TECHNICAL REPORT

IEC TR 61010-3-043

First edition
2001-08

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

Part 3-043: Conformity verification report for IEC 61010-2-043:1997 – Particular requirements for dry heat sterilizers using either hot air or hot inert gas for treatment of medical materials and for laboratory processes

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

Partie 3-043: Rapport de vérification de la conformité de la CEI 61010-2-043:1997 – Prescriptions particulières pour les stérilisateurs à chaleur utilisant de l'air chaud ou un gaz inerte chaud pour le traitement des matériels à usage médical et durant les procédés de traitement de laboratoire

Reference number
IEC/TR 61010-3-043:2001(E)

Publication numbering

As from 1 January 1997 all IEC publications are issued with a designation in the 60000 series. For example, IEC 34-1 is now referred to as IEC 60034-1.

Consolidated editions

The IEC is now publishing consolidated versions of its publications. For example, edition numbers 1.0, 1.1 and 1.2 refer, respectively, to the base publication, the base publication incorporating amendment 1 and the base publication incorporating amendments 1 and 2.

Further information on IEC publications

The technical content of IEC publications is kept under constant review by the IEC, thus ensuring that the content reflects current technology. Information relating to this publication, including its validity, is available in the IEC Catalogue of publications (see below) in addition to new editions, amendments and corrigenda. Information on the subjects under consideration and work in progress undertaken by the technical committee which has prepared this publication, as well as the list of publications issued, is also available from the following:

- **IEC Web Site (www.iec.ch)**

- **Catalogue of IEC publications**

  The on-line catalogue on the IEC web site (www.iec.ch/catlg-e.htm) enables you to search by a variety of criteria including text searches, technical committees and date of publication. On-line information is also available on recently issued publications, withdrawn and replaced publications, as well as corrigenda.

- **IEC Just Published**

  This summary of recently issued publications (www.iec.ch/JP.htm) is also available by email. Please contact the Customer Service Centre (see below) for further information.

- **Customer Service Centre**

  If you have any questions regarding this publication or need further assistance, please contact the Customer Service Centre:

  Email: custserv@iec.ch
  Tel: +41 22 919 02 11
  Fax: +41 22 919 03 00

TECHNICAL REPORT

IEC TR 61010-3-043

First edition
2001-07

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

Part 3-043: Conformity verification report for IEC 61010-2-043:1997 – Particular requirements for dry heat sterilizers using either hot air or hot inert gas for treatment of medical materials and for laboratory processes

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

Partie 3-043: Rapport de vérificatoin de la conformité de la CEI 61010-2-043:1997 – Prescriptions particulières pour les stérilisateurs à chaleur utilisant de l'air chaud ou un gaz inerte chaud pour le traitement des matériels à usage médical et durant les procédés de traitement de laboratoire

International Electrotechnical Commission 3, rue de Varembé Geneva, Switzerland
Telefax: +41 22 919 0300 e-mail: inmail@iec.ch IEC web site http://www.iec.ch

Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

PRICE CODE XA

For price, see current catalogue

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 3-043: Conformity verification report for IEC 61010-2-043:1997– Particular requirements for dry heat sterilizers using either hot air or hot inert gas for treatment of medical materials and for laboratory processes

FOREWORD

1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
2) The formal decisions or agreements of the IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.
3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.
4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

The main task of IEC technical committees is to prepare International Standards. However, a technical committee may propose the publication of a technical report when it has collected data of a different kind from that which is normally published as an International Standard, for example “state of the art”.

Technical reports do not necessarily have to be reviewed until the data they provide are considered to be no longer valid or useful.

IEC 61010-3-043, which is a technical report, has been prepared by IEC technical committee 66: Safety of measuring, control, and laboratory equipment.

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

Committee draft	Report on voting
66/223/CDV	66/230/RVC

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 3.

This report is a Technical Report and is of a purely informative nature and is therefore by itself not to be regarded as an International Standard. It is for use by test houses and other users to assist them with determining and recording verification of conformity of the equipment under test with the requirements of:

IEC 61010-2-043: 1997

and

IEC 61010-1:1990 + amendment 1:1992 + amendment 2:1995

The protocol for completion of this report is contained in publication IEC 61010-3:1997.

The IEC sells read-only PDF files as a general rule. In the present instance, and quite exceptionally, to enable the user to fill in the forms, a revisable file is included in a pocket affixed to the back cover of this publication.

This file can also be downloaded from the Web as a PDF file. There is, however, at the end of the document, a revisable file containing the forms. Please use the zip/unzip function.

A bilingual version will not be issued.

A French version may be issued.

The committee has decided that the contents of this publication will remain unchanged until 2004. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

Conformity Verification Report **IEC 61010-2-043** **Safety requirements for electrical equipment for measurement, control, and laboratory use –** **Part 2-043: Particular requirements for dry heat sterilizers** **using either hot air or hot inert gas for treatment of** **medical materials, and for laboratory processes**	
Report reference No.....:	
Compiled by (+ signature).....:	
Approved by (+ signature).....:	
Date of issue.....:	
Testing organization.....:	
Address.....:	
Testing location .....:	
Applicant.....:	
Address.....:	
Standard.....:	IEC 61010-2-043:1997 and IEC 61010-1:1990 + amendment 1:1992 + amendment 2:1995
Copyright blank test report...:	This report has been prepared by IEC/TC 66, which retains responsibility for any changes or corrections required.
Test procedure.....:	
Procedure deviation.....:	
Non-standard test method.....:	
Type of item tested.....:	□ Laboratory
Trademark..... .....:	
Model/type reference.....:	
Manufacturer.....:	
Rating.....:	
Copy of rating plate:	

Description of equipment function.....:

INSTALLATION/OVERVOLTAGE CATEGORY:

POLLUTION DEGREE:

Environmental rating: □ Standard □ Other (specify):

Equipment mobility: □Portable □Hand-held □ Floorstanding □ Fixed
□ Built in □Benchmounted □Other (specify):

Connection to mains supply: □ Permanent □Detachable □ Non-detachable □ None

Operating conditions: □Continuous □Short-time □ Intermittent

Overall size of the equipment (Length x Width x Height):

Mass of the equipment (kg):

Marked degree of protection to IEC 60529: IP___ ___

Accessories and detachable parts included in the evaluation:

Options:

NOTE "(see form A.X)" refers to a form appended to the report.

Table 1 – Documents attached to this report

Document No	Document description	Number of pages

Table 2 – Test equipment list

Item	Type	Equipment No.	Calibration date		Comments
			Last[1)]	Due	

1) or interval between calibrations.

Table 3 – List of components relied on for safety

Unique component reference or location (including drawing reference if required)	Application/Function	Manufacturer and part number (note 1)	RATING (note 2)	Licence number, file number or other documentary evidence of acceptance

NOTE 1 List all manufacturers concerned.

NOTE 2 Electrical, mechanical, flammability, etc.

Clause Subclause	Requirement	Result	Comments
5	**Marking and documentation**		
5.1.1	**General**		
	Required equipment markings are:		
	a) visible:		
	– from the exterior		
	or		
	– after removing a cover		
	or		
	– opening a door		
	or		
	– after removal from a rack or panel		
	b) not put on parts which can be removed by an OPERATOR		
	c) Letter symbols (IEC 60027) used		
	d) Graphic symbols (IEC 61010-1, Table 1) used		
5.1.2	**Identification**		
	Equipment is identified by:		
	– manufacturer's name or registered trade mark		
	– model number, name or other means		
5.1.3	**Mains supply**		
	Equipment is marked as follows:		
	a) nature of supply:		
	– a.c. RATED mains frequency or range of frequencies		
	– d.c. with symbol 1		
	b) RATED supply voltage(s) or range		
	c) – maximum RATED power (W or VA) or input current		
	If more than one voltage range:		
	– separate values marked		
	or		
F	– values differ by less than 20 % (see Form A.3)		
	d) OPERATOR – set for different RATED supply voltages:		
	– indicates the equipment set voltage		
	– PORTABLE EQUIPMENT indication is visible from the exterior		
	– changing the setting changes the indication		

Result: P = Pass F = Fail NA = Not Applicable

Clause Subclause	Requirement	Result	Comments
	e) Accessory mains socket-outlets accepting standard mains plugs are marked:		
	– with the voltage, if it is different from the mains supply voltage		
	– for use only with specific equipment		
	If not marked for specific equipment, it is marked with:		
	– the maximum RATED current or power, and maximum permitted leakage current or – symbol 14 with full details in the documentation		
F	The measured value not more than 110 % (see Form A.3)		
5.1.4	**Fuses**		
	OPERATOR replaceable fuse marking (see also 5.4.5)		
5.1.5	**Measuring circuit TERMINALS**		Not applicable
5.1.6	**TERMINALS and operating devices**		
	Where necessary for safety, indication of purpose of TERMINALS, connectors, controls and indicators		
	Mains supply TERMINALS identified		
	Power supply switch on or off position marked if used as disconnecting device		
	TERMINAL marking:		
	a) FUNCTIONAL EARTH TERMINALS		
	b) PROTECTIVE CONDUCTOR TERMINALS:		
	– symbol 6 is placed close to or on the TERMINAL or – part of appliance inlet		
	c) TERMINALS of measuring and control circuits		
	d) TERMINALS supplied from the interior		
	e) ACCESSIBLE FUNCTIONAL EARTH TERMINALS		
	aa) NORMAL USE setting a control could cause a hazard, an indicating device is provided		
5.1.7	**Equipment protected by DOUBLE INSULATION or REINFORCED INSULATION**		
	Protected throughout (symbol 11 used)		
	Only partially protected (symbol 11 not used)		

Result: P = Pass F = Fail NA = Not Applicable

Clause Subclause	Requirement	Result	Comments
5.1.8	**Battery charging**		
	Equipment with means to charge re-chargeable batteries is marked:		
	– to warn against the charging of non-rechargeable batteries		
	– to indicate the type of rechargeable battery used		
5.2	**Warning markings**		
	– visible when ready for NORMAL USE		
	– if necessary, marked with symbol 14		
	– are near or on applicable parts		
	– statement to isolate or disconnect		
	– advice how to avoid contact with ACCESSIBLE HAZARDOUS LIVE parts		
	– easily touched high temperature parts (symbol 13)		
	– if lockable door, to lock and retain key		
	– load type		
5.2.101	**Equipment with high ACCESSIBLE current**		
	If equipment must be permanently connected to protect against high ACCESSIBLE current, a warning marking is provided		
5.2.102	**Hot items falling out of equipment**		
	If hot items can fall onto the equipment support surface, a warning marking is provided		
5.3	**Durability of markings**		
F	The required markings remain clear and legible in NORMAL USE (see Form A.4)		
5.4	**Documentation**		
5.4.1	**General**		
	Equipment is accompanied by documentation which includes:		
	– technical specification		
	– instructions for use		
	– name and address of manufacturer or supplier		
	Definition of INSTALLATION CATEGORY		
	Warning statements and a clear explanation of warning symbols:		
	– provided in the documentation or – information is marked on the equipment		

Result: P = Pass F = Fail NA = Not Applicable

Clause Subclause	Requirement	Result	Comments
	– instructions on warning signs for country of use		
5.4.2	**Equipment RATINGS**		
	Documentation includes:		
	– supply voltage or voltage range		
	– frequency or frequency range		
	– power or current RATING		
	– a description of all input and output connections		
	– RATING of insulation of external circuits, when such circuits are nowhere ACCESSIBLE		
	– statement of the range of environmental conditions		
5.4.3	**Equipment Installation**		
	Instructions include:		
	– location and mounting instructions including space for maintenance		
	– individual weights of principle heavy subassemblies		
	– assembly instructions		
	– main supply requirements and connections		
	– ventilation		
	– protective earthing		
	– sound power data requirements		
	– requirements for special services		
5.4.3.101	**Drying-out**		
	After transport or storage in humid conditions, equipment could fail to meet the requirements in the standard; instructions shall include a warning		
5.4.4	**Equipment operation**		
	Instructions include:		
	a) operating controls:		
	i) interconnection		
	ii) use		
	b) positioned so that disconnection is difficult		
	c) accessories:		
	i) interconnection		
	ii) suitability		
	iii) detachable parts and special materials		

Result: P = Pass F = Fail NA = Not Applicable

Clause Subclause	Requirement	Result	Comments
	d) limits for intermittent operation		
	e) explanation of symbols used		
	f) cleaning		
	g) lockable door closure stop:		
	– correct use		
	– retain key		
	h) safe use of override key		
	i) action in case of malfunction		
5.4.5	**Equipment maintenance**		
	Instructions include:		
	i) maintenance on threaded parts		
	ii) safety devices fitted		
	– replacement of hoses, etc.		
	– specific battery type		
	– any manufacturer specified parts		
	– RATING and characteristics of fuses		
6 F	**Protection against electric shock** (see Form A.5)		
6.1	**General**		
	Conformity is checked by the determination of 6.2 and 6.3 followed by the tests of 6.4 to 6.12		
	Abestos is not used		
6.1.1	**Exceptions**		
F	Capacitance test (see Forms A.6 and A.7)		
6.2 F	**Determination of ACCESSIBLE parts** (see Form A.6)		
6.3	**Permissible limits for ACCESSIBLE parts**		
6.3.1 F	**Values in NORMAL CONDITION** (see Form A.7)		
6.3.1.2	**Levels of PERMANENTLY CONNECTED equipment are 1.5 times the values** (see Form A.7)		
6.3.2 F	**Values in SINGLE FAULT CONDITION** (see Form A.8)		
6.3.2.2	**Levels of PERMANENTLY CONNECTED equipment are 1,5 times the values** (see Form A.8)		
6.4	**Protection in NORMAL CONDITION** (see 6.8 and 8.1)		

Result: P = Pass F = Fail NA = Not Applicable

Clause Subclause	Requirement	Result	Comments
6.5	**Protection in SINGLE FAULT CONDITION** Additional protection is provided by: – one or more of 6.5.1 to 6.5.3 or – automatic disconnection of the supply		
6.5.1	**Protective earthing** ACCESSIBLE conductive parts: – bonded to the protective conductor terminal or – separated by screen or BARRIER from parts which are HAZARDOUS LIVE (For indirect bonding of measurement and test equipment, see 6.5.1.4)		
6.5.1.1	**PROTECTIVE BONDING** PROTECTIVE BONDING consists of directly connected structural parts or discrete conductors or both; and withstands thermal and dynamic stresses		
6.5.1.2 **F**	**Bonding impedance of plug-connected equipment** (see Form A.9)		
6.5.1.3 **F**	**Bonding impedance of PERMANENTLY CONNECTED EQUIPMENT** (see Form A.9)		
6.5.1.4 **F**	**Indirect bonding for measuring and test equipment** (see Form A.9)		
6.5.2	**DOUBLE INSULATION and REINFORCED INSULATION** (see 6.7, 6.8 and 6.9.2)		
6.5.3 **F**	**PROTECTIVE IMPEDANCE** (see Form A.10) Components wires and connections are RATED as required		
6.5.4	**Built-in panel meters** If, after building-in, the requirements of 6.5.1 to 6.5.3 are not met, the panel meter: – has no ACCESSIBLE conductive parts – has basic insulation of accessible surfaces – has DOUBLE/REINFORCED INSULATION of ACCESSIBLE surface of parts intended to be grasped		
6.6	**External circuits**		
6.6.1 **F**	**Separation of internal circuits** (see list in Forms A.1 and A.5) If the other internal circuit exceeds the values of 6.3.2 in NORMAL CONDITION and only BASIC INSULATION:		

Result: P = Pass F = Fail NA = Not Applicable

Clause Subclause	Requirement	Result	Comments
	a) short-circuit could not make external circuit HAZARDOUS LIVE		
	b) manufacturer's instructions include:		
	– a statement that the TERMINAL for external circuits is for use only with equipment which has no live parts which are ACCESSIBLE		
	– the RATING of the insulation required for external circuits		
	– the connection to be used at the remote end of external circuits		
	– the type of equipment which may be connected to the TERMINAL		
6.6.2	**TERMINALS for external circuits**		
	ACCESSIBLE TERMINALS are not HAZARDOUS LIVE, except as permitted by 6.1.1		
	The following terminals are not hazardous live:		
	– PROTECTIVE CONDUCTOR TERMINALS		
	– FUNCTIONAL EARTH TERMINALS		
	– headphone TERMINALS		
F	TERMINALS which receive a charge from an internal capacitor (see Form A.7)		
	High-voltage TERMINALS energized from the interior are:		
	– not accessible or – marked		
6.6.3	**Circuits with TERMINALS which are HAZARDOUS LIVE**		
	These circuits:		
	– are not connected to ACCESSIBLE conductive parts or – are connected to ACCESSIBLE conductive parts, but are not mains circuits and have one TERMINAL contact at earth potential		
	No ACCESSIBLE conductive parts are HAZARDOUS LIVE		
6.7 **F**	**CLEARANCES and CREEPAGE DISTANCES** (see annex D of IEC 61010-1 and Form A.11)		
6.8 **F**	**Dielectric strength tests** (see annex E of IEC 61010-1 and Form A.12)		
	Protection against the spread of fire (see 9.1)		

Result: P = Pass F = Fail NA = Not Applicable

Clause Subclause	Requirement	Result	Comments
6.9	**Constructional requirements for protection against electric shock**		
6.9.1	**General**		
	In circuits exceeding the values of 6.3.2:		
	– security of wiring connections		
	– screws securing removable covers		
	– accidental loosening		
6.9.2	**ENCLOSURES of equipment with DOUBLE INSULATION or REINFORCED INSULATION**		
	ENCLOSURE surrounds all metal parts except for small metal parts which are separated		
	ENCLOSURES or parts made of insulating material		
	Protection for metal ENCLOSURES or parts by:		
	– protective impedance or – an insulating coating or BARRIER on the inside or – CLEARANCES and CREEPAGE DISTANCES cannot be reduced by loosening of parts or wires		
6.9.3	**Equipment using PROTECTIVE BONDING**		
	a) OPERATOR removable parts		
	b) Movable conductive connections		
	c) Exterior metal braids of cables		
	d) Mains passed through the equipment		
	e) Protective earthing conductors green/yellow		
	Exceptions:		
	– earthing braids		
	– internal protective conductors		
	f) Equipment using PROTECTIVE BONDING		
6.9.4	**Over-range indication**		
6.10	**Connection to mains supply source and connections between parts of equipment**		
6.10.1	**Mains supply cords**		
	RATED for maximum equipment current (see 5.1.3c)		
	Cable complies with IEC 60227 or IEC 60245 or is a certified cord		
	Heat resistant if likely to contact hot parts		

Result: P = Pass F = Fail NA = Not Applicable

Clause Subclause	Requirement	Result	Comments
	Temperature RATING (cord and inlet)		
	Green/yellow used only for connection to PROTECTIVE CONDUCTOR TERMINALS		
	Detachable cords with IEC 60320 mains connectors:		
	– comply with IEC 60799		
	or		
	– have the current RATING of the mains connector		
6.10.2	**Fitting of non-detachable mains supply cords**		
6.10.2.1	**Cord entry**		
	Non-detachable cord protection:		
	– inlet smoothly rounded with radius ≥1,5 D		
	or		
	– insulated cord guard protruding ≥5 D		
6.10.2.2	**Cord anchorage**		
	The protective earth conductor is the last to take the strain		
	Cord anchorages:		
	– the cord is not clamped by direct pressure from a screw		
	– knots are not used		
	– cannot push the cord into the equipment to cause a hazard		
	– no failure of cord insulation in anchorage with metal parts		
	– compression bushing:		
	a) clamps all types and sizes of mains cords		
	and		
	b) is suitable:		
	i) for connection to TERMINALS provided		
	or		
	ii) it is designed for screened mains cord		
	– cord replacement does not cause a hazard and method of strain relief is clear		
F	Push-pull test (see Form A.13)		
	– not used to attach any other component		
6.10.3	**Plugs and connectors**		
	a) Mains supply plugs, connectors etc., conform with relevant specifications		
	b) If equipment supplied at voltages below 6.3.2.1:		
	– plugs of mains supply cords do not fit mains sockets above RATED supply voltage		

Result: P = Pass F = Fail NA = Not Applicable

Clause Subclause	Requirement	Result	Comments
	– mains type plugs used only for connection to mains supply		
F	c) Plug pins which receive a charge from an internal capacitor (see Form A.7) d) Accessory mains socket outlets:		
	– if a standard mains plug is accepted, there is a marking (see 5.1.3e)		
	– input has a protective earth conductor if outlet has earth TERMINAL contact		
6.10.101	**Connection of non-detachable mains cords to TERMINALS** Flexible cables or cords attached to TERMINAL blocks:		
	– no special preparation of conductor required		
	– designed and positioned so that conductor does not slip out		
6.11	**TERMINALS**		
6.11.1	**ACCESSIBLE TERMINALS**		
	a) No risk of accidental contact (see also 5.1.6c)		
	b) Will not work loose		
6.11.2	**PROTECTIVE CONDUCTOR TERMINAL**		
	a) Appliance inlet (no requirement)		
	b) For rewirable cords and PERMANENTLY CONNECTED EQUIPMENT, PROTECTIVE CONDUCTOR TERMINAL is close to mains supply TERMINALS		
	c) If no mains supply is required, any PROTECTIVE CONDUCTOR TERMINAL:		
	– is near TERMINALS of circuit for which protective earthing is necessary		
	– external if other TERMINALS external		
	d) Equivalent current-carrying capacity to mains supply TERMINALS		
	e) Soldered connections:		
	i) independently secured		
	ii) not used for other purposes		
	– Screw connections are secured		
	f) Contact surfaces are metal		
	g) If plug-in, makes first and breaks last		
	h) Protective conductor of measuring circuit:		
	– current RATING		

Result: P = Pass F = Fail NA = Not Applicable

Clause Subclause	Requirement	Result	Comments
	– protective bonding: i) not interrupted or ii) indirect bonding		
6.11.3	**FUNCTIONAL EARTH TERMINALS**		
	Independent connection		
6.12	**Disconnection from supply source**		
6.12.1	**General**		
	Disconnection device provided		
6.12.1.1	**Exception to 6.12.1**		
	Short-circuit or overload cannot cause a hazard		
6.12.2	**Requirements according to type of equipment**		
6.12.2.1	**PERMANENTLY CONNECTED EQUIPMENT**		
	– switch or circuit breaker is part of the equipment or – documentation specifies switch location and marking		
6.12.2.2	**Single-phase cord-connected equipment**		
	– switch or circuit breakers or – appliance coupler (disconnectable without TOOL) or – separable plug (without locking device)		
6.12.2.3	**Hazards arising from function**		
	Emergency switch		
	Emergency switch <1 m from the moving part		
6.12.3	**Disconnecting devices**		
	Electrically close to the supply		
6.12.3.1	**Switches and circuit-breakers**		
	When used as disconnection device:		
	– meet IEC 60947-1 and IEC 60947-3		
	– contact separation		
	– contact position evident in off position		
	– marked to indication function		
	– not incorporated in mains cord		
	– does not interrupt protection earth conductor		
	– if has other contacts, meets separation requirements of 6.6 and 6.7		

Result: P = Pass F = Fail NA = Not Applicable

Clause Subclause	Requirement	Result	Comments
6.12.3.2	**Appliance couplers and plugs**		
	Where an appliance coupler or separable plug is used as the disconnecting device (see 6.12.2.2):		
	– readily identifiable and easily reached by the OPERATOR		
	– single phase PORTABLE EQUIPMENT cord length ≤3 m		
	Protective earth conductor connected first and disconnected last		
6.12.101	**Disconnection by interruption of the mains supply**		
	Interruption of the supply does not cause a hazard		
7	**Protection against mechanical hazards**		
7.1	**General**		
	Conformity is checked by 7.2 to 7.5		
7.1.101	**Door closure and retaining mechanism**		
	Failure mode analysis of the door closure mechanism (see Table 1)		
7.2	**Moving parts**		
	Moving parts not able to crush, etc. (see also 6.12.2.3)		
	If OPERATOR access permitted:		
	a) access requires TOOL		
	b) statement about training		
	c) warning markings or symbol 14		
7.2.101	**Powered doors**		
7.2.101.1	**Shut-down device**		
	Each door shut-down device:		
	– easily accessible		
	– prominently placed		
	– not self resetting		
	When operating:		
	a) residual movement not a hazard		
	b) other safety components return to a safe condition		
	c) resetting through key, code or equivalent		
7.2.101.2	**Door motion reversal and stoppage**		
	Closing		
	– force <150 N		

Result: P = Pass F = Fail NA = Not Applicable

Clause Subclause	Requirement	Result	Comments
	or – reverses before 150 N		
	Opening hinged door <150 N		
7.2.101.3	**Sliding doors**		
	Power interrupt:		
	– <1 cm/s		
	– <10 cm		
	Parts disconnected:		
	– ≤1 cm/s		
	– ≤10 cm		
7.2.101.4	**Interruption of the mains supply**		
	No mechanical hazard		
7.3	**Stability**		
	Marking of non-automatic means		
	Conformity tests:		
	– 10° tilt test		
	– multi-directional force test		
	– downward force test		
7.4	**Provisions for lifting and carrying**		
	Handles or grips withstand four times mass		
	Equipment >18 kg:		
	– has means for lifting or carrying or – directions in documentation		
7.4.101	**Provision for transferring the LOAD into and out of the CHAMBER**		
	Means to protect OPERATOR against mechanical hazard		
	Prevention of shelf tilting or disengagement		
7.5	**Expelled parts**		
	Equipment contains or limits the energy		
	Protection not removable without the aid of a TOOL		
7.101	**Door interlocks**		
7.101.1	**General**		
	Interlocks prevent:		
	a) hazardous access, 1 000 N applied		
	b) i) no hot air or hot gas enters the CHAMBER until door secured		

Result: P = Pass F = Fail NA = Not Applicable

Clause Subclause		Requirement	Result	Comments
		ii) no heaters in the CHAMBER are energized until door secured		
		c) means to prevent new OPERATING CYCLE after interlock system failure		
7.101.2		**Door interlocks for double-ended STERILIZER**		
		OPERATOR cannot operate remote door (except automatic loading)		
7.102		**Prevention of door closure**		
		CHAMBER >0,7 m deep and 0,4 m in which an OPERATOR can enter:		
		– lockable device prevents door closing – instructions to retain locking means		
8		**Mechanical resistance to shock and impact**		
	F	After the tests of 8.1 to 8.4 (see Form A.11):		
	F	– voltage tests (see Form A.12)		
		– inspection, equipment meets the following requirements:		
		a) HAZARDOUS LIVE parts not ACCESSIBLE		
		b) ENCLOSURE shows no cracks (hazard)		
	F	c) CLEARANCES not less than their permitted values (see Form A.11)		
		– BARRIERS not damaged or loosened		
		– no moving parts exposed, except as permitted by 7.2		
		– no damage which could cause spread of fire		
9		**Equipment temperature limits and protection against the spread of fire**		
9.1		**General**		
		Conformity is checked by:		
	F	– 9.2 and fault tests of 4.4 (see Forms A.1, A.2 and A.18) or		
	F	– measurement of CREEPAGE DISTANCE and CLEARANCE and the voltage tests of annex G (see Form A.14) or		
	F	– method of annex F (see Forms A.15, A.16 and A.17)		
		– abestos is not used		
9.2		**Temperature tests**		

Result: P = Pass F = Fail NA = Not Applicable

Clause Subclause	Requirement	Result	Comments
9.3	**Guards**		
F	Surfaces liable to exceed 100 °C (see Form A.18):		
	– protected by guards		
	or		
	– marked		
	or		
	– intended to be hot (see 9.1)		
	Guards not removable without TOOL		
9.4	**Field-wiring TERMINAL boxes**		
	Temperature RATING of the cable is:		
F	– marked (see Form A.18)		
	and		
	– adjacent to field-wiring TERMINALS		
	or		
	– visible during and after installation		
9.5	**Overtemperature protection devices**		
F	– fitted, to operate in SINGLE FAULT CONDITION (see Form A.1)		
	– meets 14.3		
	– does not operate in NORMAL USE (see 3.5.6)		
	– if self-resetting, can only be set to operate in SINGLE FAULT CONDITION		
	Overtemperature protection:		
	– separate from temperature control		
	– not self-resetting		
	– resetting by solder not required		
9.6	**Overcurrent protection**		
9.6.1	**PERMANENTLY CONNECTED EQUIPMENT**		
	Device:		
	– fitted within the equipment		
	or		
	– specified in manufacturer's instructions		
9.6.2	**Other equipment**		
	Protection within the equipment		
	Devices not in the protective conductor		
	Fuses or single pole circuit-breakers not fitted in neutral (multi-phase)		
10	**Resistance to heat**		
10.1	**Integrity of CLEARANCE and CREEPAGE**		
F	**DISTANCES** (see Form A.11)		
10.2	**Resistance to heat of non-metallic**		
F	**ENCLOSURE** (see Form A.19)		

Result: P = Pass F = Fail NA = Not Applicable

Clause Subclause		Requirement	Result	Comments
10.3		**Resistance to heat of insulation material**		
		Parts supporting:		
		– parts connected to mains supply		
		– TERMINALS carrying >0,5 A		
11		**Protection against hazards from fluids**		
11.1		**General**		
11.2	**F**	**Cleaning** (see Form A.20)		
11.3	**F**	**Spillage** (see Form A.20)		
11.4	**F**	**Overflow** (see Form A.20)		
11.5		**Battery electrolyte**		
		Battery electrolyte leakage presents no hazard		
11.6	**F**	**Specially protected equipment** (see Form A.20)		
11.7		**Fluid pressure and leakage**		
11.7.1		**Maximum pressure**		
		Maximum pressure not exceeded		
11.7.2	**F**	**Leakage and rupture at high pressure** (see Form A.21)		
		Test to IEC 60335 (refrigeration only)		
11.7.3	**F**	**Leakage from low-pressure parts** (see Form A.21)		
11.7.4		**Overpressure safety device**		
		– shall not operate in NORMAL USE and – shall comply with the following:		
		– positioned close to parts intended to be protected		
		– access for inspection, maintenance and repair		
		– adjustment only with TOOL		
		– no discharge to person		
		– no hazard from discharge		
		– sufficient discharge capacity		
		– no shut-off valve between protective device and protected parts		
11.101		**Interruption of supplies and services**		
		No fluid hazard		

Result: P = Pass F = Fail NA = Not Applicable

Clause Subclause		Requirement	Result	Comments
12		**Protection against radiation, including laser sources, and against sonic and ultrasonic pressure**		
12.1		**General**		
12.2		**Equipment producing ionizing radiation**		
12.2.1	**F**	**Ionizing radiation** (see Form A.22)		
12.2.2		**Accelerated electrons**		
12.3		**Ultra-violet radiation**		(Conformity test under consideration)
12.4		**Micro-wave radiation**		(Conformity test and limit of 10 W/m^2 are under consideration)
12.5		**Sonic and ultrasonic pressure**		
12.5.1	**F**	**Sound level** (see Form A.23)		
12.5.2	**F**	**Ultrasonic pressure** (see Form A.23)		
12.6		**Laser sources** (IEC 60825)		
13		**Protection against liberated gases, explosion and implosion**		
13.1		**Poisonous and injurious gases**		
		Attach any data/test reports used to demonstrate conformity		
13.2		**Explosion and implosion**		
13.2.1		**Components**		
		Components liable to explode:		
		– pressure release device or – the apparatus incorporates OPERATOR protection (see also 7.5)		
		Pressure release device:		
		– discharge without danger		
		– not obstructable		
13.2.2		**Batteries**		
		Explosion or fire hazard:		
		– protection incorporated in the equipment or – instructions specify batteries and – single component cannot cause hazard (short-circuit and open circuit) (see Form A.24, including circuit diagram)		
	F			
		– warning marking or symbol 14		
		Battery compartment design		
		Polarity reversal test		

Result: P = Pass F = Fail NA = Not Applicable

Clause Subclause	Requirement	Result	Comments
13.3	**Implosion of high-vacuum devices**		
	High vacuum devices:		
	– intrinsically protected and correctly mounted		
	or		
	– ENCLOSURE provides protection:		
	i) screen not removable without TOOL		
	ii) if glass screen, not in contact		
13.101	**CHAMBER exhaust system**		
	Discharge no hazard		
13.102	**LOAD access after a fault**		
	Under single fault:		
	– no safety devices disabled		
	– no access to LOAD until no hazard		
14	**Components**		
14.1	**General**		
	Where safety is involved, components meet relevant requirements (see Table 3 of this report and Figure 5 of IEC 61010-1/A2)		
14.2	**Motors**		
14.2.1	**Motor temperatures**		
F	(see Form A.25)		
	Current drawn by a stopped fully energized motor does not cause a hazard		
	Loss of one phase of a three phase motor does not cause a hazard		
14.2.2	**Series excitation motors**		
14.3	**Overtemperature protection devices**		
	Devices operating in a SINGLE FAULT		
F	CONDITION (see Form A.26)		
	and have/are:		
	– reliable function		
	– RATED to interrupt maximum voltage and current of circuit		
	– RATED for maximum surface temperature of 4.4.4.2		
	– RATED for maximum temperature of 9.2 for parts in contact with flammable liquid		
	– not self-resetting unless protected part cannot function		

Result: P = Pass F = Fail NA = Not Applicable

Clause Subclause	Requirement	Result	Comments
14.4	**Fuse holders**		
	No access to HAZARDOUS LIVE parts		
14.5	**Mains voltage selecting devices**		
	Accidental change not possible		
14.6	**HIGH INTEGRITY components**		
	Used in applicable positions (see Table 3)		
	Conforms with IEC publications		
	Not a single electronic device		
14.7	**Mains transformers**		
14.7.1	**Short-circuit tests**		
F	**Transformers meet 4.4.4.1 to 4.4.4.3** (see Form A.27)		
14.7.2	**Overload tests**		
	Transformer:		
	– has overtemperature protection meeting 14.3		
	or		
F	– meets 4.4.4.1 to 4.4.4.3 (see Form A.28)		
14.8	**Overpressure safety devices**		
	Meets ISO 4126		
14.101	**Visibility and readability of instruments and indicating devices**		
	Devices related to safety located where readily seen by OPERATOR		
	Except for cycle counters, readable at 1 m with an external illumination of 215 lux +15 lux		
14.102	**Control system**		
	OPERATOR cannot set to hazardous condition		
	Automatic controller provided with system to control access to system functions		
	No keys, codes or TOOLS for OPERATING CYCLE:		
	– initiation		
	– termination		
	Functions b), c) and d) protected by increasingly severe restraints		
	Not possible to disable safety devices:		
	– using automatic controller		
	– using manual advance		

Result: P = Pass F = Fail NA = Not Applicable

Clause Subclause	Requirement	Result	Comments
	Manual mode disables automatic controller		
14.103	**Microprocessors**		
	Failure cannot cause a hazard		
14.104	**Access ports**		
	Access port retained by interlock under 7.101		
	or		
	Independent interlock provided		
15	**Protection by interlocks**		
15.1	**General**		
	Interlocks are designed to remove a hazard before OPERATOR exposed		
15.2	**Prevention of reactivation**		
15.3	**Reliability**		
16	**Measuring circuits**		
16.1 **F**	**Current measuring circuits** (see Form A.29)		
Annex K	**Routine tests**		
	Manufacturer's declaration		

Result: P = Pass F = Fail NA = Not Applicable

Summary of SINGLE FAULT CONDITIONS applied (4.4.2) Form A.1

(see Form A.2 for details of tests)

Subclause	Title	Does not apply	Carried out	Comments
4.4.2.1	PROTECTIVE IMPEDANCE			
4.4.2.2	Protective conductor			
4.4.2.3	Equipment or parts for short-term or intermittent operation			
4.4.2.4	Motors			
4.4.2.5	Capacitors			
4.4.2.6	Mains transformers Attach drawing of mains Txs showing all protective devices (see Forms A.27 and A.28)			
4.4.2.7	Outputs			
4.4.2.8	Equipment for more than one supply			
4.4.2.9	Cooling – air holes closed – fans stopped – coolant stopped			
4.4.2.10	Heating devices – timer overridden – temperature controller overridden – loss of cooling liquid			
4.4.2.11	Insulation between circuits and parts			
4.4.2.12	Interlocks			
List below all SINGLE FAULT CONDITIONS not covered by 4.4.2.1 to 4.4.2.12				

Form A.2

4.4 Testing in SINGLE FAULT CONDITION – Results

Test subclause	Fault No.	Fault description	T_d 4.4.3 (note 1)	How was test terminated Comments	Meets 4.4.4

1) T_d = Test duration in h:min:s

Record dielectric strength test on Form A.12 and temperature tests on Form A.18.

Record in the comments column for each test whether carried out during or after SINGLE FAULT CONDITION.

Tested by: _____ Date: _____ Test equipment No. (Table 2) _____

Form A.3

5.1.3.c Mains supply

Marked **RATING:**_____ _____Phase _____Hz _____A _____W _____VA	NOTE Measurements are only required for marked RATINGS

Test No.	**Voltage V**	**Freq. Hz**	**Current I**	**Power in W**	**Power in VA**	**Comments**

General comments:

Tested by:_____Date:_____

Test equipment No. (Table 2)_____

Form A.4

5.3 Durability of markings

Table A.4.1 – Marking method (note)
NOTE Where applicable include print method, label material, ink or paint type, fixing method, adhesive and surface to which marking is fixed.

Table A.4.2 – Agent
A (specify agent)
B (specify agent)
C Water
D Isopropyl alcohol

Marking location	Marking method (see Table A.4.1)
Identification (5.1.2)	
Mains supply (5.1.3)	
Fuses (5.1.4)	
Measuring circuit TERMINALS (5.1.4)	
TERMINALS and operating devices (5.1.6)	
Double/reinforced equipment (5.1.7)	
Battery charging (5.1.8)	
Warning marking (5.2)	

Method (Table A.4.1)	Test agent (Table A.4.2)	Remains legible Pass/Fail	Label loose Pass/Fail	Curled edges Pass/Fail	Comments

Tested by:_____Date:_____

Test equipment No. (Table 2)_____

Form A.5

Clause 6 – Protection against electric shock – Block diagram of system

POLLUTION DEGREE:_____

INSTALLATION CATEGORY (OVERVOLTAGE CATEGORY):_____

Location or description	Insulation type (note 1)	Maximum working voltage (note 2)	CREEPAGE DISTANCE (note 3)				CLEARANCE (note 3)	Test voltage (note 2)	Comments
			PWB mm	CTI	Other mm	CTI	mm	V	

NOTE 1 Type of insulation:

BI = BASIC INSULATION RI = REINFORCED INSULATION

DI = DOUBLE INSULATION SI = SUPPLEMENTARY INSULATION

PI = PROTECTIVE IMPEDANCE

NOTE 2 Types of voltage

Peak impulse test voltage (pulse) d.c.

r.m.s. peak

NOTE 3 INSTALLATION CATEGORIES (OVERVOLTAGE CATEGORIES) or POLLUTION DEGREES which differ from these should be shown under "Comments".

Tested by:_____Date:_____

Test equipment No. (Table 2)_____

Form A.6

6.1.1 Exceptions

6.2 Determination of ACCESSIBLE parts

List of accessible parts

Item	Description	Determination method (note 5)	Exception under 6.1.1 (note 4)

NOTE 1 Test fingers and pins are to be applied without force unless a force is specified (see 6.2.1)

NOTE 2 Special consideration should be given to inadequate insulation and high voltage parts (see 6.2 AM 2)

NOTE 3 Parts are considered to be ACCESSIBLE if they could be touched in the absence of any covering which is not considered to provide suitable insulation (see note to paragraph 1 of 6.4).

NOTE 4 Capacitor test may be required (see Form A.7).

NOTE 5 The determination methods are: visual; rigid test finger; jointed test finger; pin 3 mm diameter; pin 4 mm diameter.

Tested by:_____Date:_____

Test equipment No. (Table 2)_____

6.1.1 Exceptions

6.3.1 Values in NORMAL CONDITION

6.6.2 TERMINALS for external circuit

6.10.3 Plugs and connections

11.2 Cleaning

11.3 Spillage

11.4 Overflow

Item (see Form A.6)	Voltage			Current				Capacitance		10 s test (note)			Comments
	V r.m.s.	V peak	V d.c.	Test circuit A1/A2/A3	mA r.m.s.	mA peak	mA d.c.	µC	mJ	V	µC	mJ	
NOTE A 5 s test is specified in 6.10.3c).													

Tested by: _____Date: _____Test equipment No. (Table 2) _____

Form A.8

6.3.2 Values in SINGLE FAULT CONDITION

Item (See Form A.6)	Subclause and fault No. (see Form A.2)	Voltage			Transient (see note)		Current				Capacitance	Comments
		V r.m.s.	V peak	V d.c.	V	s	Test circuit A1/A2/A3	mA r.m.s.	mA peak	mA d.c.	µF (note)	
NOTE Transient voltages must be below the limits given from Figure 1 and the capacitance below the limits from Figure 2 of IEC 61010-1.												

Tested by: _____Date: _____Test equipment No. (Table 2)_____

Form A.9

6.5.1.1 Cross-sectional area bonding conductors

Conductor location	Cross-sectional area mm^2	Result Pass/Fail

Tested by:_____Date:_____

Test equipment No. (Table 2)_____

6.5.1.2 Bonding impedance of plug connected equipment

ACCESSIBLE part under test	Test current A	Voltage attained after 1 min V	Calculated resistance (Maximum allowed 0,1 Ω)	Result Pass/Fail

Tested by:_____Date:_____

Test equipment No. (Table 2)_____

6.5.1.3 Bonding impedance of PERMANENTLY CONNECTed EQUIPMENT

ACCESSIBLE part under test	Test current A	Voltage attained after 1 min (Maximum 10 V) V	Result Pass/Fail

Tested by:_____Date:_____

Test equipment No. (Table 2)_____

6.5.1.4 Indirect bonding for measuring and test equipment

ACCESSIBLE part under test	Voltage attained	Time for voltage to drop to allowable levels	Result Pass/Fail
a) Voltage limiting device			
	Voltage applied V	Time for device to trip	
b) Voltage-sensitive tripping device			

Tested by:_____Date:_____

Test equipment No. (Table 2)_____

Form A.10

6.5.3 PROTECTIVE IMPEDANCE

A HIGH INTEGRITY single component		
Component	**Location**	**Comments**

Tested by:_____Date:_____

Test equipment No. (Table 2)_____

A combination of components		
Component	**Location**	**Comments**

Tested by:_____Date:_____

Test equipment No. (Table 2)_____

A combination of BASIC INSULATION and a current or voltage limiting device		
Component	**Location**	**Comments**

Tested by:_____Date:_____

Test equipment No. (Table 2)_____

Form A.11

6.7 CLEARANCES and CREEPAGE DISTANCES

8 Mechanical resistance to shock and impact

10.1 Integrity of clearances and creepage distances

Location (see Form A.5)	Measured (initial – 6.7)		Result Pass/ Fail	Mechanical tests (note)					40 °C ambient test (10.1)	Measured after test (if required)		Result Pass/ Fail	Comments
	CREEPAGE DISTANCE mm	CLEARANCE mm		Applied force (6.7) N	Rigidity (8.1)	Impact hammer (8.2)	Drop 8.4.1 and 8.4.2 Normal	Drop 8.4.1 and 8.4.2 Hand-held		CREEPAGE DISTANCE mm	CLEARANCE mm		
NOTE Refer to Form A.12 for dielectric strength tests following the above tests.													

Tested by:_____Date:_____Test equipment No. (Table 2)_____

Form A.12

6.8 Dielectric strength tests

Location (see Form A.5 and/or fault Form A.2)	Working voltage V	Test voltage r.m.s./peak/d.c.	Result Pass/ Fail	Comments (note)

NOTE Describe conditions prior to testing:

A = Humidity preconditioning (6.8.2 and 6.8.3)

B = ENCLOSURE tests (clause 8)

C = Resistance to heat of non-metallic ENCLOSURES (10.2)

D = After single faults (4.4)

Tested by:_____Date:_____

Test equipment No. (Table 2)_____

Form A.13

6.10.2.2 Cord anchorage

Location	Mass kg	Pull N	Result Pass/Fail	Torque Nm	Result Pass/Fail	Comment

General comments:

Tested by:_____Date:_____

Test equipment No. (Table 2)_____

9.1 General

Annex G – Test details

Between parts or circuits		CREEPAGE DISTANCE mm	CLEARANCE mm	Working voltage V	Test voltage r.m.s./peak/d.c. V	Result Pass/Fail	Comments

Tested by: _____ Date: _____Test equipment No. (Table 2) _____

Form A.15

9.1 General

Annex F – Test details

F.2.1 Limited circuits

Circuit / Location	Open-circuit voltage r.m.s./d.c. V	Energy limitation					Comments
		Maximum current A	Maximum available power VA	Overload protection	Limited circuit Yes/No	Test to 4.4.3	

General comments:

Tested by:_____Date:_____

Test equipment No. (Table 2)_____

F.2.2 Unlimited circuit

Circuit / Location	Operator controlled switch	Overcurrent protection	Overtemperature protection	Comments

General comments:

Tested by:_____Date:_____

Test equipment No. (Table 2)_____

Form A.16

9.1 General

Annex F – Test details (continued)

F.4.2 Constructional details

F.4.3 Enclosures

Clause	Requirement	Result Pass/Fail	Comments
F.4.2.1	Connectors comply with IEC standards		
F.4.2.2	Printing wiring boards are flame RATED FV 0 or FV 1		
F.4.2.3	ENCLOSURE surrounds unlimited circuits		
F.4.2.4	Wires comply with IEC standards		
F.4.3.1	High-current devices: – door or – cover and – means to hold door or cover closed or – gap less than limits		
F.4.3.2	Bottom of ENCLOSURES: – no opening or – with Table F.1 and Figure F.1 or – components placement comply with Figure F.2		
F.4.3.3	Baffle or flame BARRIER: – ENCLOSURE made of metal or – ENCLOSURE made of non-metallic material (FV 0 or FV 1)		

Tested by:_____Date:_____

Test equipment No. (Table 2)_____

Form A.17

9.1 General

Annex F – Test details (continued)

F.4.3 ENCLOSURES (F.4.3.3 test to IEC 60707)

Material tested:_____ Generic name: _____ Material manufacturer:_____ _____	Overall result Pass/Fail

Type:_____

Colour:_____

Conditioning details:_____

_____

_____

		Sample 1	Sample 2	Sample 3
Thickness of specimen	mm			
Duration of flaming after first application	s			
Duration after flaming plus glowing after second application	s			
Specimen burns to holding clamp	Yes/No			
Cotton ignited	Yes/No			
Sample result	Pass/Fail			

Tested by:_____Date:_____

Test equipment No. (Table 2)_____

Form A.18

9.2 Temperature tests

9.3 Guards

9.4 Field wiring TERMINAL boxes

Operating conditions: Frequency: _____ Hz

Duration: _____ h _____ min

Voltage: _____ V Test room ambient: _____ °C

Part	t_m °C	t_c °C	t_a °C	Result Pass/Fail	Comments

NOTE 1 See also 14.1 with reference to component operating conditions.

NOTE 2 t_m = measured temperature

t_c = corrected maximum temperature (t_m + 40 – test room ambient)

t_a = maximum permitted temperature

Tested by:_____Date:_____

Test equipment No. (Table 2)_____

Form A.19

10.2 Resistance to heat of non-metallic enclosures

Test method used: Non operative treatment [ ]
Empty ENCLOSURE [ ]
Operative treatment [ ]

Temperature during tests:_____ °C

ENCLOSURE samples tested were:

Description	Material	Result Pass/Fail	Comments

Dielectric strength test (6.8.4): _____ V _____r.m.s./peak/d.c.

Comments:

Tested by:_____Date:_____

Test equipment No. (Table 2)_____

8 Mechanical resistance to shock and impact

11 Protection against hazards from fluids

Voltage tests can be carried out once after performing the tests of Clause 8 and Clause 11. However, if voltage tests are carried out separately after each set of tests, two forms can be used.

Location (see Form A.5)	Clause 8 tests				Clause 11 tests				Working voltage (note) V	Test voltage (note) V	Result Pass/ Fail	Comments
	Rigidity (8.1)	Impact Hammer (8.2)	Drop 8.4.1 and 8.4.2 Normal	Drop 8.4.1 and 8.4.2 Hand-held	Cleaning (11.2)	Spillage (11.3)	Overflow (11.4)	IEC 60529 (11.6)				
NOTE Use r.m.s., d.c. or peak to indicate the used test voltage.												

Tested by:_____Date:_____Test equipment No. (Table 2)_____

Form A.21

11.7.2 Leakage and rupture at high pressure

Part	Maximum permissible working pressure MPa	Factor (Figure 4 of IEC 61010-1)	Test pressure MPa	Leakage test Pass/Fail	Burst test Pass/Fail	Comments

Tested by:_____Date:_____

Test equipment No. (Table 2)_____

11.7.3 Leakage from low-pressure parts

Part	Test pressure MPa	Leakage test Pass/Fail	Comments

Tested by:_____Date:_____

Test equipment No. (Table 2)_____

Form A.22

12.2.1 Ionizing radiation

Locations tested	Measured values µSv/h	Result Pass/Fail	Comments

General comments:

Tested by:_____Date:_____

Test equipment No. (Table 2)_____

12.5.1 Sound level

Locations tested	Measured values dBA	Calculated maximum sound pressure level
At OPERATOR's normal position and at bystanders positions		
a)		
b)		
c)		
d)		
e)		
Comments:		

Tested by:_____Date:_____

Test equipment No. (Table 2)_____

12.5.2 Ultrasonic pressure

Locations tested	Measured values		Comments
	dB	kHz	
At OPERATOR's normal position			
At 1 m from the ENCLOSURE			
a)			
b)			
c)			
d)			
e)			
NOTE No limit is specified at present, but a limit of 110 dB above the reference pressure value of 20 μPa is under consideration for applicable frequencies between 20 kHz and 100 kHz.			
Result Pass/Fail			
Comments:			

Tested by:_____Date:_____

Test equipment No. (Table 2)_____

Form A.24

13.2.2 Batteries

Battery load and charging circuit diagram: Battery type:_____ Battery manufacturer/model/catalogue No.:_____ Battery ratings:_____ Reverse polarity instalment test – Result (Pass/Fail):_____		
Single component failures	Result Pass/Fail	
Component	Open circuit	Short-circuit
Comments:		

Tested by:_____Date:_____

Test equipment No. (Table 2)_____

Form A.25

4.4.2.4 SINGLE FAULT CONDITIONS, motors

14.2.1 Motor temperatures

Operating conditions:

Frequency:_____Hz:_____

Duration:_____h_____min

Voltage: _____V Test room ambient:_____°C

Motor No. and location	Insulation class (IEC 60085)	t_m °C	t_c °C	t_a °C	Result Pass/Fail	Comments

NOTE

T_m = Measured temperature

T_c = Corrected maximum temperature (t_m + 40 – test room ambient)

T_a = Maximum allowed temperature

Tested by:_____Date:_____

Test equipment No. (Table 2)_____

Form A.26

14.3 Overtemperature protection devices

Component	Type (note)	Result Pass/Fail	Comments

NOTE
SR = self-resetting (200 times)
NSR = non-self-resetting (10 times)
NR = non-resetting (1 time)

General comments:

Tested by:_____Date:_____

Test equipment No. (Table 2)_____

Form A.27

4.4.2.6 Mains transformer

14.7.1 Short-circuit tests (for mains transformers)

Type:_____ Manufacturer: _____					
Tested □in equipment or □on bench					
Optional – Insulation class (IEC 60085) of the lowest rated winding:					
Winding identification					
Type of protector for winding (note 1)					
Elapsed time					
Current A	Primary				
	Secondary				
Winding temperature °C	Primary				
(note 2)	Secondary				
Tissue paper/cheesecloth OK? (Pass / Fail)					
Voltage tests (note 3)					
Primary to secondary _____V_____					
Primary to core _____V_____					
Secondary to secondary _____V_____					
Secondary to core_____V_____					
Result (Pass / Fail)					

NOTE 1 Primary fuse PF / ( )A
Secondary fuse SF / ( )A
Overtemperature protection OP / ( )°C
Impedance protection Z.

NOTE 2 Indicate method of measurement
TC = with thermocouple
R = resistance method
If resistance method is used, record resistance in cold and warm condition under "Comments".

NOTE 3 Record the voltage applied and the type of voltage (r.m.s./d.c./peak) and for results use
NB = no breakdown or B = breakdown.

Comments:

Tested by:_____Date:_____

Test equipment No. (Table 2)_____

Form A.28

4.4.2.6 Mains transformer

14.7.2 Overload tests (for mains transformers)

Type:_____ Manufacturer: _____					
Tested □in equipment or □on bench					
Optional -- Insulation class (IEC 60085) of the lowest rated winding:					
Winding identification					
Type of protector for winding (note 1)					
Elapsed time					
Current A	Primary				
	Secondary				
Winding temperature °C	Primary				
(note 2)	Secondary				
Tissue paper/cheesecloth OK? (Pass / Fail)					
Voltage tests (note 3) Primary to secondary _____V_____					
Primary to core _____V_____					
Secondary to secondary _____V_____					
Secondary to core_____V_____					
Result (Pass / Fail)					

NOTE 1 Primary fuse PF / ( )A
Secondary fuse SF / ( )A
Overtemperature protection OP / ( )°C
Impedance protection Z.

NOTE 2 Indicate method of measurement
TC = with thermocouple
R = resistance method
If resistance method is used, record resistance in cold and warm condition under "Comments".

NOTE 3 Record the voltage applied and the type of voltage (r.m.s./d.c./peak) and for results use
NB = no breakdown or B = breakdown.

Comments:

Tested by:_____Date:_____

Test equipment No. (Table 2)_____

Form A.29

16.1 Current measuring circuits

The test is performed with all types and models of current transformers without internal protection, and which are specified by the manufacturer for use with the equipment.

a) Current transformers

Type/ Model	RATED current A	Test current A	Interrupt Yes/No	Result Pass/Fail	Comments

Tested by:_____Date:_____

Test equipment No. (Table 2) _____

b) Range changing switches

Type/Model	Maximum RATED current of switch	Cycling test Pass/Fail	Comments

Tested by:_____Date:_____

Test equipment No. (Table 2) _____

Standards Survey

The IEC would like to offer you the best quality standards possible. To make sure that we continue to meet your needs, your feedback is essential. Would you please take a minute to answer the questions overleaf and fax them to us at +41 22 919 03 00 or mail them to the address below. Thank you!

Customer Service Centre (CSC)

International Electrotechnical Commission
3, rue de Varembé
1211 Genève 20
Switzerland

or

Fax to: **IEC**/CSC at +41 22 919 03 00

Thank you for your contribution to the standards-making process.

Nicht frankieren
Ne pas affranchir

Non affrancare
No stamp required

A Prioritaire

RÉPONSE PAYÉE

SUISSE

Customer Service Centre (CSC)
International Electrotechnical Commission
3, rue de Varembé
1211 GENEVA 20
Switzerland

Q1 Please report on **ONE STANDARD** and **ONE STANDARD ONLY**. Enter the exact number of the standard: *(e.g. 60601-1-1)*

.....

Q2 Please tell us in what capacity(ies) you bought the standard *(tick all that apply).* I am the/a:

purchasing agent ❑
librarian ❑
researcher ❑
design engineer ❑
safety engineer ❑
testing engineer ❑
marketing specialist ❑
other.....

Q3 I work for/in/as a: *(tick all that apply)*

manufacturing ❑
consultant ❑
government ❑
test/certification facility ❑
public utility ❑
education ❑
military ❑
other.....

Q4 This standard will be used for: *(tick all that apply)*

general reference ❑
product research ❑
product design/development ❑
specifications ❑
tenders ❑
quality assessment ❑
certification ❑
technical documentation ❑
thesis ❑
manufacturing ❑
other.....

Q5 This standard meets my needs: *(tick one)*

not at all ❑
nearly ❑
fairly well ❑
exactly ❑

Q6 If you ticked NOT AT ALL in Question 5 the reason is: *(tick all that apply)*

standard is out of date ❑
standard is incomplete ❑
standard is too academic ❑
standard is too superficial ❑
title is misleading ❑
I made the wrong choice ❑
other .....

Q7 Please assess the standard in the following categories, using the numbers:
(1) unacceptable,
(2) below average,
(3) average,
(4) above average,
(5) exceptional,
(6) not applicable

timeliness.....
quality of writing.....
technical contents.....
logic of arrangement of contents .....
tables, charts, graphs, figures.....
other .....

Q8 I read/use the: *(tick one)*

French text only ❑
English text only ❑
both English and French texts ❑

Q9 Please share any comment on any aspect of the IEC that you would like us to know:

.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....

ISBN 2-8318-5933-6

ICS 19.080; 11.080.10

Typeset and printed by the IEC Central Office
GENEVA, SWITZERLAND