TECHNICAL REPORT

IEC TR 61010-3-045

First edition
2003-04

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

Part 3-045: Conformity verification report for IEC 61010-2-045:2000 – Particular requirements for washer disinfectors used in medical, pharmaceutical, veterinary and laboratory fields

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

Partie 3-045: Rapport de vérification de la conformité de la CEI 61010-2-045:2000 – Prescriptions particulières pour appareils de désinfection/ lavage utilisés dans les domaines médical, pharmaceutique, vétérinaire et en laboratoire

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 3-045: Conformity verification report for IEC 61010-2-045:2000 – Particular requirements for washer disinfectors used in medical, pharmaceutical, veterinary and laboratory fields

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.
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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Technical reports do not necessarily have to be reviewed until the data they provide are considered to be no longer valid or useful.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 61010-3-045, 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
66/274/CDV	66/301/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 2.

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 users to assist them with determining and recording verification of conformity of the equipment under test with the requirements of:

IEC 61010-2-045: 2000

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 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.

The committee has decided that the contents of this publication will remain unchanged until 2005. At this date, the publication will be

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- withdrawn;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

Conformity Verification Report **IEC 61010-2-045** **Safety requirements for electrical equipment for measurement, control, and laboratory use Particular requirements for washer disinfectors used in medical, pharmaceutical, veterinary and laboratory fields**
Report reference No.....:
Compiled by (+ signature).....:
Approved by (+ signature).....:
Date of issue.....:
Testing organization.....:
Address.....:
Testing location .....:
Applicant.....:
Address.....:
Standard.....: IEC 61010-2-045: 2000 and IEC 61010-1:1990 + A 1:1992 + A 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.....: Measurement Control 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 Built in	Hand-held Bench mounted	Floorstanding Other (specify):	Fixed
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	Requirement - Test	Result Comments	Verdict
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		
	– PRESSURE VESSEL markings		
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		
	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		

Clause	Requirement - Test	Result Comments	Verdict
	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		
	RATED maximum working voltage or current marked		
	Unless clear indication that below limits:		
	– maximum RATED voltage to earth is marked		
	or		
	– for specific connection only, and means for identifying provided		
	– is adjacent to TERMINALS		
	or		
	– if insufficient space:		
	– on the RATING plate or scale plate		
	or		
	– if the TERMINAL is marked with		
	symbol 14		
	INSTALLATION CATEGORY marked		
	TERMINALS permanently connected and not ACCESSIBLE		
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		
	In normal use, change of setting a control could not cause a hazard, an indicating device is provided		

Clause	Requirement - Test	Result Comments	Verdict
5.1.7	Equipment protected by DOUBLE INSULATION or REINFORCED INSULATION		
	Protected throughout (symbol 11 used)		
	Only partially protected (symbol 11 not used)		
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		
5.1.101	Overpressure safety device		
	Identification includes:		
	Model number etc.		
	Manufacturer's pressure setting :.....		
	If bursting disc:		
	pressure:.....		
	temperature :.....		
5.1.102	Pressure vessel markings		
	Markings comply with the pressure vessel regulations and codes in the country of intended use		
	or		
	The markings include:		
	a) Name of manufacturer		
	b) Serial number		
	c) Maximum working pressure		
	d) Maximum working temperature		
	e) Date of manufacture		
	f) Minimum working pressure (if below atmospheric)		
	g) Construction standard applied		
	h) Chamber volume in litres		
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		
	TERMINAL voltage exceeding 1 kV		
	(symbol 12)		
	– easily touched high temperature parts (symbol 13)		
	If lockable door, to lock and retain key		
	Symbol 14 permanently visibly marked if:		
	a) Materials have hazardous properties		
	b) Effluent discharged into drain could cause a hazard		

Clause	Requirement - Test	Result Comments	Verdict
	c) Biological or other hazardous materials remain in CHAMBER after OPERATING CYCLE failure d) Replenishment of toxic materials could cause a hazard		
5.3 F	Durability of markings The required markings remain clear and legible in NORMAL USE	(see Form A.4)	
5.4 5.4.1	Documentation 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 Pressure vessel conformity declaration Instructions on warning signs for country of use Emergency guidelines		
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 5.4.3.1	Equipment installation Installation and assembly instructions Documentation includes instructions for: a) Floor loading requirements b) Weights of heavy sub-assemblies c) Maintenance space Ease of disconnection d) Assembly e) Protective earthing f) Mains supply: – Requirements – Connections Temperature rating of cable		

Clause	Requirement - Test	Result Comments	Verdict
	g) Sound power data h) Hazardous substances: Handling Containment Additional equipment for control of emissions i) Requirements for system to control escaping biological emissions		
5.4.3.2	Special non-electrical supplies and systems Installation instructions include: a) Non-recirculating exhaust system b) Drainage system c) Any other non-electrical supplies		
5.4.3.3	Permanently connected equipment Instructions for: a) External switch or circuit-breaker b) External overcurrent protection device c) Switch or circuit-breaker located near equipment		
5.4.4	Equipment operation Instructions for use include: a) Operating controls: 1) identification 2) use b) Accessories and other equipment: Interconnection Suitability Detachable parts Special materials c) Limits for intermittent operation d) Explanation of symbols used e) Cleaning f) Decontamination after incomplete operation cycle g) Lockable door closure stop: Correct use Retain key or other means h) Safe use of the override key i) Action in case of malfunction j) Maximum quantities of chemical substances k) Loading procedure l) Testing function of critical safety devices		
5.4.4.2	Consumable materials Instructions for inspections, replacement and storage, including hazard protection		
5.4.4.3	Operator training Instructions for responsible body:		

Clause	Requirement - Test	Result Comments	Verdict
	a) Personnel training b) Comprehensive instructions for personnel working with toxic materials: Process Health hazard Leak detection methods c) In-service programmes: – Conducted – Attendance records – Evidence of understanding		
5.4.5	Equipment maintenance, repair and disposal Instructions include: a) Maintenance on threaded parts b) Safety devices fitted c) Decontamination prior to maintenance d) Maintenance schedules and repair procedures e) Safe disposal		
6 F 6.1	**Protection against electric shock** General Asbestos not used Conformity is checked by the determination of 6.2 and 6.3 followed by the tests of 6.4 to 6.12	**(see Form A.5)**	
6.1.1 F	Exceptions 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)	
6.3.2 F	Values in SINGLE FAULT CONDITION	(see Form A.8)	
6.4	Protection in NORMAL CONDITION (see 6.8 and 8.1)		
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)		

Clause	Requirement - Test	Result Comments	Verdict
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 Components wires and connections are RATED as required	(see Form A.10)	
6.5.4	Built-in panel meters If after building-in the requirements of 6.5.1 to 6.5.3 are not met: 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 6.6.1	External circuits 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: 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		

Clause	Requirement - Test	Result Comments	Verdict
F	TERMINALS which receive a charge from an internal capacitor	(see Form A.7)	
	High-voltage TERMINALS energised 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)		
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		

Clause	Requirement - Test	Result Comments	Verdict
	green/yellow		
	Exceptions:		
	– earthing braids		
	– internal protective conductors		
	f) Equipment using PROTECTIVE BONDING		
6.9.4	Over-range indication		
	Unambiguous		
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		
	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		
	Not used to attach any other components		
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		

Clause	Requirement - Test	Result Comments	Verdict
	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)	
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 – mains type plugs used only for connection to mains supply		
F	c) Plug pins which receive a charge from an internal capacitor 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	(see Form A.7)	
6.11 6.11.1	TERMINALS ACCESSIBLE TERMINALS 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 rewireable 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: – independently secured – 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 – protective bonding: i) not interrupted or ii) indirect bonding		

Clause	Requirement - Test	Result Comments	Verdict
6.11.3	FUNCTIONAL EARTH TERMINALS Independent connection		
6.11.101	Connection of non-detachable mains cords to TERMINALS No special preparation of conductor ends No damage No slip-out of conductors possible		
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		
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):		

Clause	Requirement - Test	Result Comments	Verdict
	– 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 F	Disconnection by interruption of the mains supply Interruption of the supply does not cause: Any safety system to be disabled A hazard	(see Form A.1)	
7	**Protection against mechanical hazards**		
7.1	General Not a hazard in NORMAL USE Protection against expelled parts under SINGLE FAULT CONDITION Asbestos not used for mechanical parts Conformity is checked by 7.2 to 7.102		
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 F	Doors Door provided with: a guard; or interlock system; or device which halts; or reverse motion device	(see Form A.30)	
7.2.102 F	Manually operated door Required force does not exceed 250 N	(see Form A.31)	
7.3	Stability Physically stable in NORMAL USE 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		
7.4.101	Means for transferring the load into and out of the chamber Means to protect OPERATOR against mechanical hazard		

Clause	Requirement - Test	Result Comments	Verdict
	Means to prevent shelf tilting or disengaging		
F	Force required for loading / unloading does not exceed 250 N	(see Form A.31)	
7.5	Expelled parts		
	Equipment contains or limits the energy		
	Protection not removable without the aid of a TOOL		
7.101	Protection when the CHAMBER is accessed		
	While OPERATOR in CHAMBER means provided to prevent:		
	a) Inadvertent operation:		
	b) Door closing		
	Means locked by key or Tool		
	Manufacturer's instructions specify retention of key or tool		
7.102	Emergency stop device		
	Prominently placed emergency stop device		
	When device operated, all components return to safe condition		
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)	
	Asbestos not used for thermal insulation		
9.2	Temperature tests		
9.3	Guards		
F	Surfaces liable to exceed 100 °C:	(see Form A.18)	

Clause	Requirement - Test	Result Comments	Verdict
	– protected by guards or – marked or – intended to be hot (see 9.1) Guards not removable without TOOL		
9.4 F	Field-wiring TERMINAL boxes Temperature RATING of the cable is: – marked and – marked adjacent to field-wiring TERMINALS Cable temperature RATING specified by manufacturer	(see Form A.18)	
9.5 F	Overtemperature protection devices Fitted, to operate in SINGLE FAULT CONDITION 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 Entirely separated from temperature control systems Not self-resetting Not resettable by soldering	(see Form A.1)	
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 F	Integrity of CLEARANCE and CREEPAGE DISTANCES	(see Form A.11)	
10.2 F	Resistance to heat of non-metallic ENCLOSURE	(see Form A.19)	
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)	

Clause	Requirement - Test	Result Comments	Verdict
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 Test to IEC 60335 (refrigeration only) PRESSURE VESSEL meet requirements of 14.101	(see Form A.21)	
11.7.3 F	Leakage from low-pressure parts	(see Form A.21)	
11.7.4	Overpressure safety device a) – Fitted – Operates ≤ maximum working pressure b) Pressure not exceeded by more than 10 % c) No accumulation of fluid in a seating of a safety value d) Device is only used to discharge excess pressure in single fault condition e) Device construction materials not be degraded to cause a hazard Fitted in accordance to with manufacturer's instructions 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		
11.7.101	Indicator and interlock for residual fluid Means provided to indicate hazard due to residual fluid		
11.7.102	Discharge to atmosphere Discharge does not causes a hazard and a) Discharge pipe: – has a continuous fall to ist outlet or – specified in manufacturer`s instructions		

Clause	Requirement - Test	Result Comments	Verdict
	b) If discharge inside cabinet: – cabinet vented – discharge and vent not cause a hazard		
11.7.103	Hot and cold water services Conformity with IEC 61770		
	Manufacturer's instructions on back-syphonage prevention		
11.101	Instruments and indicating devices Indication provided if necessary for safety: a) Water pump pressure b) PRESSURE VESSEL pressure c) Vapour condenser temperature d) Non-resettable OPERATING CYCLE counter e) Stages of the OPERATING CYCLE f) Failure of supplies		
11.102	Interruption of non-electrical supplies and services Any electrical or non-electrical safety system not disabled		
F	No hazard	(see Form A.1)	
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)	
	Maximum sound pressure level does not exceed the mean level by more than 15 dB		
12.5.2 F	Ultrasonic pressure	(see Form A.23)	
12.6	Laser sources (IEC 60825)		
13	**Protection against liberated gases, explosion and implosion and pathogenic substances**		
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		

Clause	Requirement - Test	Result Comments	Verdict
	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		
F	– single component cannot cause hazard (short-circuit and open circuit)	(see Form A.24, including circuit diagram)	
	– warning marking or symbol 14		
	Battery compartment design		
	Polarity reversal test		
13.3	Implosion of high-vacuum devices		
	High vacuum devices:		
	– intrinsically protected and correctly mounted		
	or		
	– ENCLOSURE provides protection:		
	– screen not removable without TOOL		
	– if glass screen, not in contact		
13.101	LOAD access after a fault		
	Access to LOAD prevented while the CHAMBER conditions present a hazard		
	Additional instructions provided to facilitate entry under hazardous conditions		
13.102	Chemical dosing system		
	Means provided to replenish containers without creating a hazard		
13.103	Pathogenic substances		
	Emissions do not cause a hazard		
	Additional instructions provided if additional means required to control emissions		
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)		
	Any device failure indicated by a visible alarm		
	Starting of operating cycle prevented while a hazardous component failure exists		
	Access to load prevented until hazard is removed		
14.2	Motors		
14.2.1 F	Motor temperatures	(see Form A.25)	
14.2.2	Series excitation motors		
14.3	Overtemperature protection devices		

Clause	Requirement - Test	Result Comments	Verdict
F	Devices operating in a SINGLE FAULT CONDITION 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	(see Form A.26)	
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 Conforms with IEC publications Not a single electronic device	(see Table 3)	
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, except for small pressure systems outside the scope		
14.101	PRESSURE VESSELS Demonstrated compliance with applicable national pressure vessel regulations and codes or Manufacturer's documentation states regulations and codes which pressure vessel complies with		
14.102	Visibility and readability of instruments and indicating devices Safety related indicating devices: Readily seen Readable at 1 m with 215 lx ± 15 lx, except operating cycle counters		
14.103	Control system Operator cannot set to hazardous condition Automatic controller provided with system to control access to system functions		

Clause	Requirement - Test	Result Comments	Verdict
	The following functions are protected by increasingly severe constrains: a) Initiating of operating cycle b) Selection of particular operating cycle c) Manual advance through operating cycle d) Changing programme e) Maintenance Termination of operating cycle does not require tool, key or code Disabling of safety devices prevented Selection of manual mode disables automatic controller		
14.104	Microprocessors Failure does not cause a hazard Loss of processor memory battery power does not lead to a hazard		
14.105	Access ports Means are provided to prevent hazardous opening of ports which can be opened/closed without TOOL		
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		
15.101	Doors a) Means are provided to prevent hazardous process material being admitted to CHAMBER before closing/locking/sealing the DOOR b) Means are provided to prevent new OPERATING CYCLE starting: 1) After failure of the DOOR 2) After failure of the LOAD transport system 3) From conditions within the CHAMBER		
15.102	Double-ended equipment Opening or closing a DOOR at the end of the CHAMBER remote from OPERATOR prevented or Automatic conveyor-loading equipment		
15.103	Access to the CHAMBER Hazardous access to CHAMBER prevented by interlocks		
15.104	Failure of an exhaust system Means provided to prevent starting of OPERATION CYCLE during exaust system failure		
16	**Measuring circuits**		
16.1 F	Current measuring circuits	(see Form A.29)	
Annex K	Routine tests Manufacturer's declaration		

Summary of SINGLE FAULT CONDITIONS applied (4.4.2)

(see Form A.2 for details of tests)

FORM A.1

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				
7.2.101	Doors			
11.7.3	Leakage from low pressure parts			
11.7.4d)	Overpressure safety device			
11.102	Failure or partial failure of the mains supply			
13.103	Pathogenic substances			
Supplementary information: (see Form A.2 for details of tests)				

Form A.2

4.4 Testing in single fault condition – Results

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

1) Td = 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	

NOTES

1 Type of insulation:

BI = BASIC INSULATION RI = REINFORCED INSULATION

DI = DOUBLE INSULATION SI = SUPPLEMENTARY INSULATION

PI = PROTECTIVE IMPEDANCE

2 Types of voltage

Peak impulse test voltage (pulse) d.c.

r.m.s. peak

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)

NOTES

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

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

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).

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

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

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 µF (note)	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.		
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, vibration and impact (AM 1 only)
8 Mechanical resistance to shock and impact (AM 2 only)
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	CLEARANCE		Applied force	Rigidity	Impact hammer	Drop 8.1.4 and 8.4.2			CREEPAGE DISTANCE	CLEARANCE		
	mm	mm		(6.7) N	(8.1)	(8.2)	Normal	Hand-held		mm	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)_____

Form A.14

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

Location/Circuit	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:_____			Overall result
Generic name: _____ _____			Pass/Fail
Material manufacturer:_____ _____			
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	tm °C	tc °C	ta °C	Result Pass/Fail	Comments

NOTES

1 See also 14.1 with reference to component operating conditions.

2 tm = measured temperature

tc = corrected maximum temperature (tm + 40 - test room ambient)

ta = 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)_____

Form A 20

8 Mechanical resistance to shock, vibration and impact (AM 1 only)
8 Mechanical resistance to shock and impact (AM 2 only)
11 Resistance to moisture and liquids (AM 1 only)
11 Protection against hazards from fluids (AM 2 only)

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.

	Clause 8 tests				Clause 11 tests								
Location (see form A.5)	Rigidity (8.1)	Impact hammer (8.2)	Drop 8.4.1 and 8.4.2		Cleaning (11.2)	Spillage (11.3)	Overflow (11.4)	Equipment plus liquid (11.5.1/note)	IEC 60529 (11.6)	Working voltage (note 2) V	Test voltage (note 2) V	Result Pass/ Fail	Comments
			Normal	Hand-held									

NOTES

1 Not for amendment 2

2 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 (AM 2)

Part	Maximum permissible working pressure MPa	Factor (Fig. 4 of IEC 61010-1 AM 2)	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 (AM 2)

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)_____

Form A.23

12.5.1 Sound pressure level (AM 1 only)

12.5.1 Sound level (AM 2 only)

Locations tested	Measured values dBA	Calculated maximum sound pressure level (AM 2)
1 m from the enclosure (AM 1 only)		
At OPERATOR'S normal position and at bystanders positions (AM 2)		
a)		
b)		
c)		
d)		
e)		
Result Pass/Fail (AM 1 only)		
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)	tm °C	tc °C	ta °C	Result Pass/Fail	Comments

NOTE

tm = Measured temperature

tc = Corrected maximum temperature (tm + 40 - test room ambient)

ta = 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)					

NOTES

1 Primary fuse PF / ( )A

Secondary fuse SF / ( )A

Overtemperature protection OP / ( )° C

Impedance protection Z.

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".

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)					

NOTES

1 Primary fuse PF / ( )A

Secondary fuse SF / ( )A

Overtemperature protection OP / ( )° C

Impedance protection Z.

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".

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 (AM 2 only)

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) _____

7.2.101	TABLE: Door motion reversal and stoppage			Form A.30
Description where test applied	**Force N**	**Interlocked Yes / No**	**Reverse motion Yes / No**	**Verdict**
Supplementary information:				

7.2.101	TABLE: Doors		
Description where test applied	**Sped cm / s**	**Distance moved cm**	**Verdict**
Supplementary information:			

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

7.2.102	**TABLE: Manually operated door**		**Form A.31**
7.4.101	**TABLE: Means for transferring the load into and out of the equipment**		
Description where test applied	**Force N**	**< 250 N Pass / Fail**	**Verdict**
Supplementary Information:			

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:

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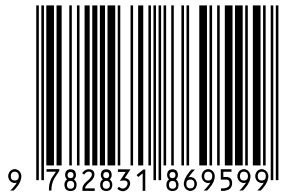

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