 61010 specifies general safety requirements for the following types of electrical equipment and their accessories, wherever they are intended to be used.~~

This Technical Specification IEC 62850 specifies general safety requirements for the following types of equipment and their accessories intended to be used in educational establishments by persons between the age of 3 years and the age of 16 years under the supervision of the RESPONSIBLE BODY.

If all or part of the equipment falls within the scope of one or more part 2 standards of IEC 61010 as well as within the scope of this technical specification, it will also need to meet the requirements of those other part 2 standards.

NOTE 1 In some countries age limits can be different from those used in this technical specification or can be replaced by capability requirements.

a) Electrical test and measurement equipment

This is equipment which by electromagnetic means tests, measures, indicates or records one or more electrical or physical quantities, also non-measuring equipment such as signal generators, measurement standards, power supplies for laboratory use, transducers, transmitters, etc.

NOTE 2 This includes bench-top power supplies intended to aid a testing or measuring operation on another piece of equipment. Power supplies intended to power equipment are within the scope of IEC 61558 (see 1.1.2 h)).

This Technical Specification also applies to test equipment integrated into manufacturing processes and intended for testing manufactured devices.

NOTE 3 Manufacturing test equipment is likely to be installed adjacent to and interconnected with industrial machinery in this application.

b) Electrical industrial process-control equipment

This is equipment which controls one or more output quantities to specific values, with each value determined by manual setting, by local or remote programming, or by one or more input variables.

c) Electrical laboratory equipment

This is equipment which measures, indicates, monitors, inspects or analyses materials, or is used to prepare materials, and includes in vitro diagnostic (IVD) equipment.

~~This equipment may also be used in areas other than laboratories; examples include self-test IVD equipment to be used in the home and inspection equipment to be used to check people or material during transportation.~~

1.1.2 Equipment excluded from scope

This Technical Specification does not apply to equipment within the scope of:

- a) IEC 60065 (Audio, video and similar electronic apparatus);
- b) IEC 60204 (Safety of machinery – Electrical equipment of machines);
- c) IEC 60335 (Household and similar electrical appliances);
- d) IEC 60364 (Electrical installations of buildings);
- e) IEC 60439 ~~61439-1~~ (Low-voltage switchgear and controlgear assemblies);
- f) IEC 60601 (Medical electrical equipment);
- g) IEC 60950 (Information technology equipment including electrical business equipment, except as specified in 1.1.3);
- h) IEC 61558 (Power transformers, power supply units and similar);
- i) IEC 61010-031 (Hand-held probe assemblies);
- j) IEC 61243-3 (Live working – Voltage detectors – Part 3: Two-pole low-voltage type).

1.1.3 Computing equipment

This Technical Specification applies only to computers, processors, etc. which form part of equipment within the scope of this Technical Specification or are designed for use exclusively with the equipment.

NOTE Computing devices and similar equipment within the scope of IEC 60950 and conforming to its requirements are considered to be suitable for use with equipment within the scope of this Technical Specification. However, some of the requirements of IEC 60950 for resistance to moisture and liquids are less stringent than those in this Technical Specification (see 5.4.4 second paragraph).

1.2 Object

1.2.1 Aspects included in scope

The purpose of the requirements of this Technical Specification is to ensure that HAZARDS to the OPERATOR and the surrounding area are reduced to a tolerable level.

Requirements for protection against particular types of HAZARD are given in Clauses 6 to 13, as follows:

- a) electric shock or burn (see Clause 6);
- b) mechanical HAZARDS (see Clauses 7 and 8);
- c) spread of fire from the equipment (see Clause 9);
- d) excessive temperature (see Clause 10);
- e) effects of fluids and fluid pressure (see Clause 11);
- f) effects of radiation, including lasers sources, and sonic and ultrasonic pressure (see Clause 12);
- g) liberated gases, explosion and implosion (see Clause 13).

Requirements for protection against HAZARDS arising from REASONABLY FORESEEABLE MISUSE and ergonomic factors are specified in Clause 16.

RISK assessment for HAZARDS or environments not fully covered above is specified in Clause 17.

NOTE Attention is drawn to the existence of additional requirements regarding the health and safety of labour forces.

NOTE 1 Attention is drawn to the additional requirements that can be specified by national authorities responsible for health and safety in education. In particular, there can be limitations on the use of radioactive materials, X-ray and laser equipment, and hazardous substances.

NOTE 2 Attention is also drawn to the existence of additional requirements that can be specified by national authorities responsible for the health and safety of CHILDREN in education with special needs.

1.2.2 Aspects excluded from scope

This Technical Specification does not cover:

- a) reliable function, performance, or other properties of the equipment not related to safety;
- b) effectiveness of transport packaging;
- c) EMC requirements (see the IEC 61326 series);
- d) protective measures for explosive atmospheres (see the IEC 60079 series).

1.3 Verification

This Technical Specification also specifies methods of verifying that the equipment meets the requirements of this Technical Specification, through inspection, TYPE TESTS, ROUTINE TESTS, and RISK assessment.

1.4 Environmental conditions

1.4.1 Normal environmental conditions

This Technical Specification applies to equipment designed to be safe at least under the following conditions:

- a) indoor use;
- b) altitude up to 2 000 m;
- c) temperature 5 °C to 40 °C;
- d) maximum relative humidity 80 % for temperatures up to 31 °C decreasing linearly to 50 % relative humidity at 40 °C;
- e) MAINS supply voltage fluctuations up to ± 10 % of the nominal voltage;
- f) TRANSIENT OVERVOLTAGES up to the levels of OVERVOLTAGE CATEGORY II;

NOTE-4 These levels of TRANSIENT OVERVOLTAGE are typical for equipment supplied from the building wiring.

- g) TEMPORARY OVERVOLTAGES occurring on the MAINS supply;
- h) applicable POLLUTION DEGREE of the intended environment (POLLUTION DEGREE 2 in most cases).

NOTE 2—Manufacturers may specify more restricted environmental conditions for operation; nevertheless the equipment shall be safe within these normal environmental conditions.

1.4.2 Extended environmental conditions

This Technical Specification applies to equipment designed to be safe not only in the environmental conditions specified in 1.4.1, but also in any of the following conditions as RATED by the manufacturer of the equipment:

- a) outdoor use;
- b) altitude above 2 000 m;
- c) ambient temperatures below 5 °C or above 40 °C;
- d) relative humidity above the levels specified in 1.4.1;
- e) MAINS supply voltage fluctuations exceeding ± 10 % of the nominal voltage;
- f) WET LOCATION;
- g) TRANSIENT OVERVOLTAGES up to the levels of OVERVOLTAGE CATEGORY III or IV (see Annex K).

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 60065, *Audio, video and similar electronic apparatus – Safety requirements*

IEC 60068-2-14, *Environmental testing – Part 2-14: Tests – Test N: Change of temperature*

IEC 60068-2-75, *Environmental testing – Part 2-75: Tests – Test Eh: Hammer tests*

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

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

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

IEC 60309-1, *Plugs, socket-outlets and couplers for industrial purposes – Part 1: General requirements*

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

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 60332-2-2, *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 60335-2-24, *Household and similar electrical appliances – Safety – Part 2-24: Particular requirements for refrigerating appliances, ice-cream appliances and ice makers*

IEC 60335-2-89, *Household and similar electrical appliances – Safety – Part 2-89: Particular requirements for commercial refrigerating appliances with an incorporated or remote refrigerant unit or compressor*

~~IEC 60364-4-44, *Low voltage electrical installations – Part 4-44: Protection for safety – Protection against voltage disturbances and electromagnetic disturbances*~~

~~IEC 60405, *Nuclear instrumentation – Constructional requirements and classification of radiometric gauges*~~

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

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

IEC 60664-3:2003, *Insulation coordination for equipment within low-voltage systems – Part 3: Use of coating, potting or moulding for protection against pollution*
Amendment 1:2010

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

IEC 60799, *Electrical accessories – Cord sets and interconnection cord sets*

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

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

IEC 60947-3, *Low-voltage switchgear and controlgear – Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units*

~~IEC 61010-031, *Safety requirements for electrical equipment for measurement, control and laboratory use – Part 031: Safety requirements for hand-held probe assemblies for electrical measurement and test*~~

~~IEC 61180 (all parts), *High-voltage test techniques for low-voltage equipment*~~

IEC 61180-1:1992, *High-voltage test techniques for low-voltage equipment – Part 1: Definitions, test and procedure requirements*

IEC 61180-2, *High-voltage test techniques for low-voltage equipment – Part 2: Test equipment*

IEC 61672-1, *Electroacoustics – Sound level meters – Part 1: Specifications*

IEC 61672-2, *Electroacoustics – Sound level meters – Part 2: Pattern evaluation tests*

IEC 62262, *Degrees of protection provided by enclosures for electrical equipment against external impacts (IK code)*

IEC 62471, *Photobiological safety of lamps and lamp systems*

IEC/TR 62471-2, *Photobiological safety of lamps and lamp systems – Part 2: Guidance on manufacturing requirements relating to non-laser optical radiation safety*

IEC 62598, *Nuclear instrumentation – Constructional requirements and classification of radiometric gauges*

~~IEC Guide 104, *The preparation of safety publications and the use of basic safety publications and group safety publications*~~

ISO/IEC Guide 50, *Safety aspects – Guidelines for child safety*

ISO/IEC Guide 51:1999, *Safety aspects – Guidelines for their inclusion in standards*

ISO 306, *Plastics – Thermoplastic materials – Determination of Vicat softening temperature (VST)*

ISO 361, *Basic ionizing radiation symbol*

ISO 3746, *Acoustics – Determination of sound power levels of noise sources using sound pressure – Survey method using an enveloping measurement surface over a reflecting plane*

ISO 7000, *Graphical symbols for use on equipment – Index and synopsis*. Available from: <http://www.graphical-symbols.info/equipment>

ISO 9614-1, *Acoustics – Determination of sound power levels of noise sources using sound intensity – Part 1: Measurement at discrete points*

ISO 13857:2008, *Safety of machinery – Safety distances to prevent hazard zones being reached by upper and lower limbs*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1 Equipment and states of equipment

3.1.1

FIXED EQUIPMENT

equipment fastened to a support, or otherwise secured in a specific location

[SOURCE: IEC 60050-826:2004, 826-16-07, modified – “electric” has been deleted.]

3.1.2

PERMANENTLY CONNECTED EQUIPMENT

equipment that is electrically connected to a supply by means of a permanent connection which can be detached only by the use of a TOOL

3.1.3

PORTABLE EQUIPMENT

equipment intended to be carried by hand

3.1.4

HAND-HELD EQUIPMENT

PORTABLE EQUIPMENT intended to be supported by one hand during NORMAL USE

3.1.5

TOOL

~~external device, including keys and coins, used to aid a person to perform a mechanical function~~

mechanical device intended to make a task easier

Note 1 to entry: See 4.3.2.14.

3.1.6

DIRECT PLUG-IN EQUIPMENT

equipment with a MAINS plug that is attached to the equipment housing without the use of a MAINS supply cord so that the equipment is supported by the MAINS socket-outlet

3.2 Parts and accessories

3.2.1

TERMINAL

~~component provided for the connection of a device to external conductors~~

conductive part of a device, electric circuit or electric network, provided for connecting that device, electric circuit or electric network to one or more external conductors