



BSI Standards Publication

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

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Part 1: General requirements

This is a preview of "BS EN 61010-1:2010+A...". [Click here to purchase the full version from the ANSI store.](#)

## National foreword

This British Standard is the UK implementation of EN 61010-1:2010+A1:2019. It is derived from IEC 61010-1:2010, incorporating corrigenda May 2011 and May 2019 and amendment 1:2016. It supersedes BS EN 61010-1:2010, which will be withdrawn on 22 February 2022.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to IEC text carry the number of the IEC amendment. For example, text altered by IEC amendment A1 is indicated by A1 A1.

The CENELEC common modifications have been implemented at the appropriate places in the text. The start and finish of each common modification is indicated in the text by tags C C.

The UK participation in its preparation was entrusted to Technical Committee EPL/66, Safety of measuring, control and laboratory equipment.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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**Compliance with a British Standard cannot confer immunity from legal obligations.**

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 November 2010.

### Amendments/corrigenda issued since publication

Date	Text affected
31 July 2011	Implementation of IEC corrigendum May 2011: Modification of Table 6 and Table K.9
31 March 2018	Correction to supersession details in National Foreword
31 March 2019	Implementation of IEC amendment 1:2016 with CENELEC endorsement A1:2019
31 May 2019	Implementation of IEC corrigendum May 2019: Table I.1 replaced

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## EUROPÄISCHE NORM

February 2019

ICS 19.080; 71.040.10

English Version

**Safety requirements for electrical equipment for measurement, control,  
and laboratory use -  
Part 1: General requirements  
(IEC 61010-1:2010)**

Règles de sécurité pour appareils  
électriques de mesurage, de régulation et  
de laboratoire -  
Partie 1: Exigences générales  
(CEI 61010-1:2010)

Sicherheitsbestimmungen für elektrische  
Mess-, Steuer-, Regel- und Laborgeräte -  
Teil 1: Allgemeine Anforderungen  
(IEC 61010-1:2010)

This European Standard was approved by CENELEC on 2010-10-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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

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

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



European Committee for Electrotechnical Standardization  
Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

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## European foreword

The text of document 66/414/FDIS, future edition 3 of IEC 61010-1, prepared by IEC TC 66, Safety of measuring, control and laboratory equipment, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61010-1 on 2010-10-01.

This European Standard supersedes EN 61010-1:2001.

This edition includes the following significant changes from EN 61010-1:2001, as well as numerous other changes.

- The scope of the standard has been expanded to include all locations where these products may be used, so that both professional and non-professional versions of these products are within the scope.
- The requirements for testing and measuring circuits (in various subclauses and the entirety of Clause 16) have been removed and included in a particular standard EN 61010-2-030.
- Insulation requirements (6.7) have been completely rewritten.
- Specific requirements have been added for solid insulation and thin-film insulation.
- Subclause 6.7 now contains only the insulation requirements for MAINS CIRCUITS of OVERVOLTAGE CATEGORY II up to 300 V, and for secondary circuits.
- The insulation requirements for all other circuits have been moved to a new Annex K.
- Additional requirements for protection against mechanical HAZARDS (Clause 7) have been included.
- Surface temperature limits (Clause 10) have been modified to conform to the limits of EN 563.
- Radiation requirements (Clause 12) have been modified, and take into account a distinction between intended emission and unintended emission.
- Requirements for reasonably foreseeable misuse and ergonomic aspects have been added (Clause 16).
- A new clause (Clause 17) has been added to deal with HAZARDS and environments not covered by the standard, along with a new informative annex (Annex J) dealing with RISK assessment.
- A new informative annex (Annex E) addresses methods of reducing the POLLUTION DEGREE of a micro-environment.
- Requirements for the qualification of coatings for protection against POLLUTION have been added (Annex H).
- A new informative annex (Annex I) has been added to further explain how to determine the WORKING VOLTAGE of a MAINS CIRCUIT.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN and CENELEC shall not be held responsible for identifying any or all such patent rights.

The following dates were fixed:

- |  |       |            |
|--|-------|------------|
| – latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement | (dop) | 2011-07-01 |
| – latest date by which the national standards conflicting with the EN have to be withdrawn   | (dow) | 2013-10-01 |

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Annex ZA has been added by CENELEC.

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## Endorsement notice

The text of the International Standard IEC 61010-1:2010 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60079 series	NOTE	Harmonized in EN 60079 series (partially modified).
IEC 60085	NOTE	Harmonized as EN 60085.
IEC 60112:1979	NOTE	Harmonized as HD 214 S2:1980 (not modified).
IEC 60127 series	NOTE	Harmonized in EN 60127 series (not modified).
IEC 60204 series	NOTE	Harmonized in EN 60204 series (partially modified).
IEC 60332-1 series	NOTE	Harmonized in EN 60332-1 series (not modified).
IEC 60332-2 series	NOTE	Harmonized in EN 60332-2 series (not modified).
IEC 60335 series	NOTE	Harmonized in EN 60335 series (partially modified).
IEC 60364 series	NOTE	Harmonized in EN 60364 series (partially modified).
IEC 60439 series	NOTE	Harmonized in EN 60439 series (partially modified).
IEC 60439-1:1999	NOTE	Harmonized as EN 60439-1:1999 (not modified).
IEC 60445:1999	NOTE	Harmonized as EN 60445:2000 (not modified).
IEC 60447:1993	NOTE	Harmonized as EN 60447:1993 (not modified).
IEC 60601 series	NOTE	Harmonized in EN 60601 series (partially modified).
IEC 60664-1	NOTE	Harmonized as EN 60664-1.
IEC 60695-10-2	NOTE	Harmonized as EN 60695-10-2.
IEC 60950 series	NOTE	Harmonized in EN 60950 series (partially modified).
IEC 60950-1	NOTE	Harmonized as EN 60950-1.
IEC 60990	NOTE	Harmonized as EN 60990
IEC 61010-2-030	NOTE	Harmonized as EN 61010-2-030.
IEC 61032	NOTE	Harmonized as EN 61032
IEC 61243-3	NOTE	Harmonized as EN 61243-3
IEC 61326 series	NOTE	Harmonized in EN 61326 series (not modified).
IEC 61508 series	NOTE	Harmonized in EN 61508 series (not modified).
IEC 61558 series	NOTE	Harmonized in EN 61558 series (partially modified).
ISO 9241 series	NOTE	Harmonized in EN ISO 9241 series.
ISO 14121-1	NOTE	Harmonized as EN ISO 14121-1.
ISO 14738	NOTE	Harmonized as EN ISO 14738.
ISO 14971	NOTE	Harmonized as EN ISO 14971.

## Foreword to amendment A1

This document (EN 61010-1:2010/A1:2019) consists of the text of IEC 61010-1:2010/AMD1:2016 prepared by IEC/TC 66 "Safety of measuring, control and laboratory equipment", together with the common modifications prepared by CLC/SR 66 "Safety of measuring, control, and laboratory equipment".

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2019-08-22
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2022-02-22

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

This amendment 1 to the third edition modifies the third edition published in 2010. It constitutes a technical revision.

This edition as amended includes the following significant changes from the third edition, as well as numerous other changes:

- The scope of the standard is modified to include the standard paragraph that Group Safety Publications are required to have. It does not affect the range of equipment in the scope.
- Symbols are the preferred marking method over warnings.
- Limit voltage values for accessible parts have been brought back to the values of the second edition in subclause 6.3 and Figure 2.
- d.c. is allowed as an alternative for dielectric testing of solid insulation and thin film insulation in mains circuits of overvoltage category II up to 300 V.
- Clearances and creepage distances in mains circuits of overvoltage category III and IV are subjected to dielectric testing in case of doubt.
- The 500 VA power requirement of the a.c. dielectric strength test equipment is replaced by a requirement to maintain the test voltage throughout the test.
- Temperature measurements (10.4.1) are made at the least favourable ambient temperature within the RATED ambient temperature range of the equipment if this represents a less favourable condition.
- Subclause 11.6 is renamed to "Equipment RATED with a degree of ingress protection (IP code)". It is completely revised and includes now complete requirements.
- The test pressures for hydraulic tests in 11.7.2 are revised.
- The requirements for protection against optical radiation are revised. The coverage is increased.
- The requirements for circuits used to limit TRANSIENT OVERVOLTAGES (14.8) are revised.
- In Annex H the test number 1 "Scratch resistance" is removed.

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and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For the relationship with EU Directive(s) see informative Annex ZZ, which is an integral part of this document.

### **Endorsement notice**

The text of the International Standard IEC 61010-1:2010/AMD1:2016 was approved by CENELEC as a European Standard with common modifications.

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(normative)

### Normative references to international publications with their corresponding European publications

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.

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: [www.cenelec.eu](http://www.cenelec.eu).

Publication	Year	Title	EN/HD	Year
IEC 60027-1 + A1 + A2	1992 1997 2005	Letters symbols to be used in electrical technology - Part 1: General	EN 60027-1 + A2	2006 2007
IEC 60027-2	2005	Letter symbols to be used in electrical technology - Part 2: Telecommunications and electronics	EN 60027-2	2007
IEC 60027-3	2002	Letter symbols to be used in electrical technology - Part 3: Logarithmic and related quantities, and their units	EN 60027-3	2007
IEC 60027-4	2006	Letter symbols to be used in electrical technology - Part 4: Rotating electric machines	EN 60027-4	2007
IEC 60027-6	2006	Letter symbols to be used in electrical technology - Part 6: Control technology	EN 60027-6	2007
IEC 60027-7	2010	Letter symbols to be used in electrical technology - Part 7: Power generation, transmission and distribution	EN 60027-7	2010
IEC 60065 (mod.) Cor. 1 A1 (mod.) A2 (mod.)	2001 2002 2005 2010	Audio, video and similar electronic apparatus - Safety requirements	EN 60065 + Cor. + A1 + A11 + A2 + A12	2002 2007 2006 2008 2010 2012
IEC 60068-2-14	2009	Environmental testing – Part 2-14: Tests – Test N: Change of temperature	EN 60068-2-14	2009
IEC 60068-2-75	1997	Environmental testing – Part 2-75: Tests – Test Eh: Hammer tests	EN 60068-2-75	1997
IEC 60073	2002	Basic and safety principles for man-machine interface, marking and identification – Coding principles for indicators and actuators	EN 60073	2002



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		rated voltages up to and including 450/750 V - Part 1: General requirements		
IEC 60227-2 + Cor. 1  + A1	1997 1998 2003	Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V - Part 2: Test methods	HD 21.2 S3:1997/A1 EN 50341-3:2001/ Cor. 1	2002 2006
IEC 60227-3 + A1	1993 1997	Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V - Part 3: Non-sheathed cables for fixed wiring	IEC 60227-3 + A1	1993 1997
IEC 60227-4 + A1	1992 1997	Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V - Part 4: Sheathed cables for fixed wiring	IEC 60227-4 + A1	1992 1997
IEC 60227-5	2011	Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V - Part 5: Flexible cables (cords)	IEC 60227-5	2011
IEC 60227-6	2001	Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V - Part 6: Lift cables and cables for flexible connections	IEC 60227-6	2001
IEC 60227-7 + A1 + A2	1995 2003 2011	Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V - Part 7: Flexible cables screened and unscreened with two or more conductors	IEC 60227-7 + A1 + A2	1995 2003 2011
IEC 60245-1 + A1	2003 2007	Rubber insulated cables - Rated voltages up to and including 450/750 V - Part 1: General requirements	IEC 60245-1 + A1	2003 2007
IEC 60245-2 + A1 + A2	1994 1997 1997	Rubber insulated cables - Rated voltages up to and including 450/750 V - Part 2: Test methods	IEC 60245-2 + A1 + A2	1994 1997 1997
IEC 60245-3 + A1 + A2	1994 1997 2011	Rubber insulated cables - Rated voltages up to and including 450/750 V - Part 3: Heat resistant silicone insulated cables	IEC 60245-3 + A1 + A2	1994 1997 2011
IEC 60245-4	2011	Rubber insulated cables - Rated voltages up to and including 450/750 V - Part 4: Cords and flexible cables	IEC 60245-4	2011
IEC 60245-5 + A1	1994 2003	Rubber insulated cables - Rated voltages up to and including 450/750 V - Part 5: Lift cables	IEC 60245-5 + A1	1994 2003
IEC 60245-6 + A1 + A2	1994 1997 2003	Rubber insulated cables - Rated voltages up to and including 450/750 V - Part 6: Arc welding electrode cables	IEC 60245-6 + A1 + A2	1994 1997 2003
IEC 60245-7 + A1	1994 1997	Rubber insulated cables - Rated voltages up to and including 450/750 V - Part 7: Heat resistant ethylene-vinyl acetate rubber insulated cables	IEC 60245-7 + A1	1994 1997

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+ A1	2003	voltages up to and including 450/750 V -	+ A1	2003
+ A2	2011	Part 8: Cords for applications requiring high flexibility	+ A2	2011
IEC 60309-1	1999	Plugs, socket-outlets and couplers for industrial purposes - Part 1: General requirements	EN 60309-1	1999
+ A1 (mod.)	2005		+ A1	2007
+ A2	2012		+ A2	2012
IEC 60309-2	1999	Plugs, socket-outlets and couplers for industrial purposes - Part 2: Dimensional interchangeability requirements for pin and contact-tube accessories	EN 60309-2	1999
+ A1 (mod.)	2005		+ A1	2007
+ A2	2012		+ A2	2012
IEC 60309-4 (mod.)	2006	Plugs, socket-outlets and couplers for industrial purposes - Part 4: Switched socket-outlets and connectors with or without interlock	EN 60309-4	2007
+ A1	2012		+ A1	2012
IEC 60320-1	2001	Appliance couplers for household and similar general purposes - Part 1: General requirements	EN 60320-1	2001
+ A1	2007		+ A1	2007
IEC 60320-2-1	2000	Appliance couplers for household and similar general purposes - Part 2-1: Sewing machine couplers	EN 60320-2-1	2000
IEC 60320-2-2	1998	Appliance couplers for household and similar general purposes - Part 2-2: Interconnection couplers for household and similar equipment	EN 60320-2-2	1998
IEC 60320-2-3	1998	Appliance coupler for household and similar general purposes - Part 2-3: Appliance coupler with a degree of protection higher than IPX0	EN 60320-2-3	1998
+ A1	2004		+ A1	2005
IEC 60320-2-4	2005	Appliance couplers for household and similar general purposes - Part 2-4: Couplers dependent on appliance weight for engagement	EN 60320-2-4	2006
+ A1	2009		+ A1	2009
IEC 60332-1-2	2004	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 premixed flame	EN 60332-1-2	2004
IEC 60332-2-2	2004	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	EN 60332-2-2	2004
IEC 60335-2-24	2010	Household and similar electrical appliances – Safety – Part 2-24: Particular requirements for refrigerating appliances, ice-cream appliances and ice-makers	EN 60335-2-24	2010
IEC 60335-2-89	2010	Household and similar electrical appliances – Safety – Part 2-89: Particular requirements for commercial refrigerating appliances with an incorporated or remote refrigerant condensing unit or compressor	EN 60335-2-89	2010
+ A1	2012		+ A1	2016

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+ Cor. 1	2010	Part 4-44: Protection for safety –		2010
+ Cor. 2	2011	Protection against voltage disturbances		2012
+A1	2015	and electromagnetic disturbances		
IEC 60417 DB	-	Graphical symbols for use on equipment	IEC 60417 DB	-
IEC 60529	1989	Degrees of protection provided by	EN 60529	1991
+ A1	1999	enclosures (IP Code)	+ A1	2000
+ A2	2013		+ A2	2013
IEC 60664-3	2003	Insulation coordination for equipment	EN 60664-3	2003
+ A1	2010	within low-voltage systems – Part 3: Use	+ A1	2010
+ Cor. 1	2010	of coating, potting or moulding for		
		protection against pollution		
IEC 60695-11-10	2013	Fire hazard testing – Part 11-10: Test	EN 60695-11-10	2013
		flames – 50 W horizontal and vertical		
		flame test methods		
IEC 60799	1998	Electrical accessories – Cord sets and	EN 60799	1998
		interconnection cord sets		
IEC 60825-1	2007	Safety of laser products – Part 1:	EN 60825-1	2007
Cor. 1	2008	Equipment classification and		
		requirements		
IEC 60947-1	2007	Low-voltage switchgear and controlgear	EN 60947-1	2007
+ A1	2010	– Part 1: General rules	+ A1	2011
IEC 60947-2	2006	Low-voltage switchgear and controlgear	EN 60947-2	2006
+ A1	2009	– Part 2: Circuit-breakers	+ A1	2009
+ A2	2013		+ A2	2013
IEC 60947-3	2008	Low-voltage switchgear and controlgear	EN 60947-3	2009
+ A1	2012	– Part 3: Switches, disconnectors,	+ A1	2012
Cor. 1	2013	switch-disconnectors and fuse-		
		combination units		
IEC 61010-031	2002	Safety requirements for electrical	EN 61010-031	2002
+ A1	2008	equipment for measurement, control and	+ A1	2008
		laboratory use – Part 031: Safety		
		requirements for hand-held probe		
		assemblies for electrical measurement		
		and test		
IEC 61180-1	1992	High-voltage test techniques for low-	EN 61180-1	1994
		voltage equipment – Part 1: Definitions,		
		test and procedure requirements		
IEC 61180-2	1994	High-voltage test techniques for low-	EN 61180-2	1994
		voltage equipment – Part 2: Test		
		equipment		
IEC 61672-1	2013	Electroacoustics – Sound level meters –	EN 61672-1	2013
		Part 1: Specifications		
IEC 61672-2	2013	Electroacoustics – Sound level meters –	EN 61672-2	2013
		Part 2: Pattern evaluation tests		
IEC 62262	2002	Degrees of protection provided by	EN 50102	1995
		enclosures for electrical equipment	+ A1	1998
		against external impacts (IK code)	+ Cor. 1	2002
IEC 62471	2006	Photobiological safety of lamps and	EN 62471	2008
		lamp systems		

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		lamp systems – Part 2: Guidance on manufacturing requirements relating to non-laser optical radiation safety		
IEC 62598	2011	Nuclear instrumentation – Constructional requirements and classification of radiometric gauges	EN 62598	2013
IEC Guide 104	2010	The preparation of safety publications and the use of basic safety publications and group safety publications	IEC Guide 104	2010
ISO/IEC Guide 51	1999	Safety aspects – Guidelines for their inclusion in standards	ISO/IEC Guide 51	1999
ISO 306	2013	Plastics – Thermoplastic materials – Determination of Vicat softening temperature (VST)	EN ISO 306	
ISO 361	1975	Basic ionizing radiation symbol	ISO 361	1975
ISO 13857	2008	Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs	EN ISO 13857	2008
ISO 3746	2010	Acoustics – Determination of sound power levels of noise sources using sound pressure – Survey method using an enveloping measurement surface over a reflecting plane	EN ISO 3746	2010
ISO 7000	2004	Graphical symbols for use on equipment	ISO 7000	2004
ISO 9614-1	1993	Acoustics – Determination of sound power levels of noise sources using sound intensity – Part 1: Measurement at discrete points	EN ISO 9614-1	2009
EN 378-2 + A2	2008 2012	Refrigerating systems and heat pumps – Safety and environmental requirements. Design, construction, testing, marking and documentation		

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(informative)

**Relationship between this European standard and the safety objectives of Directive 2014/35/EU [2014 OJ L96] aimed to be covered**

This European Standard has been prepared under a Commission's standardization request relating to harmonized standards in the field of the Low Voltage Directive, M/511, to provide one voluntary means of conforming to safety objectives of Directive 2014/35/EU of the European Parliament and of the Council of 26 February 2014 on the harmonization of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits [2014 OJ L96].

Once this standard is cited in the Official Journal of the European Union under that Directive, compliance with the normative clauses of this standard given in Table ZZ.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding safety objectives of that Directive, and associated EFTA regulations.

**Table ZZ.1 – Correspondence between this European standard and Annex I of Directive 2014/35/EU [2014 OJ L96]**

Safety objectives of Directive 2014/35/EU (Annex I)	Clause(s) / sub-clause(s) of this EN	Remarks / Notes
<b>1. General conditions</b>		
1 (a) the essential characteristics, the recognition and observance of which will ensure that electrical equipment will be used safely and in applications for which it was made, shall be marked on the electrical equipment, or, if this is not possible, on an accompanying document	5.1 5.2 5.4	
1 (b) the electrical equipment, together with its component parts, shall be made in such a way as to ensure that it can be safely and properly assembled and connected	6.6 6.10 6.11 Annex F	
1 (c) the electrical equipment shall be so designed and manufactured as to ensure that protection against the hazards set out in points 2 and 3 is assured, providing that the equipment is used in applications for which it was made and is adequately maintained	5.4 17 (for hazards not covered by clauses 6-16) See also the details in points 2 and 3	