Technical Construction File

Tcf No: Applicant:	CE-YA26063001-AL-LVD Yinboshi (Guangdong) Acoustic Technology Co., Ltd.
Address:	No. 14, Yihuan Road, Mashe Village, Lishui Town, Nanhai District, Foshan City, Guangdong Province, China
Manufacturer:	Yinboshi (Guangdong) Acoustic Technology Co., Ltd.
Address:	No. 14, Yihuan Road, Mashe Village, Lishui Town, Nanhai District, Foshan City, Guangdong Province, China
Product:	Soundproof Pod
Model:	S:985mm×990mm×2300mm M:1600mm×1440mm×2300mm
Test standard:	EN 61010-1:2010/A1:2019
Conclusion:	The products meet the above standards.
Edit Date:	2026-06-30
Issue date:	2026-06-30

ASSESSMENT REPORT

TCF

Reference No. ..... : No: CE-YA26063001-AL-LVD

Tested by(+ signature).....: Project Engineer/Downey Xue

Reviewed by(+ signature).....: Manager/Vincent Yan

Date of issue ..... : 2026-06-30

Applicant

Name .....: Yinboshi (Guangdong) Acoustic Technology Co., Ltd.

Address ..... : No. 14, Yihuan Road, Mashe Village, Lishui Town, Nanhai District, Foshan City, Guangdong Province, China

Test specification

Standard .....: EN 61010-1:2010/A1:2019

Test procedure ..... : CE-LVD

Non-standard test method ..... : N.A.

Test item description：

Manufacturer..... : Yinboshi (Guangdong) Acoustic Technology Co., Ltd.

Factory..... : Yinboshi (Guangdong) Acoustic Technology Co., Ltd.

Trademark .....: Refer to the nameplate.

Model/Type reference .....: Refer to the page 1

Rating(s) ..... : Refer to the nameplate.

General product information:

The machine is Soundproof Pod

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Clause	Requirement-Test	Result-Remark	Verdict
1	**Scope**		
	This group safety publication is primarily intended to be used as a product safety standard for the products mentioned in the scope,but shall also be used by technical committees in the preparation of their publications for products similar to those mentioned in the scope of this standard,in accordance with the principles laid down in IEC Guide 104 and ISO/IEC Guide 51.		**P**
	This part of IEC61010 specifies general safety requirements for the following types of electrical equipment and their accessories,wherever they are intended to be used.		P
	a)Electrical test and measurement equipment		P
	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.		P
	This standard also applies to test equipment integrated into manufacturing processes and intended for testing manufactured devices.		P
	NOTE 2 Manufacturing test equipment is likely to be installed adjacent to and interconnected with industrial machinery in this application.		P
	b)Electrical industrial process-control equipment		P
	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.		P
	c)Electrical laboratory equipment		P
	This is equipment which measures,indicates,monitors,inspects or analyses materials,or is used to prepare materials,and includes in vitro diagnostic(IVD)equipment.		P
	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.		P
2	**Normative references**		**-**
	The following referenced documents,where applicable,are indispensable for the application of this document.For dated references,only the edition cited applies.For undated references, the latest		P

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Clause	Requirement-Test	Result-Remark	Verdict
	edition of the referenced document (including any amendments)applies.		
3	**Terms and definitions**		-
	For the purposes of this document,the following definitions apply:		P
3.1	Equipment and states of equipment		P
3.1.1	FIXED EQUIPMENT		P
	equipment fastened to a support, or otherwise secured in a specific location [IEC 60050-826: 2004, 826-16-07, modified]		P
3.1.2	PERMANENTLY CONNECTED EQUIPMENT		P
	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		P
3.1.3	PORTABLE EQUIPMENT		N
	equipment intended to be carried by hand		P
3.1.4	HAND-HELD EQUIPMENT		P
	PORTABLE EQUIPMENT intended to be supported by one hand during NORMAL USE		P
3.1.5	TOOL		P
	external device,including keys and coins,used to aid a person to perform a mechanical function		N
3.1.6	DIRECT PLUG-IN EQUIPMENT		N
	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		N
3.2	Parts and accessories		P
3.2.1	TERMINAL		P
	component provided for the connection of a device to external conductors [IEC 60050-151: 2001, 151-12-12, modified]		P
	NOTE TERMINALS can contain one or several contacts and the term therefore Pincludes sockets,connectors,etc.		N
3.2.2	FNUNCTIONAL EARTH TERMINAL		P
	TEPRMINAL by which electrical connection is made directly to a point of a measuring or control circuit or to a screening part and which is intended to be earthed for any functional purpose other than safety		P
	NOTE For measuring equipment,this TERMINAL is often called the measuring earth TERMINAL.		P
3.2.3	PROTECTIVE CONDUCTOR TERMINAL		P
	TERMINAL which is bonded to conductive parts of equipment for safety purposes and is intended to be		P

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	connected to an external protective earthing system		
3.2.4	ENCLOSURE		N
	part providing protection of equipment against certain external influences and,in any direction,protection against direct contact		N
	NOTE ENCLOSURES may also provide protection against the spread of fire(see 9.3.2 c)).		P
3.2.5	PROTECTIVE BARRIER		P
	part providing protection against direct contact from any usual direction of access [IEC 60050-195:1998,195-06-15]		P
	NOTE Depending on its construction,a PROTECTIVE BARRIER can be called a casing,cover,screen,door,guard, etc.		P
	A PROTECTIVE BARRIER can act alone;it is then only effective when it is in place.A PROTECTIVE BARRIER can also act in conjunction with an interlocking device with or without guard locking;in this case,protection is ensured whatever the position of the PROTECTIVE BARRIER.		P
3.3	Quantities		N
3.3.1	RATED (value)		P
	quantity value assigned,generally by a manufacturer,for a specified operating condition of a component,device or equipment		P
3.3.2	RATING		P
	set of RATED values and operating conditions [IEC 60050-151:2001,151-16-11]		N
3.3.3	WORKING VOLTAGE		P
	highest r.m.s.value of the a.c.or d.c.voltage across any particular insulation which can occur when the equipment is supplied at RATED voltage		P
	NOTE 1 Transients and voltage fluctuations are not considered to be part of the wORKING VOLTAGE. NOTE 2 Both open-circuit conditions and normal operating conditions are taken into account.		P
3.4	Tests		N
3.4.1	TYPE TEST		P
	test of one or more samples of equipment (or parts of equipment)made to a particular design, to show that the design and construction meet one or more requirements of this standard		P
	NOTE This is an amplification of the IEC 60050-151:2001,151-16-16 definition to cover design as well as construction.		P
3.4.2	ROUTINE TEST		p

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	conformity test made on each individual item during or after manufacture [IEC 60050-151: 2001, 151-16-17]		P
3.5	Safety terms		P
3.5.1	ACCESSIBLE(of a part)		N
	able to be touched with a standard test finger or test pin,when used as specified in 6.2		P
3.5.2	HAZARD		P
	potential source of harm		N
3.5.3	HAZARDOUS LIVE		N
	capable of rendering an electric shock or electric burn		N
4	**Tests**		**P**
4.1	General		P
	Tests in this standard are TYPE TESTS to be carried out on samples of equipment or parts. Their only purpose is to check that the design and construction ensure conformity with this standard.In addition,manufacturers shall perform the ROUTINE TESTS of Annex F on 100%of equipment produced which has both HAZARDOUS LIVE parts and ACCESSIBLE conductive parts.		P
	The equipment shall at least meet the requirements of this standard.It is permissible to exceed the requirements.If,in this standard,a lower limit is specified for a conformity value, then the equipment may demonstrate a larger value.If an upper limit is specified for a conformity value,the equipment may demonstrate a lower value.		P
	Tests on subassemblies that meet the requirements of the relevant standards specified in this standard,and used in accordance with them,need not be repeated during TYPE TESTS of the whole equipment.		P
4.2	Sequence of tests		P
	The sequence of tests is optional unless otherwise specified.The equipment under test shall be carefully inspected after each test.If the result of a test causes doubt whether any earlier tests would have been passed if the sequence had been reversed,these earlier tests shall be repeated.		P
4.3	Reference test conditions		P
4.3.1	Environmental conditions		P
	Unless otherwise specified in this standard,the		P

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	following environmental conditions shall exist in the test location:		
	a)a temperature of 15℃ to 35℃;		P
	b)a relative humidity of not more than 75%,but not exceeding the limits of 1.4.1 d);		P
	c)an air pressure of 75 kPa to 106 kPa;		N
	d)no hoar-frost,dew,percolating water,rain,solar radiation,etc.		N
4.3.2	State of equipment		N
4.3.2.1	General		N
	Unless otherwise specified,each test shall be carried out on the equipment assembled for NORMAL USE and under the least favourable combination of the conditions given in 4.3.2.2 to 4.3.2.13.		P
	NOTE In case of doubt,tests should be performed in more than one combination of conditions.		P
	If dimensions or mass make it unsuitable to carry out particular tests on completely assembled equipment,tests on sub-assemblies are allowed,provided it is verified that the assembled equipment will meet the requirements of this standard.		N
4.3.2.2	Position of equipment		N
	The equipment shall be in any position of NORMAL USE and with any ventilation unimpeded. Equipment intended to be built into a wall,recess,cabinet,etc.,shall be installed as specified in the manufacturer's instructions.		N
4.3.2.3	Accessories		P
	Accessories and OPERATOR-interchangeable parts available from,or recommended by,the manufacturer for use with the equipment under test shall be either connected or not connected.		P
4.3.2.4	Covers and removable parts		P
	Covers or parts which can be removed without using a TOOL shall be removed or not removed.		P
4.3.2.5	MAINS supply		N
	The following requirements apply.		P
	a)The supply voltage shall be between 90%and		P

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Clause	Requirement-Test	Result-Remark	Verdict
	110%of any RATED supply voltage for which the equipment can be set or,if the equipment is RATED for a greater fluctuation,at any supply voltage within the fluctuation range.		
	b)The frequency shall be any RATED frequency.		P
	c)Equipment for both a.c.and d.c.shall be connected to an a.c.or d.c.supply.		P
	d)Equipment for single-phase a.c.supply shall be connected both with normal and reverse polarity.		P
	e)If the means of connection permits reversal,battery-operated and d.c.equipment shall be connected with both reverse and normal polarity.		P
4.3.2.6	Input and output voltages		P
	Input and output voltages,including floating voltages but excluding the MAINS supply voltage, shall be set to any voltage within the RATED voltage range.		P
4.3.2.7	Earth TERMINALS		P
	PROTECTIVE CONDUCTOR TERMINALS,if any,shall be connected to earth. FUNCTIONAL EARTH TERMINALS shall be connected or not connected to earth.		N
4.3.2.8	Controls		P
	Controls which an OPERATOR can adjust without the use of a TOOL shall be set to any position except that:		N
	a)MAINS selection devices shall be set to the correct value; b)combinations of settings shall not be made if they are prohibited by the manufacturer's marking on the equipment.		P
4.3.2.9	Connections		N
	The equipment shall be connected for NORMAL USE,or not connected.		N
4.3.2.10	Load on motors		P
	Load conditions of motor-driven parts of equipment shall be in accordance with the NORMAL USE.		P
4.3.2.11	Output		P
	For equipment giving an electrical output: a)the equipment shall be operated in such a way as to provide the RATED output power to the RATED load; b)the RATED load impedance of any output shall be connected or not connected.		P
4.3.2.12	Duty cycle		P

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Clause	Requirement-Test	Result-Remark	Verdict
	Equipment for short-term or intermittent operation shall be operated for the longest RATED period and shall have the shortest RATED recovery period consistent with the manufacturer's instructions.		P
	Equipment for short-term or intermittent operation that develops significant heat during the startup phase,and that relies on continued operation to dissipate that heat,shall also be operated for the shortest RATED period followed by the shortest RATED recovery period.		P
4.4	Testing in SINGLE FAULT CONDITION		P
4.4.1	General		N
	The following requirements apply. a)Examination of the equipment and its circuit diagram will generally show the fault conditions which are liable to result in HAZARDS and which,therefore,shall be applied. b)Fault tests shall be made as specified for checking conformity,unless it can be demonstrated that no HAZARD could arise from a particular fault condition. c)The equipment shall be operated under the least favourable combination of reference test conditions(see 4.3).These combinations may be different for different faults and they shall be recorded for each test.		P
	If the environmental limits of the reference test conditions (see 4.3)do not allow realistic assessment of SINGLE FAULT CONDITIONS,the test shall be conducted at the least favourable RATED environmental conditions of the equipment.A		P
4.4.2	Application of fault conditions		N
	The following requirements apply. a)If a PROTECTIVE IMPEDANCE is formed by a combination of components,each component shall be short-circuited or disconnected,whichever is less favourable. b)If a PROTECTIVE IMPEDANCE is formed with a single component that meets the requirements of 6.5.4,it need not be short-circuited or disconnected.		N
4.4.2.3	Protective conductor		P
	The protective conductor shall be interrupted,except for PERMANENTLY CONNECTED EQUIPMENT and equipment utilizing a connector meeting the requirements of IEC 60309.		P
4.4.2.4	Equipment or parts for short-term or intermittent		P

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Clause	Requirement-Test	Result-Remark	Verdict
	operation		
	These shall be operated continuously if continuous operation could occur in a SINGLE FAULT CONDITION.Individual parts may include motors,relays,other electromagnetic devices and heaters.		P
4.4.2.5	Motors		N
	Motors shall be stopped while fully energized or prevented from starting,whichever is less favourable.		P
	One supply phase of any multi-phase motor shall be interrupted while the motor is operating at its intended full load.		P
4.4.2.6	Capacitors		N
	Capacitors(except for self-healing capacitors)in the auxiliary winding circuits of motors shall be short-circuited.		P
4.4.2.7	MAINS transformers		P
	Each untapped output winding,and each section of a tapped output winding,is overloaded in turn one at a time.The other windings are loaded or not loaded,whichever load condition of NORMAL USE is less favourable.If any overloads arise from testing in the fault conditions of 4.4,secondary windings shall be subjected to those overloads.		P
	Overloading is carried out by connecting a variable resistor across the winding.The resistor is adjusted as quickly as possible and readjusted,if necessary,after 1 min to maintain the applicable overload.No further readjustments are then permitted.		N
	If overcurrent protection is provided by a current-breaking device,the overload test current is the maximum current which the overcurrent protection device is just capable of passing for 1 h.Before the test,the device is replaced by a link with negligible impedance.If this value cannot be derived from the specification,it is to be established by test.		P
	Transformers with overtemperature protection which meets the requirements of 14.3 during the short-circuit test of 4.4.2.7.2 need not be subjected to overload tests.		P
4.4.3	Duration of tests		P
4.4.3.1	General		P
	The equipment shall be operated until further		P

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Clause	Requirement-Test	Result-Remark	Verdict
	change as a result of the applied fault is unlikely.Each test is normally limited to 1 h since a secondary fault arising from a SINGLE FAULT CONDITION will usually manifest itself within that time.If there is an indication that a HAZARD of electric shock,spread of fire or injury to persons may eventually occur,the test shall be continued for 4 h unless one of these HAZARDS arises before then.		
4.4.3.2	Current limiting devices		P
	If a device which interrupts or limits the current during operation is included to limit the temperature of parts which can easily be touched,the maximum temperature attained by those parts shall be measured,whether the device operates or not.		N
4.4.3.3	Fuses		N
	If a fault is terminated by the opening of a fuse and if the fuse does not operate within approximately 1 s,the current through the fuse under the relevant fault condition shall be measured.The pre-arcing time/current characteristics of the fuse shall be evaluated to find out whether the minimum operating current is reached and what is the maximum time before the fuse operates.The current through the fuse may vary as a function of time.		N
	If the minimum operating current of the fuse is not reached in the test,the equipment shall be operated for a period corresponding to the maximum fusing time or continuously for the duration specified in 4.4.3.1,with the fuse replaced with a short-circuit.		N
4.4.4	Conformity after application of fault conditions		P
4.4.4.1	General		P
	Conformity with requirements for protection against electric shock after the application of single faults is checked as follows:		P
	a)by making the measurements of 6.3.2 to check that no ACCESSIBLE conductive parts have become HAZARDOUS LIVE;		P
	b)by performing a voltage test on DOUBLE INSULATION or REINFORCED INSULATION to check that the protection is still at least at the level ofBASIC INSULATION. The voltage tests are made as specified in 6.7 and 6.8(without humidity preconditioning)with the test voltage for BASIC INSULATION;		N
	c)by measuring the temperature of transformer		P

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Clause	Requirement-Test	Result-Remark	Verdict
	windings if the protection against electrical HAZARDS is achieved by DOUBLE INSULATION or REINFORCED INSULATION within the transformer. The temperatures of Table 20 shall not be exceeded.		
4.4.4.2	Temperature		P
	Conformity with requirements for temperature protection is checked by determining the temperature of the outer surface of the ENCLOSURE and of parts which can easily be touched (See Clause 10).		P
4.4.4.3	Spread of fire		N
	Conformity with requirements for protection against the spread of fire is checked by placing the equipment on white tissue-paper covering a softwood surface and covering the equipment with cheesecloth.No molten metal,burning insulation,flaming particles,etc.shall fall on the surface on which the equipment stands and there shall be no charring,glowing,or flaming of the tissue paper or cheesecloth.Melting of insulation material shall be ignored if no HAZARD could arise.		N
5	**Marking and documentation**		**P**
5.1	Marking		P
5.1.1	General		P
	Equipment shall bear markings as specified in 5.1.2 to 5.2.Except for marking of internal parts,these markings shall be visible from the exterior,or be visible after removing a cover or opening a door without the aid of a TOOL,if the cover or door is intended to be removed or opened by an OPERATOR.Markings applying to the equipment as a whole shall not be put on parts which can be removed by an OPERATOR without the use of a TOOL.		P
	For rack-or panel-mounted equipment,markings are permitted to be on a surface that becomes visible after removal of the equipment from the rack or panel.		P
	Letter symbols for quantities and units shall be as specified in IEC 60027.Graphic symbols shall be in accordance with Table 1 if applicable.There are no colour requirements for symbols.Graphic symbols shall be explained in the documentation.		P
5.1.2	Identification		P
	The equipment shall,as a minimum,be marked with:		P

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Clause	Requirement-Test	Result-Remark	Verdict
	a)the name or trade mark of the manufacturer or supplier;		
	b)a model number,name or other means to identify the equipment.If equipment bearing the same distinctive designation(model number)is manufactured at more than one location, equipment from each manufacturing location shall be marked so that the location can be identified.		P
5.1.3	MAINS supply		P
	The equipment shall be marked with the following information.		P
	a)Nature of supply: 1)a.c.:RATED MAINS frequency or range of frequencies; 2)d.c.:symbol 1 of Table 1. NOTE 1 For information purposes it may be useful to mark -equipment intended for a.c.with symbol 2 of Table 1; -equipment suitable for both a.c.and d.c.with symbol 3 of Table 1; -equipment for three-phase supply with symbol 4 of Table 1.		P
	b)The RATED supply voltage(s)or the RATED range of supply voltages		P
	c)The maximum RATED power in watts(active power)or volt-amperes(apparent power),or the maximum RATED input current,with all accessories or plug-in modules connected.If the equipment can be used on more than one voltage range,separate values shall be marked for each voltage range unless the maximum and minimum values do not differ by more than 20%of the mean value.The marked value shall not be less than 90%of the maximum value.		P
	d)Equipment which an OPERATOR can set for different RATED supply voltages shall be provided with means for the indication of the voltage for which the equipment is set.For PORTABLE EQUIPMENT the indicationshall be visible from the exterior.If the equipment is so constructed that the supply voltage setting can be altered without the use of a TOOL,the action of changing the setting shall also change the indication.		P
	e)Accessory MAINS socket-outlets accepting standard MAINS plugs shall be marked with the voltage if it is different from the MAINS supply voltage.If the outlet is for use only with specific equipment,it shall be marked to identify the		P

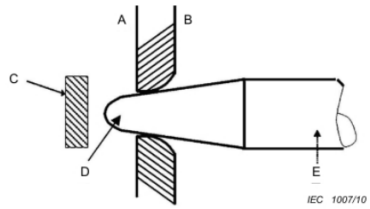
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	equipment for which it is intended.If not,the maximum RATED current or power shall be marked,or symbol 14 of Table 1 placed beside the outlet with the full details included in the documentation.		
	Table 1 – Symbols Number / Symbol / Reference / Description 1 / IEC 60417-5031 (2002-10) / Direct current 2 / IEC 60417-5032 (2002-10) / Alternating current 3 / IEC 60417-5033 (2002-10) / Both direct and alternating current 4 / IEC 60417-5032-1 (2002-10) / Three-phase alternating current 5 / IEC 60417-5017 (2006-08) / Earth (ground) TERMINAL 6 / IEC 60417-5019 (2006-08) / PROTECTIVE CONDUCTOR TERMINAL 7 / IEC 60417-5020 (2002-10) / Frame or chassis TERMINAL 8 / Not used 9 / IEC 60417-5007 (2009-02) / On (Power) 10 / IEC 60417-5008 (2009-02) / Off (Power) 11 / IEC 60417-5172 (2003-02) / Equipment protected throughout by DOUBLE INSULATION or REINFORCED INSULATION 12 / Caution, possibility of electric shock 13 / IEC 60417-5041 (2002-10) / Caution, hot surface 14 / ISO 7000-0434B (2004-01) / Caution [a] 15 / IEC 60417-5268 (2002-10) / In position of a bi-stable push control 16 / IEC 60417-5269 (2002-10) / Out position of a bi-stable push control 17 / ISO 361 / Ionizing radiation [a] See 5.4.1 which requires manufacturers to state that documentation must be consulted in all cases where this symbol is marked.		P
5.1.4	Fuses		P
	For any fuse which may be replaced by an OPERATOR,there shall be a marking beside the fuseholder,which will enable the OPERATOR to identify the correct replacement fuse (see 5.4.5).		P
5.1.5	TERMINALS,connections and operating devices		N
5.1.5.1	General		N
	If necessary for safety,an indicationshall be given of the purpose of TERMINALS,connectors, controls,and indicators,including any connections for fluids such as gas,water and drainage. Where there is insufficient space,symbol 14 of Table 1 may be used.		P
	Push-buttons and actuators of emergency stop devices,and indicators used only to indicate a warning of danger or the need for urgent action,shall be coloured red and coded as specified		P

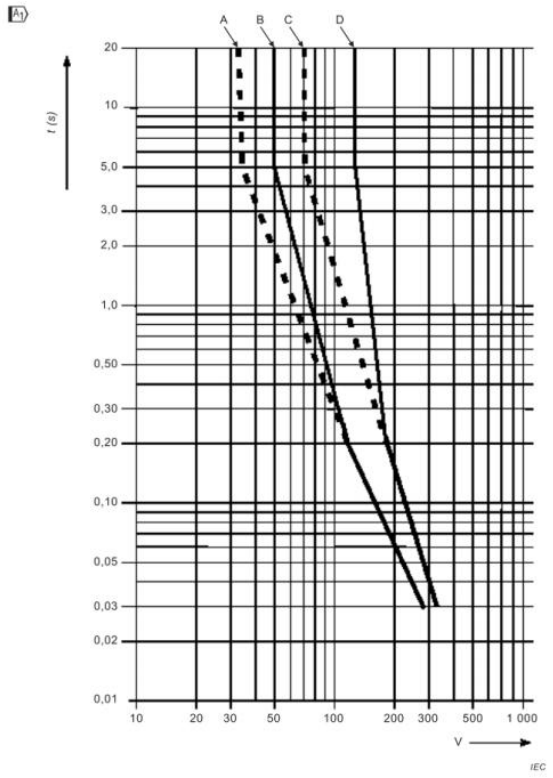
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	in IEC 60073.If the meaning of colour relates to the safety of persons or the environment, supplementary means of coding shall be provided (see IEC 60073).		
5.1.5.2	TERMINALS		P
	TERMINALS for connection to the MAINS supply shall be identifiable.		P
5.1.6	Switches and circuit-breakers		P
	If the power supply switch or circuit-breaker is used as the disconnecting device,the off- position shall be clearly marked.		P
	If a push-button switch is used as the power supply switch,symbols 9 and 15 of Table 1 may be used to indicate the on-position,or symbols 10 and 16 to indicate the off-position,with the pair of symbols (9 and 15,or 10 and 16)close together.		N
5.1.7	Equipment protected by DOUBLE INSULATION or REINFORCED INSULATION		N
	Equipment which is only partially protected by DOUBLE INSULATION or REINFORCED INSULATION shall not be marked with symbol 11 of Table 1.		P
5.2	Warning markings		N
	A Warning markings specified in this standardshall meet the following requirements.A		N
	Warning markings shall be visible when the equipment is ready for NORMAL USE.If a warning applies to a particular part of the equipment,the markingshall be placed on or near that part.		N
	The size of warning markings shall be as follows: a)symbols shall be at least 2,75 mm high.Text shall be at least 1,5 mm high and contrast in colour with the background; b)symbols or text moulded,stamped or engraved in a material shall be at least 2,0 mm high. If not contrasting in colour,they shall have a depth or raised height of at least 0,5 mm.		N
	If it is necessary for the RESPONSIBLE BODY or OPERATOR to refer to the documentation to preserve the protection afforded by the equipment,the equipment shall be marked with symbol 14 of Table 1.Symbol 14 is not required to be used if other symbols which address the safety		P

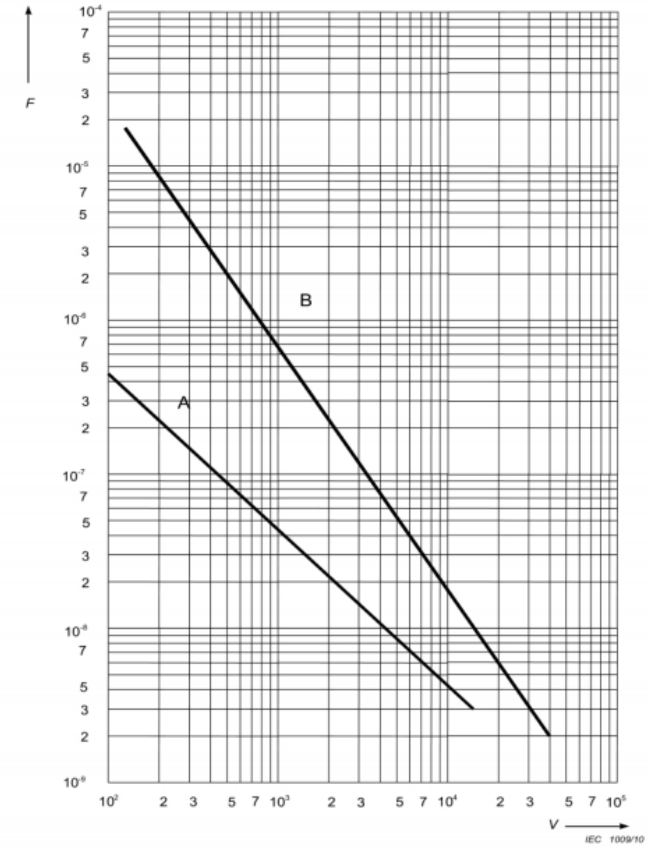
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	aspects are used and explained in the documentation.		
5.3	Durability of markings		N
	Required markings shall remain clear and legible under conditions of NORMAL USE and shall resist the effects of the cleaning agents specified by the manufacturer.		N
	Conformity is checked by performing the following test for durability of markings on the outside of the equipment. The markings are rubbed by hand,without undue pressure,for 30 s with a cloth soaked with each specified cleaning agent (or,if not specified,with 70% isopropyl alcohol).		N
	After the above treatment the markings shall be clearly legible and adhesive labels shall not have worked loose or become curled at the edges.		N
5.4	Documentation		N
5.4.1	General		P
	The following documentation necessary for safety purposes,as needed by the OPERATOR or the RESPONSIBLE BODY,shall be provided with the equipment.Safety documentation for service personnel authorized by the manufacturershall be made available to such personnel:		P
	a)intended use of the equipment; b)technical specification; c)name and address of the manufacturer or supplier from whom technical assistance may be obtained; d)the information specified in 5.4.2 to 5.4.6;		P
	e)information about how to mitigate RISKS remaining after a RISK assessment has been performed (see Clause 17); f) for equipment which for safety reasons requires specific accessories (for example probe assemblies)with specific characteristics,the documentation shall indicate that only accessories which meet the manufacturer's specifications shall be used;		P
	g)if a HAZARD could be caused by an incorrect reading when measuring,indicating or detecting harmful or corrosive substances,or HAZARDOUS		P

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Clause	Requirement-Test	Result-Remark	Verdict
	LIVE electrical quantities,the instructions shall provide guidance on how to determine that the equipment is functioning correctly;		
	Warning symbols and warning statements that are marked on the equipment shall be explained in the documentation.In particular,the documentation shall include a statement that it must be consulted in all cases where symbol 14 of Table 1 is marked,in order to find out the nature of the potential HAZARDS and any actions which have to be taken to avoid them.		P
5.4.2	Equipment RATINGS		-
5.4.3	Equipment installation		N
	NOTE It is recommended to add a statement in the documentation for the installation that the safety of any system incorporating the equipment is the responsibility of the assembler of the system.		N
5.4.4	Equipment operation		P
	Instructions for use shall include,if applicable: a)identification and description of operating controls and their use in all operating modes;		N
	b)instructions not to position the equipment so that it is difficult to operate the disconnecting device;		N
	c)instructions for interconnection to accessories and other equipment,including indication of d)specifications of limits for intermittent operation;		N
	e)explanations of symbols related to safety which are used on the equipment;		P
	If equipment conforming to IEC 60950 is used with equipment conforming to this standard, and if there is a HAZARD due to moisture or liquids,the instructions for use shall specify any additional precautions necessary.		P
5.4.5	Equipment maintenance and service		P
	Instructions on the following subjects shall be provided for service personnel,as necessary to permit safe servicing and continued safety of the equipment after servicing if the equipment is suitable to be serviced:		P

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Clause	Requirement-Test	Result-Remark	Verdict
	a)product-specific RISKS that may affect the service personnel; b)protective measures for these RISKS; c)verification of the safe state of the equipment after repair.		P
5.4.6	Integration into systems or effects resulting from special conditions		P
	Aspects resulting from integration into systems or effects resulting from special ambient or application conditions shall be described in the documentation.		P
6	**Protection against electric shock**		**P**
6.1	General		P
6.2	Determination of ACCESSIBLE parts		P
6.2.1	General		-
	Unless obvious,determination of whether a part is ACCESSIBLE is made as specified in 6.2.2 to 6.2.4 in all positions of NORMAL USE. Test fingers (see Annex B)and pins are applied without force unless a force is specified.Parts are considered to be ACCESSIBLE if they can be touched with any part of a test finger or test pin,or if they could be touched in the absence of a covering which is not considered to provide suitable insulation (see 6.9.2A)		P
	Rack-mounted and panel-mounted equipment is installed as specified in the manufacturer's instructions before making the examinations of 6.2.2 to 6.2.4.For such equipment,the OPERATOR is assumed to be in front of the panel.		N
6.2.2	Examination		P
	The jointed test finger (see Figure B.2)is applied in every possible position.If a part could become ACCESSIBLE by applying a force,the rigid test finger (see Figure B.1)is applied with a force of 10N. The force is exerted by the tip of the test finger so as to avoid wedge and lever action. The test is applied to all outer surfaces,including the bottom.However,on equipment accepting plug-in modules the tip of the jointed test finger is inserted only to a depth of 180 mm from the opening in the equipment.		P

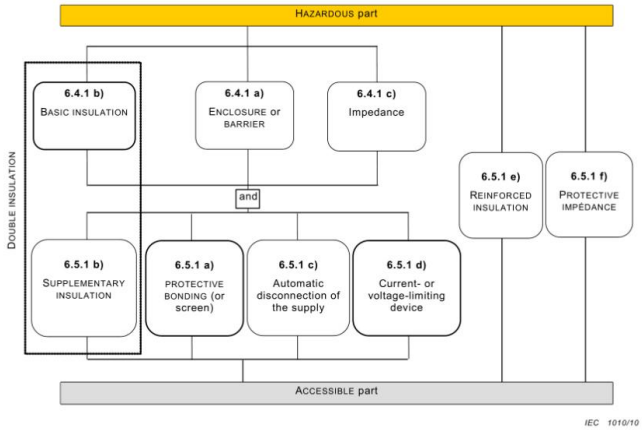
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Clause	Requirement-Test	Result-Remark	Verdict
	 **Key** A inside of equipment B outside of equipment C HAZARDOUS LIVE part D tip of test finger is considered to be ACCESSIBLE E test finger **Figure 1 – Measurements through openings in ENCLOSURES**		P
6.2.3	Openings above parts that are HAZARDOUS LIVE		P
	A metal test pin 100 mm long and 4 mm in diameter is inserted into any openings above parts which are HAZARDOUS LIVE. The test pin is suspended freely and allowed to penetrate up to 100 mm.		P
6.2.4	Openings for pre-set controls		P
	A metal test pin 3mm in diameter is inserted through holes intended to give access to pre-set controls which require the use of a screwdriver or other TOOL. The test pin is applied in every possible direction through the hole.Penetration shall not exceed three times the distance from the ENCLOSURE surface to the control shaft or 100 mm,whichever is smaller.		N
6.3	Limit values for ACCESSIBLE parts		N
6.3.1	Levels in NORMAL CONDITION		N
6.3.2	Levels in SINGLE FAULT CONDITION		P
	Voltages above the levels of a)are deemed to be HAZARDOUS LIVE if any of the levels of b)or c)are exceeded at the same time.		P
	a) The a.c.voltage levels are 50 V r.m.s.,70V peak,and the d.c.voltage level is 120 V.For equipment intended for use in WET LOCATIONS,the a.c.voltage levels are 33 V r.m.s.,46,7V peak,and the d.c.voltage level is 70 V.A For voltages of short duration,the duration versus voltage levels are those of Figure 2,measured across a 50 kQ resistor.		P
	b)The current levels are:		N

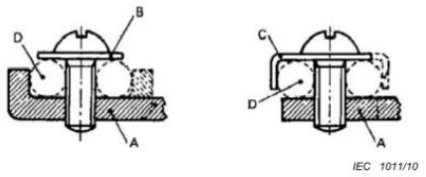
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Clause	Requirement-Test	Result-Remark	Verdict
	1)3,5 mA r.m.s.for sinusoidal waveforms,5 mA peak for non-sinusoidal waveforms or mixed frequencies,or 15 mA d.c.,when measured with the measuring circuit of Figure A.1.If the frequency does not exceed 100 Hz,the measuring circuit of Figure A.2 can be used.The measuring circuit of Figure A.4 is used for equipment intended for use in WET LOCATIONS; 2)500 mA r.m.s.when measured with the measuring circuit of Figure A.3.This relates to possible burns at higher frequencies.		
	c)The capacitance level is line B of Figure 3.		N
	 Key A a.c. voltage level in WET LOCATIONS B a.c. voltage level in dry locations C d.c. voltage level in WET LOCATIONS D d.c. voltage level in dry locations NOTE The lines A and C continue with lines B and D below the value of 0,2s **Figure 2 – Maximum duration of short-term ACCESSIBLE voltages in SINGLE FAULT CONDITION (see 6.3.2 a))**		N

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Clause	Requirement-Test	Result-Remark	Verdict
	 Key A NORMAL CONDITION B SINGLE FAULT CONDITION **Figure 3 – Capacitance level versus voltage in NORMAL CONDITION and SINGLE FAULT CONDITION** (see 6.3.1 c) and 6.3.2 c))		P
6.2.4	Primary means of protection		P
6.4.1	General		P
	ACCESSIBLE parts shall be prevented from becoming HAZARDOUS LIVE by one or more of the following means (see Annex D):		P

	a)ENCLOSURES or PROTECTIVE BARRIERS(see 6.4.2);
	b)BASIC INSULATION(see 6.4.3);
	c)impedance (see 6.4.4).
			P

6.4.2	Impedance		P
	An impedance used as a primary means of protection shall meet all the following requirements:		N
	a)it shall limit the current or voltage to not more than the applicable level of 6.3.2; b)it shall be RATED for the maximum WORKING VOLTAGE and for the amount of power that it will dissipate;		N

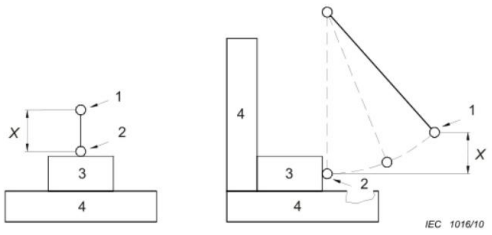
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Clause	Requirement-Test	Result-Remark	Verdict
	c)CLEARANCE and CREEPAGE DISTANCE between terminations of the impedance shall meet the applicable requirements of 6.7 for BASIC INSULATION.		N
	Conformity is checked by inspection,by measuring the voltage or current to confirm that they do not exceed the levels of 6.3.2,and by measuring CLEARANCE and CREEPAGE DISTANCE as specified in 6.7.		P
6.5	Additional means of protection in case of SINGLE FAULT CONDITIONS		P
6.5.1	General	-	P
	ACCESSIBLE parts shall be prevented from becoming HAZARDOUs LIVE in SINGLE FAULT CONDITION.The primary means of protection(see 6.4)shall be supplemented by one of a),b), c)or d).Alternatively one of the single means of protection e)or f)shall be used.See Figure 4 and Annex D.		N
	 Figure 4 – Acceptable arrangement of protective means against electric shock		N
6.5.2	PROTECTIVE BONDING		P
6.5.2.1	General		P
	ACCESSIBLE conductive parts shall be bonded to the PROTECTIVE CONDUCTOR TERMINAL if they could become HAZARDOUS LIVE in case of a single fault of the primary means of protection specified in 6.4.Alternatively,such ACCESSIBLE parts shall be separated from parts which are HAZARDOUS LIVE by a conductive protective screen bonded to the PROTECTIVE CONDUCTOR TERMINAL.		P
6.5.2.2	Integrity of PROTECTIVE BONDING		P
	The integrity of PROTECTIVE BONDING shall be		P

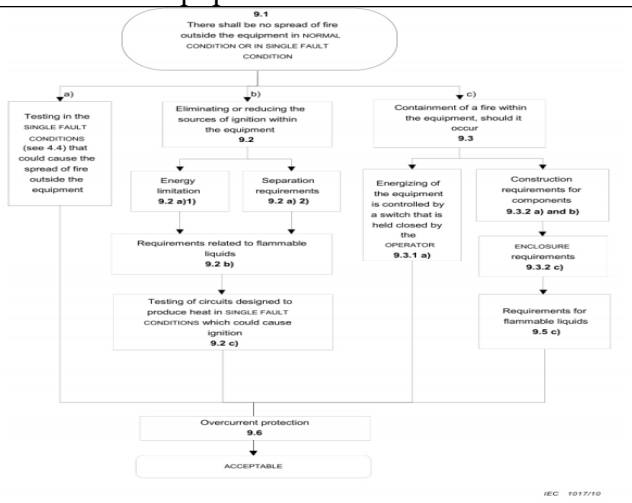
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Clause	Requirement-Test	Result-Remark	Verdict
	assured as specified below.		
	a)PROTECTIVE BONDING shall consist of directly connected structural parts or discrete conductors,or both.It shall withstand all thermal and dynamic stresses to which it could be subjected before one of the overcurrent protective means specified in 9.6 disconnects the equipment from the supply.		P
	b)Soldered connections subject to mechanical stress shall be mechanically secured independently from the soldering.Such connections shall not be used for other purposes such as fixing constructional parts.		N
	c)Screw connections shall be secured against loosening.		P
	d)If a part of the equipment is removable by an OPERATOR,the PROTECTIVE BONDING for the remainder of the equipment shall not be interrupted(except for a part that also carries the MAINS input connection to the whole equipment).		N
	 **Key** A fixed part B washer or clamping plate C anti-spread device D conductor space **Figure 5 – Examples of binding screw assemblies**		P
	Table 2 – Tightening torque for binding screw assemblies Thread size mm: 4,0 | 5,0 | 6,0 | 8,0 | 10,0 Tightening torque N·m: 1,2 | 2,0 | 3,0 | 6,0 | 10,0		P
7	**Protection against mechanical HAZARDS**		**P**
7.1	General		-
7.2	Sharp edges		P
	All easily-touched parts of the equipment shall be smooth and rounded so as not to cause injury during NORMAL USE of the equipment.		P
	Unless the fault presents an obvious HAZARD,easily-touched parts of the equipment shall not cause an injury in SINGLE FAULT CONDITION.		P

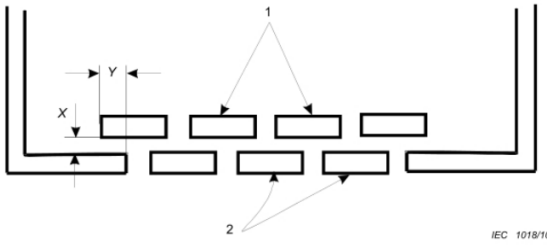
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Clause	Requirement-Test	Result-Remark	Verdict
	Conformity is checked by inspection and,if necessary,by application of an object that represents a finger in size,shape and hardness,to check for abrasions or cuts.		P
	NOTE An acceptable procedure is outlined in UL 1439.		P
7.3	Moving parts		P
7.3.1	General		P
	HAZARDS from moving parts shall not exceed a tolerable level except as specified in 7.3.2. The conditions specified in 7.3.4 and 7.3.5 are considered to represent a tolerable level.If these conditions are not met,a RISK assessment shall be carried out according to 7.3.3 or Clause 17.		P
	NOTE In this context moving parts mean parts that are driven by an energy source other than directly applied human or animal effort.		P
7.3.2	Exceptions		P
	If it is not feasible for operating reasons to prevent certain moving parts from causing a potential HAZARD,access is permitted in the following circumstances.		N
	a)Equipment with easily-touched moving parts which are obviously intended to operate on parts or materials external to the equipment,for example drilling and mixing equipment, shall be designed to minimize inadvertent touching of these moving parts(for example,by guards or handles).		P
	b)If,during routine maintenance outside NORMAL USE,it is unavoidable for technical reasons for an OPERATOR to perform a function which requires access to moving parts that could cause a HAZARD,access is permitted if all of the following precautions have been taken:		N
	1)access is not possible without the use of a TOOL; 2)the instructions for the RESPONSIBLE BODY include a statement that OPERATORS must be trained before being allowed to perform the hazardous operation; 3)there are warning markings on covers or parts which have to be removed to obtain access,prohibiting access by untrained		N

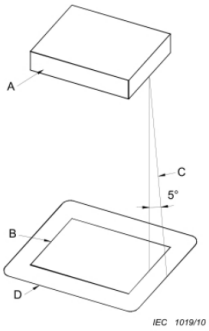
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Clause	Requirement-Test	Result-Remark	Verdict
	OPERATORS.As an alternative,symbol 14 of Table 1 shall be placed on the covers or parts,with the warnings included in the documentation.		
7.3.3	RISK assessment for mechanical HAZARDS to body parts		P
	Table 12 – Protective measures against mechanical HAZARDS to body parts **Mechanical HAZARD conditions** / **Minimum protective measures** **Severity** [a] / **Probability of exposure** [b] / **Possibility of avoiding the HAZARD** [c] / **Minimum protective measures** [d] S / E_2 / P_2 / C S / E_2 / P_1 / C S / E_1 / P_2 / C S / E_1 / P_1 / B M / E_2 / P_2 / B M / E_2 / P_1 / A M / E_1 / P_2 / A M / E_1 / P_1 / No action [a] **Severity:** M = Moderate HAZARDS, sufficient to bruise or scratch a body part. S = Serious HAZARDS, sufficient to break bones or dismember a body part. [b] **Probability of exposure:** E_1 = Exposure is not intended during NORMAL USE E_2 = Exposure is intended during NORMAL USE [c] **Possibility of avoiding the HAZARD:** P_1 = Possibility of avoidance: – The motion is visible and velocity is low enough for body parts to be removed without being trapped, or – an audible or visible alarm is activated before body parts can be trapped. P_2 = No possibility of avoidance: Conditions other than P1. [d] **Minimum protective measures:** A = Low level measures; warning markings, audible or visual signals or instructions for use. (A1) B = Moderate measures; emergency switches, PROTECTIVE BARRIERS or covers removable only with a TOOL, distances (see ISO 13857), or separations (see ISO 13854 or EN 349). (A1) C = Stringent measures; interlocks, PROTECTIVE BARRIERS or covers removable only with a TOOL and with instructions to disconnect from the power source.		P
7.4	Stability		P
	Equipment and assemblies of equipment not secured to the building structure before operationshall be physically stable.		P
7.5	Provisions for lifting and carrying		N
7.5.1	General		N
	Equipment or parts having a mass of 18 kg or more shall be provided with a means for lifting and carrying,or directions shall be given in the documentation.		N
7.5.2	Handles and grips		N
	If carrying handles or grips are fitted to the equipment,or supplied with it,they shall be capable of withstanding a force of four times the weight of the equipment.		N
	A single handle or grip is subjected to a force corresponding to four times the weight of the equipment.Unless the handle mounting screws (if any)are secured against loosening,one screw is		N

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Clause	Requirement-Test	Result-Remark	Verdict
	removed before performing these tests. The force is applied uniformly over a 70 mm width at the centre of the handle or grip,without clamping. The force is steadily increased so that the test value is attained after 10 s and maintained for a period of 1 min.		
7.6	Wall mounting		P
	Mounting brackets on equipment intended to be mounted on a wall or ceilingshall withstand a force of four times the weight of the equipment.		P
7.7	Expelled parts		P
	Equipment shall contain or limit the energy of parts which could cause a HAZARD if expelled in the event of a fault.		P
	The means of protection against expelled parts shall not be removable without the aid of a TOOL.		N
8	**Resistance to mechanical stresses**		**P**
8.1	General		-
8.2	ENCLOSURE rigidity tests		P
8.2.1	Static test		P
	The equipment is held firmly against a rigid support and subjected to a force of 30N applied by the hemispherical end of a hard rod of 12 mm diameter. The rod is applied to each part of the ENCLOSURE which could easily be touched when the equipment is ready for use,including any part of the bottom of PORTABLE EQUIPMENT,and which could cause a HAZARD if distorted.		P
	In case of doubt whether a non-metallic ENCLOSURE will pass this test at an elevated temperature,this test is performed after the equipment is operated at an ambient temperature of 40°C,or the maximum RATED ambient temperature if higher,until a steady-state condition is reached. The equipment is disconnected from the supply source before the test is performed.		N
8.2.2	Impact test		P
	Bases,covers,etc.,intended to be removed and replaced by an OPERATOR have their fixing screws tightened using a torque likely to be applied in NORMAL USE. With the equipment held firmly against a rigid support,the impact is applied to any point on surfaces which are easily touched in NORMAL USE and which would be likely to cause a HAZARD if damaged.		P

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Clause	Requirement-Test	Result-Remark	Verdict
	 Figure 10a – Impact applied to a horizontal surface Figure 10b – Impact applied to a vertical surface **Key** 1 Sphere start position 2 Sphere impact position 3 Test sample 4 Rigid supporting surface *X* Vertical fall distance. See Table 15 for values of *X* **Figure 10 – Impact test using a sphere**		P
	Table 15 – Impact energy levels, test height and corresponding IK codes Impact energy level J and IK Code: 1 (IK06) / 2 (IK07) / 5 (IK08) Vertical fall distance (X) mm: 200 / 400 / 1 000		N
8.3	Drop test		P
8.3.1	Equipment other than HAND-HELD EQUIPMENT and DIRECT PLUG-IN EQUIPMENT		P
	The equipment is placed in its position of NORMAL USE on a smooth,hard rigid surface of concrete or steel.It is then tilted about each bottom edge in turn so that the distance between the opposite edge and the test surface is 100 mm for equipment up to 20 kg,25mm for equipment between 20 kg and 100 kg,or so that the angle made by the bottom and test surface is 30°,whichever is less severe.It is then allowed to fall freely onto the test surface.		P
8.3.2	HAND-HELD EQUIPMENT and DIRECT PLUG-IN EQUIPMENT		N
	The equipment is dropped once through a distance of 1m onto a 50 mm thick hardwood board having a density of more than 700 kg/m³lying flat on a rigid base such as concrete. The equipment is dropped so that it lands in the position expected to present the most severe condition.		N
9	**Protection against the spread of fire**		**P**
9.1	General		P
	There shall be no spread of fire outside the equipment in NORMAL CONDITION or in SINGLE FAULT CONDITION.Figure 11 is a flow chart showing methods of conformity verification.		P
	Equipment energized from a MAINS supply shall also meet the requirements of 9.6.		P

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Clause	Requirement-Test	Result-Remark	Verdict
	Conformity is checked by at least one of the following methods. a)Testing in the SINGLE FAULT CONDITIONS(see 4.4)that could cause the spread of fire outside the equipment. The conformity criteria of 4.4.4.3 shall be met.		P
	b)Verifying elimination or reduction of the sources of ignition within the equipment as specified in 9.2.		N
	c)Verifying,as specified in 9.3,that if a fire occurs it will be contained within the equipment.		P
	These alternative methods can be applied throughout the equipment or individually for different sources of HAZARDS or for different areas of the equipmen.		N
	 Figure 11 – Flow chart to explain the requirements for protection against the spread of fire		P
9.2	Eliminating or reducing the sources of ignition within the equipment		P
	The possibility of ignition and occurrence of fire is considered to be reduced to a tolerable level if all the following requirements a),b)and c),if applicable,are met.		P
	a)Either 1)or 2): 1)the voltage,current and power available to the circuit or part of equipment are limited as specified in 9.4; Conformity is checked by measurement of limited-energy values as specified in 9.4. 2)insulation between parts at different potentials meets the requirements for BASIC INSULATION,or it can be demonstrated that bridging the insulation will not cause ignition. Conformity is checked by inspection and in case of doubt by test.		P

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Clause	Requirement-Test	Result-Remark	Verdict
	b)Any ignition HAZARD related to flammable liquids is reduced to a tolerable level as specified in 9.5. Conformity is checked as specified in 9.5. c)In circuits designed to produce heat,no ignition occurs when tested in SINGLE FAULT CONDITION(see 4.4).		P
9.3	**Containment of fire within the equipment,should it occur**		**P**
9.3.1	General		P
	The possibility of the spread of fire outside the equipment is considered to be reduced to a tolerable level if the equipment meets one of the following constructional requirements: a)energizing of the equipment is controlled by a switch that needs to be continuously held in the energized state by the OPERATOR; b)the equipment and the equipment ENCLOSURE conform to the constructional requirements of 9.3.2 and the applicable requirements of 9.5 are met.		P
9.3.2	Constructional requirements		P
	Table 16 – Acceptable perforation of the bottom of an ENCLOSURE Minimum thickness mm / Maximum diameter of holes mm / Minimum spacing of holes centre to centre mm 0,66 / 1,14 / 1,70 (233 holes/645 mm²) 0,66 / 1,19 / 2,36 0,76 / 1.15 / 1,70 0,76 / 1,19 / 2,36 0,81 / 1,91 / 3,18 (72 holes/645 mm²) 0,89 / 1,90 / 3,18 0,91 / 1,60 / 2,77 0,91 / 1,98 / 3,18 1,00 / 1,60 / 2,77 1,00 / 2,00 / 3,00		P
	 $Y \geq$ twice X but never less than 25 mm **Key** 1 Baffle plates (may be below the bottom of the ENCLOSURE) 2 Bottom of ENCLOSURE **Figure 12 – Baffle**		N

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Clause	Requirement-Test	Result-Remark	Verdict
	 **Key** A Part or component of the equipment that is considered to be a source of fire HAZARD. This consists of an entire component or part of the equipment if it is not otherwise shielded, or the unshielded portion of a component that is partially shielded by its casing. B Projection of the outline of A on the horizontal plane. C Inclined line that traces out the minimum area of the bottom and sides to be constructed as specified in 9.3.2 c) 1) and 9.3.2 c) 2). This line projects at a 5° angle from the vertical at every point around the perimeter of A and is oriented so as to trace out the maximum area. D Minimum area of the bottom to be constructed as specified in 9.3.2 c) 1). **Figure 13 – Area of the bottom of an ENCLOSURE to be constructed as specified in 9.3.2 c) 1)**		N
9.4	Limited-energy circuit		P
9.4.1	General requirements		P
	Conformity is checked by inspection and by measuring the potentials appearing in the circuit and the maximum available current,under the following conditions:		P
	i) the potentials appearing in the circuit are measured in the load condition that maximizes the voltage;		P
	ii) output current is measured after 60 s of operation,with the resistive load (including short circuit)which produces the highest value of current.		N
	Table 17 – Limits of maximum available current Open-circuit output voltage (*U* or *Û*) V / Maximum available current A a.c. r.m.s. | d.c. | Peak[a] | a.c. r.m.s. or d.c. $U \le 2$ | $U \le 2$ | $\hat{U} \le 2{,}8$ | 50 $2 < U \le 12{,}5$ | $2 < U \le 12{,}5$ | $2{,}8 < \hat{U} \le 17{,}6$ | $100 / U$ $12{,}5 < U \le 18{,}7$ | $12{,}5 < U \le 18{,}7$ | $17{,}6 < \hat{U} \le 26{,}4$ | 8 $18{,}7 < U \le 30$ | $18{,}7 < U \le 60$ | $26{,}4 < \hat{U} \le 42{,}4$ | $150 / U$ [a] The peak value ($\hat{U}$) applies to non-sinusoidal a.c. and to d.c. with ripple exceeding 10 %, and is provided for convenience. The r.m.s. value of the maximum available current shall be determined as that value is related to heating.		P

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Clause	Requirement-Test	Result-Remark	Verdict
	Table 18 – Values for overcurrent protection devices Potential appearing in the circuit (*U or Û*) V / Current that the device breaks after not more than 120 s [b c] A a.c. r.m.s. | d.c. | Peak [a] | a.c. r.m.s. or d.c. $U \le 2$ | $U \le 2$ | $\hat{U} \le 2{,}8$ | 62,5 $2 < U \le 12{,}5$ | $2 < U \le 12{,}5$ | $2{,}8 < \hat{U} \le 17{,}6$ | 125 / U $12{,}5 < U \le 18{,}7$ | $12{,}5 < U \le 18{,}7$ | $17{,}6 < \hat{U} \le 26{,}4$ | 10 $18{,}7 < U \le 30$ | $18{,}7 < U \le 60$ | $26{,}4 < \hat{U} \le 42{,}4$ | 200 / U [a] The peak value ($\hat{U}$) applies to non-sinusoidal a.c. and to d.c. with ripple exceeding 10 %, and is provided for convenience. The r.m.s. value of the maximum available current shall be determined as that value is related to heating. [b] The evaluation is based on the specified time-current breaking characteristic of the device, which is different from the RATED breaking current. (For example, an ANSI/UL 248-14 5 A fuse is specified to break 10 A at 120 s or less and an IEC 60127 T-type 4 A fuse is specified to break at 8,4 A at 120 s or less.) [c] The breaking current of fuses is dependent on temperature, and this has to be taken into account if the temperature immediately around the fuse is significantly higher than the room temperature.		N
9.5	Requirements for equipment containing or using flammable liquids		P
	Flammable liquids contained in,or specified for use with,the equipment shall not cause the spread of fire in NORMAL CONDITION or in SINGLE FAULT CONDITION.		P
	The HAZARDS arising from flammable liquids are considered to be reduced to a tolerable level if one of the following requirements is met.		N
	a)The temperature of the surface of the liquid and parts in contact with the surface,in NORMAL CONDITION and SINGLE FAULT CONDITION,is limited to a temperature not exceeding t-25℃,where t is the fire point of the liquid (see 10.3 b)).		P
	b)The quantity of liquid is limited to an amount that could not cause the spread of fire.		P
	c)If the liquid can be ignited,the flames are contained to prevent the spread of fire outside the equipment.Detailed instructions for use shall be provided to establish adequate RISK reduction procedures.		P
9.6	Overcurrent protection		P
9.6.1	General		P
	Equipment intended to be energized from a MAINS supply shall be protected by fuses,circuit-breakers,thermal cut-outs,impedance limiting circuits or similar means,to provide protection against excessive current being drawn from the MAINS in case of a fault in the equipment.		P

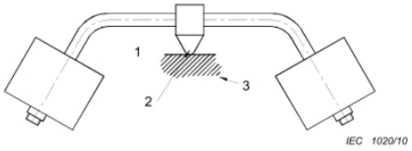
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Clause	Requirement-Test	Result-Remark	Verdict
	A minimum of BASIC INSULATION is required between MAINS-connected parts of opposite polarity on the supply side of the overcurrent protection device.		P
	Overcurrent protection devices shall not be fitted in the protective conductor.Fuses or single pole circuit-breakers shall not befitted in the neutral conductor of multi-phase equipment.		N
	Conformity is checked by inspection and measurement and for solid insulation by the a.c.voltage test of 6.8.3.1 or the d.c.voltage test of 6.8.3.2(without humidity preconditioning)using the test voltage from Table 5 for BASIC INSULATION for the appropriate line-to-neutral voltage for 1 min.EMC capacitors meeting the requirements of Clause 14 maybe disconnected during the voltage test.A		N
9.6.2	PERMANENTLY CONNECTED EQUIPMENT		N
	Overcurrent protection devices are optional in PERMANENTLY CONNECTED EQUIPMENT.If none are fitted,the installation instructions shall specify the characteristics of the overcurrent protection devices required in the building installation.		N
9.6.3	Other equipment		N
	If an overcurrent protection device is provided,it shall be within the equipment.		P
	Conformity is checked by inspection.		N
10	**Equipment temperature limits and resistance to heat**		**P**
10.1	Surface temperature limits for protection against burns		P
	The temperature of easily touched surfaces shall not exceed the values of Table 19 in NORMAL CONDITION,and 105℃ in SINGLE FAULT CONDITION,at an ambient temperature of 40℃ .		P
	Easily touched surfaces of equipment RATED for a maximum ambient temperature above 40℃ are permitted to exceed the values of Table 19 in NORMAL CONDITION,and to exceed 105℃ in SINGLE FAULT CONDITION,by not more than the amount by which the maximum RATED temperature exceeds 40℃ .		P
	Surfaces protected by barriers that prevent them from being touched accidentally are not considered		P

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Clause	Requirement-Test	Result-Remark	Verdict
	to be easily touched surfaces,provided that the barriers cannot be removed without the use of a TOOL.		
	Table 19 – Surface temperature limits in NORMAL CONDITION Part / Limit °C 1 Outer surface of ENCLOSURE (unintentional contact) a) metal, uncoated or anodized — 65 b) metal, coated (paint, non metallic) — 80 c) plastics — 85 d) glass and ceramics — 80 e) small areas (<2 cm^2) that are not likely to be touched in NORMAL USE — 100 2 Knobs and handles (NORMAL USE contact) a) metal — 55 b) plastics — 70 c) glass and ceramics — 65 d) non-metallic parts that in NORMAL USE are held only for short periods (1 s – 4 s) — 70 NOTE ISO 13732-1 gives information about the effect of the duration of contact.		P
	Conformity is checked by measurement as specified in 10.4,and by inspection of barriers to check that they protect against accidentally touching surfaces that are at temperatures above the values of Table 19,and that they cannot be removed without a TOOL.		P
10.2	Temperatures of windings		
	If a HAZARD could be caused by excessive temperature,the temperature of the insulating material of windings shall not exceed the values of Table 20 in NORMAL CONDITION and SINGLE FAULT CONDITION.		P
	Conformity is checked by measurement as specified in 10.4,in NORMAL CONDITION and in the applicable SINGLE FAULT CONDITIONS of 4.4.2.5,4.4.2.10 and 4.4.2.11,and also in any other SINGLE FAULT CONDITIONS that could cause a HAZARD as a result of excessive temperature.		P
	Table 20 – Maximum temperatures for insulation material of windings Class of insulation (see IEC 60085) / NORMAL CONDITION °C / SINGLE FAULT CONDITION °C Class A — 105 — 150 Class B — 130 — 175 Class E — 120 — 165 Class F — 155 — 190 Class H — 180 — 210		P
10.3	Other temperature measurements		P
	The following other measurements are made,if applicable,for the purposes of other sub-clauses.Tests are made in NORMAL CONDITION		N

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Clause	Requirement-Test	Result-Remark	Verdict
	unless stated.		
	a)The temperature of a field-wiring TERMINAL box or compartment is measured if there is a possibility that it could exceed 60℃ at an ambient temperature of 40℃,or the maximum RATED ambient temperature if higher(in connection with the marking requirement of 5.1.8).		P
	b)The temperature of the surface of flammable liquids,and parts in contact with the surface, is measured in the SINGLE FAULT CONDITIONS of 4.4.2.10 and 4.4.2.11(in connection with 9.5 a)).		P
	c)The temperature of non-metallic ENCLOSURES is measured during the test of 10.5.1(to establish a base temperature for the test of 10.5.2).		P
	d)The temperature of parts made of insulating material which are used to support parts connected to the MAINS supply(to establish a temperature for test 1)of 10.5.3).		P
	e)The temperature of TERMINALS carrying a current exceeding 0,5 A if substantial heat could be dissipated in case of poor contact(to establish a temperature for test 1)of 10.5.3).		P
10.4	Conduct of temperature tests		P
10.4.1	General		N
	Equipment shall be tested under reference test conditions.Unless a particular SINGLE FAULT CONDITION specifies otherwise,the manufacturer's instructions concerning ventilation,cooling liquid,limits for intermittent use,etc.are followed.Any cooling liquid shall be at the highest RATED temperature.		N
	Maximum temperature is determined by measuring the temperature rise under reference test conditions and adding this rise to 40℃,or to the maximum RATED ambient temperature if higher.		
	Alternatively,temperature measurements are made at the least favourable ambient temperature within the RATED ambient temperature range of the equipment if this represents a less favourable condition.Measures are taken to eliminate errors caused by the method of achieving the test ambient temperature(e.g.suitable baffling or enclosure if the testis conducted in an environmental chamber and the forced airmovements wouldcool the exterior of the equipment).		P

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Clause	Requirement-Test	Result-Remark	Verdict
	The temperature ofinsulating material of windings is measured as the temperature of winding wire and of core lamination in contact with the insulating material.It can be determined by the resistance method or by using temperature sensors selected and positioned so that they have a negligible effect on the temperature of the winding. The latter method may be used if the windings are non-uniform or if it is difficult to measure resistance.		P
10.4.2	Temperature measurement of heating equipment		P
	Equipment intended to produce heat for functional purposes is tested in a test corner.		P
10.4.3	Equipment intended for installation in a cabinet or a wall		P
	Such equipment is built in as specified in the installation instructions,using walls of plywood painted matt black,approximately 10 mm thick when representing the walls of a cabinet, approximately 20 mm thick when representing the walls of a building.		P
10.5	Resistance to heat		P
10.5.1	Integrity of CLEARANCES and CREEPAGE DISTANCES		N
	CLEARANCES and CREEPAGE DISTANCES shall meet the requirements of 6.7 when the equipment is operated at an ambient temperature of 40℃,or the maximum RATED ambient temperature if higher.		P
	Conformity,in cases of doubt if the equipment produces an appreciable amount of heat,is checked by operating the equipment under the reference test conditions of 4.3,except that the ambient temperature is 40℃,or the maximum RATED ambient temperature if higher.After this test,CLEARANCES and CREEPAGE DISTANCES shall not have been reduced below the requirements of 6.7.		N
	If the ENCLOSURE is non-metallic,the temperature of parts of the ENCLOSURE is measured during the above test for the purposes of 10.5.2.		N
10.5.2	Non-metallic ENCLOSURES		P

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Clause	Requirement-Test	Result-Remark	Verdict
	ENCLOSURES of non-metallic materialshall be resistant to elevated temperatures. Conformity is checked by test,after one of the following treatments.		P
	a)A non-operative treatment,in which the equipment,not energized,is stored for 7h at 70°C±2°C,or at 10°C±2°C above the temperature measured during the test of 10.5.1, whichever is higher.If the equipment contains components that might be damaged by this treatment,an empty ENCLOSURE may be treated,followed by assembly of the equipment at the end of the treatment.		N
	b)An operative treatment,in which the equipment is operated under the reference test conditions of 4.3,except that the ambient temperature is 20°C±2°C above 40°C,or above the maximum RATED ambient temperature if higher than 40°C.		N
	Within 10 minutes of the end of treatment the equipment shall be subjected to the suitable stresses of 8.2 and 8.3,and meet the pass criteria of 8.1.		N
10.5.3	Insulating material		N
	Insulating material shall have adequate resistance to heat.		N
	a)Parts that are made of insulating material,and which are used to support other parts that are connected to the MAINS supply,shall be made of insulating materials that will not cause a HAZARD if short circuits occur inside the equipment.		P
	b)If in NORMAL USE,TERMINALS carry a current exceeding 0,5A and if substantial heat could be dissipated in case of poor contact,the insulation which supports the TERMINALS shall be made of material that will not soften to an extent that could cause a HAZARD or further short circuits.		P
	In case of doubt,conformity is checked by examination of material data.If the material data is not conclusive,one of the following tests is performed.		P
	1)A sample of the insulating material,at least 2,5 mm thick,is subjected to a ball-pressure test using the test apparatus Figure 14. The test is made in a heating cabinet at the temperature measured as		P

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Clause	Requirement-Test	Result-Remark	Verdict
	specified in 10.3 d)or 10.3 e)±2℃,or at 125℃±2℃, whichever is higher. The part to be tested is supported so that its upper surface is horizontal,and the spherical part of the apparatus is pressed against this surface with a force of 20 N.After 1h the apparatus is removed and the sample is cooled within 10s to approximately room temperature by immersion in cold water. The diameter of the impression caused by the ball shall not exceed 2 mm.		
	 **Key** 1 Part to be tested 2 Spherical part of the apparatus (diameter 5 mm) 3 Support **Figure 14 – Ball-pressure test apparatus**		N
	2)The Vicat softening test of ISO 306,method A120. The Vicat softening temperature shall be at least 130℃.		P