

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



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2013 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester.

If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de la CEI ou du Comité national de la CEI du pays du demandeur.

Si vous avez des questions sur le copyright de la CEI ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de la CEI de votre pays de résidence.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

Useful links:

IEC publications search - www.iec.ch/searchpub

The advanced search enables you to find IEC publications by a variety of criteria (reference number, text, technical committee,...).

It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available on-line and also once a month by email.

Electropedia - www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing more than 30 000 terms and definitions in English and French, with equivalent terms in additional languages. Also known as the International Electrotechnical Vocabulary (IEV) on-line.

Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: csc@iec.ch.

A propos de la CEI

La Commission Electrotechnique Internationale (CEI) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications CEI

Le contenu technique des publications de la CEI est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente. un corrigendum ou amendement peut avoir été publié.

Liens utiles:

Recherche de publications CEI - www.iec.ch/searchpub

La recherche avancée vous permet de trouver des publications CEI en utilisant différents critères (numéro de référence, texte, comité d'études,...).

Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

Just Published CEI - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications de la CEI. Just Published détaille les nouvelles publications parues. Disponible en ligne et aussi une fois par mois par email.

Electropedia - www.electropedia.org

Le premier dictionnaire en ligne au monde de termes électroniques et électriques. Il contient plus de 30 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans les langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (VEI) en ligne.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: csc@iec.ch.

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

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

PRICE CODE **XH**
CODE PRIX

ICS 19.080

ISBN 978-2-83220-655-3

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

CONTENTS

FOREWORD.....	10
INTRODUCTION.....	12
1 Scope and object.....	13
1.1 Scope.....	13
1.1.1 Equipment included in scope	13
1.1.2 Equipment excluded from scope	13
1.1.3 Computing equipment.....	14
1.2 Object	14
1.2.1 Aspects included in scope	14
1.2.2 Aspects excluded from scope	15
1.3 Verification	15
1.4 Environmental conditions	15
1.4.1 Normal environmental conditions	15
1.4.2 Extended environmental conditions	15
2 Normative references	16
3 Terms and definitions	18
3.1 Equipment and states of equipment.....	18
3.2 Parts and accessories	18
3.3 Quantities.....	19
3.4 Tests.....	20
3.5 Safety terms.....	20
3.6 Insulation	22
4 Tests.....	23
4.1 General.....	23
4.2 Sequence of tests	24
4.3 Reference test conditions.....	24
4.3.1 Environmental conditions.....	24
4.3.2 State of equipment.....	24
4.4 Testing in SINGLE FAULT CONDITION	26
4.4.1 General.....	26
4.4.2 Application of fault conditions	26
4.4.3 Duration of tests	29
4.4.4 Conformity after application of fault conditions.....	29
5 Marking and documentation.....	30
5.1 Marking	30
5.1.1 General	30
5.1.2 Identification.....	30
5.1.3 MAINS supply	30
5.1.4 Fuses	32
5.1.5 TERMINALS, connections and operating devices.....	32
5.1.6 Switches and circuit-breakers	33
5.1.7 Equipment protected by DOUBLE INSULATION or REINFORCED INSULATION	33
5.1.8 Field-wiring TERMINAL boxes	34
5.2 Warning markings	34
5.3 Durability of markings.....	34
5.4 Documentation	35

5.4.1	General	35
5.4.2	Equipment RATINGS	35
5.4.3	Equipment installation	36
5.4.4	Equipment operation	36
5.4.5	Equipment maintenance and service	37
5.4.6	Integration into systems or effects resulting from special conditions	37
6	Protection against electric shock	38
6.1	General	38
6.1.1	Requirements	38
6.1.2	Exceptions	38
6.2	Determination of ACCESSIBLE parts	38
6.2.1	General	38
6.2.2	Examination	39
6.2.3	Not used Openings above parts that are HAZARDOUS LIVE	39
6.2.4	Not used Openings for pre-set controls	39
6.2.5	Additional determination for all openings except TERMINALS	40
6.3	Limit values for ACCESSIBLE parts	40
6.3.1	Levels in NORMAL CONDITION	40
6.3.2	Levels in SINGLE FAULT CONDITION	40
6.4	Primary means of protection	43
6.4.1	General	43
6.4.2	ENCLOSURES and PROTECTIVE BARRIERS	43
6.4.3	BASIC INSULATION	43
6.4.4	Impedance	43
6.5	Additional means of protection in case of SINGLE FAULT CONDITIONS	43
6.5.1	General	43
6.5.2	PROTECTIVE BONDING	44
6.5.3	SUPPLEMENTARY INSULATION and REINFORCED INSULATION	47
6.5.4	PROTECTIVE IMPEDANCE	47
6.5.5	Automatic disconnection of the supply	48
6.5.6	Current- or voltage-limiting device	48
6.6	Connections to external circuits	48
6.6.1	General	48
6.6.2	TERMINALS for external circuits	49
6.6.3	Circuits with TERMINALS which are HAZARDOUS LIVE	49
6.6.4	TERMINALS for stranded conductors	49
6.7	Insulation requirements	50
6.7.1	The nature of insulation	50
6.7.2	Insulation for MAINS CIRCUITS of OVERVOLTAGE CATEGORY II with a nominal supply voltage up to 300 V	52
6.7.3	Insulation for secondary circuits derived from MAINS CIRCUITS of OVERVOLTAGE CATEGORY II up to 300 V	56
6.8	Procedure for voltage tests	61
6.8.1	General	61
6.8.2	Humidity preconditioning	62
6.8.3	Test procedures	63
6.9	Constructional requirements for protection against electric shock	63
6.9.1	General	63
6.9.2	Insulating materials	64

6.9.3	Colour coding	64
6.10	Connection to the MAINS supply source and connections between parts of equipment	64
6.10.1	MAINS supply cords	64
6.10.2	Fitting of non-detachable MAINS supply cords	65
6.10.3	Plugs and connectors	67
6.11	Disconnection from supply source	67
6.11.1	General	67
6.11.2	Exceptions	67
6.11.3	Requirements according to type of equipment	67
6.11.4	Disconnecting devices	68
7	Protection against mechanical HAZARDS	69
7.1	General	69
7.2	Sharp edges	69
7.3	Moving parts	69
7.3.1	General	69
7.3.2	Exceptions	69
7.3.3	RISK assessment for mechanical HAZARDS to body parts	70
7.3.4	Limitation of force and pressure	71
7.3.5	Gap limitations between moving parts	71
7.4	Stability	73
7.5	Provisions for lifting and carrying	74
7.5.1	General	74
7.5.2	Handles and grips	74
7.5.3	Lifting devices and supporting parts	74
7.6	Wall mounting	75
7.7	Expelled parts	75
8	Resistance to mechanical stresses	75
8.1	General	75
8.2	ENCLOSURE rigidity tests	76
8.2.1	Static test	76
8.2.2	Impact test	77
8.3	Drop test	78
8.3.1	Equipment other than HAND-HELD EQUIPMENT and DIRECT PLUG-IN EQUIPMENT	78
8.3.2	HAND-HELD EQUIPMENT and DIRECT PLUG-IN EQUIPMENT	78
9	Protection against the spread of fire	78
9.1	General	78
9.2	Eliminating or reducing the sources of ignition within the equipment	80
9.3	Containment of fire within the equipment, should it occur	80
9.3.1	General	80
9.3.2	Constructional requirements	80
9.4	Limited-energy circuit	83
9.5	Requirements for equipment containing or using flammable liquids	84
9.6	Overcurrent protection	84
9.6.1	General	84
9.6.2	PERMANENTLY CONNECTED EQUIPMENT	85
9.6.3	Other equipment	85
10	Equipment temperature limits and resistance to heat	85

10.1	Surface temperature limits for protection against burns	85
10.2	Temperatures of windings	86
10.3	Other temperature measurements	87
10.4	Conduct of temperature tests	87
10.4.1	General	87
10.4.2	Temperature measurement of heating equipment	87
10.4.3	Equipment intended for installation in a cabinet or a wall	88
10.5	Resistance to heat	88
10.5.1	Integrity of CLEARANCES and CREEPAGE DISTANCES	88
10.5.2	Non-metallic ENCLOSURES	88
10.5.3	Insulating material	88
11	Protection against HAZARDS from fluids	89
11.1	General	89
11.2	Cleaning	90
11.3	Spillage	90
11.4	Overflow	90
11.5	Battery electrolyte	90
11.6	Specially protected equipment	91
11.7	Fluid pressure and leakage	91
11.7.1	Maximum pressure	91
11.7.2	Leakage and rupture at high pressure	91
11.7.3	Leakage from low-pressure parts	92
11.7.4	Overpressure safety device	92
12	Protection against radiation, including laser sources, and against sonic and ultrasonic pressure	92
12.1	General	92
12.2	Equipment producing ionizing radiation	92
12.2.1	Ionizing radiation	92
12.2.2	Accelerated electrons	94
12.3	Ultraviolet (UV) Optical radiation	94
12.4	Microwave radiation	95
12.5	Sonic and ultrasonic pressure	95
12.5.1	Sound level	95
12.5.2	Ultrasonic pressure	95
12.6	Laser sources	96
13	Protection against liberated gases and substances, explosion and implosion	96
13.1	Poisonous and injurious gases and substances	96
13.2	Explosion and implosion	97
13.2.1	Components	97
13.2.2	Batteries and battery charging	97
13.2.3	Implosion of cathode ray tubes	97
14	Components and subassemblies	98
14.1	General	98
14.2	Motors	99
14.2.1	Motor temperatures	99
14.2.2	Series excitation motors	99
14.3	Overtemperature protection devices	100
14.4	Fuse holders	100
14.5	MAINS voltage selection devices	100

14.6	MAINS transformers tested outside equipment.....	100
14.7	Printed wiring boards.....	101
14.8	Circuits or components used as TRANSIENT OVERVOLTAGE limiting devices	101
14.9	<u>Small components</u>	102
15	Protection by interlocks	102
15.1	General.....	102
15.2	Prevention of reactivating.....	102
15.3	Reliability	102
16	HAZARDS resulting from application.....	103
16.1	REASONABLY FORESEEABLE MISUSE.....	103
16.2	Ergonomic aspects.....	103
17	RISK assessment.....	103
Annex A (normative)	Measuring circuits for touch current (see 6.3).....	105
Annex B (normative)	Standard test fingers (see 6.2).....	109
Annex C (normative)	Measurement of CLEARANCES and CREEPAGE DISTANCES.....	112
Annex D (normative)	Parts between which insulation requirements are specified (see 6.4 and 6.5.3)	116
Annex E (informative)	Guideline for reduction of POLLUTION DEGREES.....	119
Annex F (normative)	ROUTINE TESTS.....	120
Annex G (informative)	Leakage and rupture from fluids under pressure	122
Annex H (normative)	Qualification of conformal coatings for protection against POLLUTION	127
Annex I (informative)	Line-to-neutral voltages for common MAINS supply systems	130
Annex J (informative)	Risk assessment.....	131
Annex K (normative)	Insulation requirements not covered by 6.7	134
Annex L (informative)	Index of defined terms.....	156
	Bibliography.....	158
Figure 1	– Measurements through openings in ENCLOSURES.....	39
Figure 2	– Maximum duration of short-term ACCESSIBLE voltages in SINGLE FAULT CONDITION (see 6.3.2 a))	41
Figure 3	– Capacitance level versus voltage in NORMAL CONDITION and SINGLE FAULT CONDITION (see 6.3.1 c) and 6.3.2 c))	42
Figure 4	– Acceptable arrangement of protective means against electric shock	44
Figure 5	– Examples of binding screw assemblies	46
Figure 6	– Distance between conductors on an interface between two layers.....	54
Figure 7	– Distance between adjacent conductors along an interface of two inner layers	54
Figure 8	– Distance between adjacent conductors located between the same two layers	55
Figure 9	– Detachable MAINS supply cords and connections	65
Figure 10	– Impact test using a sphere	77
Figure 11	– Flow chart to explain the requirements for protection against the spread of fire.....	79
Figure 12	– Baffle	82
Figure 13	– Area of the bottom of an ENCLOSURE to be constructed as specified in 9.3.2 c) 1).....	82

Figure 14 – Ball-pressure test apparatus	89
Figure 15 – Flow chart for conformity options 14.1 a), b), c) and d).....	99
<u>Figure 16 – Cylinder for checking the size of small components.....</u>	<u>102</u>
Figure A.1 – Measuring circuit for a.c. with frequencies up to 1 MHz and for d.c.	105
Figure A.2 – Measuring circuits for sinusoidal a.c. with frequencies up to 100 Hz and for d.c.	106
Figure A.3 – Current measuring circuit for electrical burns	107
Figure A.4 – Current measuring circuit for wet contact	108
Figure B.1 – Rigid test finger	109
Figure B.2 – Jointed test finger	110
<u>Figure B.3 – Jointed test probe for equipment intended to be used by CHILDREN</u>	<u>111</u>
Figure C.1 – Examples of methods of measuring CLEARANCES and CREEPAGE DISTANCES	115
Figures D.1 a) to d) – Protection between HAZARDOUS LIVE circuits and ACCESSIBLE parts	117
Figures D.1 e) to h) – Protection between HAZARDOUS LIVE circuits and circuits which ACCESSIBLE external TERMINALS	117
Figures D.2 a) and b) – Protection between a HAZARDOUS LIVE internal circuit and an ACCESSIBLE part which is not bonded to other ACCESSIBLE parts	118
Figures D.2 c) and d) – Protection between a HAZARDOUS LIVE primary circuit and circuits which have ACCESSIBLE external TERMINALS	118
Figure D.3 – Protection of external ACCESSIBLE TERMINALS of two HAZARDOUS LIVE circuits	118
Figure G.1 – Conformity verification process (see G.2)	123
Figure H.1 – Test sequence and conformity	129
Figure J.1 – Iterative process of RISK assessment and RISK reduction	131
Figure J.2 – Risk reduction	132
Figure K.1 – Distance between conductors on an interface between two layers	139
Figure K.2 – Distance between adjacent conductors along an interface of an inner layer	139
Figure K.3 – Distance between adjacent conductors located between the same two layers	140
Figure K.4 – Example of recurring peak voltage	153
Table 1 – Symbols	31
Table 2 – Tightening torque for binding screw assemblies	46
Table 3 – Multiplication factors for CLEARANCES of equipment RATED for operation at altitudes up to 5 000 m	51
Table 4 – CLEARANCES and CREEPAGE DISTANCES for MAINS CIRCUITS of OVERVOLTAGE CATEGORY II up to 300 V	53
Table 5 – Test voltages for solid insulation in MAINS CIRCUITS of OVERVOLTAGE CATEGORY II up to 300 V	53
Table 6 – CLEARANCES and test voltages for secondary circuits derived from MAINS CIRCUITS of OVERVOLTAGE CATEGORY II up to 300 V	57
Table 7 – CREEPAGE DISTANCES for secondary circuits	58
Table 8 – Minimum values for distance or thickness (see 6.7.3.4.2 to 6.7.3.4.4)	60
Table 9 – Distances between TERMINALS and foil	61

Table 10 – Correction factors according to test site altitude for test voltages for CLEARANCES	62
Table 11 – Values for physical tests on cord anchorages	66
Table 12 – Protective measures against mechanical HAZARDS to body parts.....	70
Table 13 – Minimum maintained gaps to prevent crushing for different body parts	72
Table 14 – Maximum gaps to prevent access for different body parts.....	73
Table 15 – Impact energy levels, test height and corresponding IK codes	78
Table 16 – Acceptable perforation of the bottom of an ENCLOSURE	81
Table 17 – Limits of maximum available current.....	83
Table 18 – Values for overcurrent protection devices	84
Table 19 – Surface temperature limits in NORMAL CONDITION.....	86
Table 20 – Maximum temperatures for insulation material of windings	87
<u>Table 21 – Lamp or lamp systems considered photobiologically safe</u>	94
<u>Table 22 – Lamp or lamp systems considered photobiologically conditionally safe</u>	94
Table 23 <u>Table 24</u> – Impulse withstand voltages for OVERVOLTAGE CATEGORY II	101
Table C.1 – Dimensions of X.....	112
Table E.1 – Environmental situations	119
Table E.2 – Reduction of POLLUTION DEGREES	119
Table F.1 – Test voltages for ROUTINE TESTS OF MAINS CIRCUITS	121
Table G.1 – Test pressures for equipment with pressures above 14 MPa.....	125
Table H.1 – Test parameters, test conditions and test procedures	128
Table I.1 – Line-to-neutral voltages for common MAINS supply systems	130
Table J.1 – Severity of harm	133
Table J.2 – Probability of harm	133
Table J.3 – RISK category	133
Table K.1 – Multiplication factors for CLEARANCES for equipment RATED for operation at altitudes up to 5 000 m	135
Table K.2 – CLEARANCES and CREEPAGE DISTANCES for MAINS CIRCUITS of OVERVOLTAGE CATEGORY II above 300 V.....	135
Table K.3 – CLEARANCES and CREEPAGE DISTANCES for MAINS CIRCUITS of OVERVOLTAGE CATEGORY III	136
Table K.4 – CLEARANCES and CREEPAGE DISTANCES for MAINS CIRCUITS of OVERVOLTAGE CATEGORY IV	136
Table K.5 – Test voltages for solid insulation in MAINS CIRCUITS of OVERVOLTAGE CATEGORY II above 300 V	137
Table K.6 – Test voltages for solid insulation in MAINS CIRCUITS of OVERVOLTAGE CATEGORY III	137
Table K.7 – Test voltages for solid insulation in MAINS CIRCUITS of OVERVOLTAGE CATEGORY IV	138
Table K.8 – Test voltages for testing long-term stress of solid insulation in MAINS CIRCUITS.....	138
Table K.9 – Minimum values for distance or thickness of solid insulation	139
Table K.10 – CLEARANCES and test voltages for secondary circuits derived from MAINS CIRCUITS of OVERVOLTAGE CATEGORY II above 300 V	142
Table K.11 – CLEARANCES and test voltages for secondary circuits derived from MAINS CIRCUITS of OVERVOLTAGE CATEGORY III.....	143

Table K.12 – CLEARANCES and test voltages for secondary circuits derived from MAINS CIRCUITS of OVERVOLTAGE CATEGORY IV	144
Table K.13 – CREEPAGE DISTANCES for secondary circuits.....	145
Table K.14 – Minimum values for distance or thickness (see K.2.4.2 to K.2.4.4)	147
Table K.15 – CLEARANCE values for the calculation of K.3.2	151
Table K.16 – Test voltages based on CLEARANCES	152
Table K.17 – CLEARANCES for BASIC INSULATION in circuits having recurring peak voltages or WORKING VOLTAGES with frequencies above 30 kHz	154

Withheld

iTech Standards
(<https://standards.itih.ai>)
Document Preview

TS 62850:2013
<https://standards.itih.ai/standards/iec/72444054-e77b-4445-b3e1-25e3a11e3a72/iec-ts-62850-2013>

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**

FOREWORD

- 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.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

The main task of IEC technical committees is to prepare International Standards. In exceptional circumstances, a technical committee may propose the publication of a technical specification when

- the required support cannot be obtained for the publication of an International Standard, despite repeated efforts, or
- the subject is still under technical development or where, for any other reason, there is the future but no immediate possibility of an agreement on an International Standard.

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.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- transformed into an International Standard,
- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The 'colour inside' logo on the cover page of this publication 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.

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.