

IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST
CERTIFICATES FOR ELECTRICAL EQUIPMENT
(IECEE) CB SCHEME

SYSTEME CEI D'ACCEPTATION MUTUELLE DE
CERTIFICATS D'ESSAIS DES EQUIPEMENTS
ELECTRIQUES (IECEE) METHODE OC

CB TEST CERTIFICATE
CERTIFICAT D'ESSAI OC

Product
Produit

PORTABLE THREADING MACHINE

Name and address of the applicant
Nom et adresse du demandeur

Lee Yeong Industrial Co., Ltd.
No. 2, Kejia Rd.,
Douliu City, Yunlin County 64057, Taiwan

Name and address of the manufacturer
Nom et adresse du fabricant

Lee Yeong Industrial Co., Ltd.
No. 2, Kejia Rd.,
Douliu City, Yunlin County 64057, Taiwan

Name and address of the factory
Nom et adresse de l'usine

Lee Yeong Industrial Co., Ltd.
No. 2, Kejia Rd.,
Douliu City, Yunlin County 64057, Taiwan

Note: When more than one factory, please report on page 2
Note: Lorsque il y plus d'une usine, veuillez utiliser la 2^{ème} page

Ratings and principal characteristics
Valeurs nominales et caractéristiques principales

AC 110-120V or AC 220-240V; 50-60Hz; 1100W; Class II

Trade mark (if any)
Marque de fabrique (si elle existe)

AGP

Model/type Ref.
Ref. de type

PT600

Additional information (if necessary may also be
reported on page 2)
Les Information complémentaire (si nécessaire,
peuvent être indiqués sur la 2^{ème} page)

A sample of the product was tested and found
to be in conformity with
Un échantillon de ce produit a été essayé et a été
considéré conforme à la

PUBLICATION **EDITION**
IEC 60745-1:2006
IEC 60745-2-9:2003 + A1

As shown in the Test Report Ref. No. which forms part
of this Certificate
Comme indiqué dans le Rapport d'essais numéro de
référence qui constitue une partie de ce Certificat

11034887 001

This CB Test Certificate is issued by the National Certification Body
Ce Certificat d'essai OC est établi par l'Organisme National de Certification



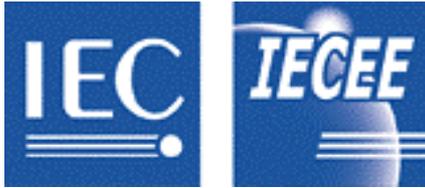
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Date: 31.10.2013

Signature:

Dipl.-Ing. W. Feucker



Test Report issued under the responsibility of:



TEST REPORT IEC 60745-2-9 Safety of Hand-Held Motor-Operated Electric Tools Part 2: Particular requirements for tappers	
Report Reference No.	11034887.001
Date of issue	16.08.2013
Total number of pages	69
CB Testing Laboratory	TUV Rheinland Taiwan Ltd., Taichung Laboratory
Address	No.3, Lane 36, Sec. 3, Mingsheng Rd., Daya District, Taichung City 428, Taiwan, R.O.C.
Applicant's name	Lee Yeong Industrial Co., Ltd.
Address	No. 2, Kejia Rd., Douliu City, Yunlin County 64057, Taiwan.
Test specification:	
Standard	IEC60745-2-9: 2003 (Second Edition) + A1:2008 used in conjunction with IEC 60745-1: 2006 (Fourth Edition)
Test procedure	CB Scheme
Non-standard test method	N/A
Test Report Form No.	IEC60745_2_9B
Test Report Form(s) Originator	CQC-GQI
Master TRF	2012-05
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This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.	
Test item description	Portable Threading Machine
Trade Mark	
Manufacturer	Lee Yeong Industrial Co., Ltd.
Model/Type reference	PT600
Ratings	1)110-120V~, 50-60Hz, 1100W 2) 220-240V~, 50-60Hz, 1100W

Testing procedure and testing location:	
<input checked="" type="checkbox"/> CB Testing Laboratory:	TUV Rheinland Taiwan Ltd., Taichung Laboratory
Testing location/ address	No.3, Lane 36, Sec. 3, Mingsheng Rd., Daya District, Taichung City 428, Taiwan, R.O.C.
<input type="checkbox"/> Associated CB Laboratory:	
Testing location/ address	
Tested by (name + signature)	Stanley Chuang 
Approved by (+ signature)	Andy Wen 
<input type="checkbox"/> Testing procedure: TMP	
Tested by (name + signature)	
Approved by (+ signature)	
Testing location/ address	
<input type="checkbox"/> Testing procedure: WMT	
Tested by (name + signature)	
Witnessed by (+ signature)	
Approved by (+ signature)	
Testing location/ address	
<input type="checkbox"/> Testing procedure: SMT	
Tested by (name + signature)	
Approved by (+ signature)	
Supervised by (+ signature)	
Testing location/ address	
List of Attachments (including a total number of pages in each attachment):	
- 3 pages of photo documentation	
Summary of testing:	
Tests performed (name of test and test clause):	Testing location:

- 1.The threading machine have been fulfilled the requirement of IEC 60745-1: 2006 (Forth Edition) consolidated with IEC60745-2-9: 2003(Second Edition) +A1:2008
- 2.Some items of national differences are reserved for further confirmation when applying national approval.

TÜV Rheinland Taiwan
Ltd. Taichung Laboratory
No.9, Lane 36, Sec. 3,
Minsheng Rd., Daya
District, Taichung City
428, Taiwan

Summary of compliance with National Differences

List of countries addressed:

N/A

The product fulfils the requirements of _____ (insert standard number and edition and delete the text in parenthesis or delete the whole sentence if not applicable)

Copy of marking plate:

(The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks).



Test item particulars	
Class of tool	Class II
Method of supply cord attachment	Type X
Duty conditions	Normal
Type of operation	Normal
Degree of protection	IP20
Accessories and detachable parts included	N/A
Other options included	N/A
Possible test case verdicts:	
- test case does not apply to the test object.....	N/A
- test object does meet the requirement	P (Pass)
- test object does not meet the requirement	F (Fail)
Testing	
Date of receipt of test item	
Date (s) of performance of tests	
General remarks:	
<p>The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory. "(see Enclosure #)" refers to additional information appended to the report. "(see appended table)" refers to a table appended to the report.</p> <p>Throughout this report a <input type="checkbox"/> comma / <input type="checkbox"/> point is used as the decimal separator.</p>	
Notes:	
This report consists of 69 pages of IEC 60745-2-9 report and 3 pages of photo documentation.	
Manufacturer's Declaration per sub-clause 6.2.5 of IEC 60745-2-9:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided	<input type="checkbox"/> Yes <input type="checkbox"/> Not applicable
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies).....	
Lee Yeong Industrial Co., Ltd. No. 2, Kejia Rd., Douliu City, Yunlin County 64057, Taiwan.	

General product information:

The products are hand-held tools designed as threading machine. The rated voltage is 110-120V~ and 220-240V~/50-60Hz with rated input of 1100W.

The specifications are as follows:

Net weight (kg)	No load speed (/min)	Full load speed (/min)	Max. Die head(mm)
7.4	19	12	60.33

Details refer to user manual.

IEC 60745-2-9			
Clause	Requirement + Test	Result - Remark	Verdict
5	GENERAL CONDITIONS FOR THE TESTS		-
5.2	A single tool subjected to all tests, except as specified, and it withstood all relevant tests	As required	P
	A separate sample subjected to tests requiring tool modifications or disassembly after test performed	As required	P
	Additional samples of tools designed for different supply voltages subjected to tests	110-120V~ and 220-240V~	P
	Testing of components necessitated subjecting additional samples of these components to tests	As required	P
	Cumulative stress resulting from successive tests on electronic circuits avoided	As required	P
	Components replaced or additional samples used as necessary	As required	P
5.3	Tests conducted in order of clauses	As required	P
	Tests specified not deemed applicable based on construction of the tool	As required	P
5.4	The tool and its movable parts tested in most unfavourable position in normal use	As required	P
5.5	User adjustable controls and switching devices tested in their most unfavourable settings	As required	P
	Electronic speed control devices set at their highest speed		P
5.6	Tests conducted in a draught-free location, and unless otherwise specified, in (20 ± 5) °C	As required	P
	Tests conducted at (23 ± 2) °C due to temperature limited temperature sensitive device	Not applicable	N/A
5.7.2	Tool rated for more than one rated voltage tested at the most unfavourable voltage (V)	110-120V~ and 220-240V~	P
5.8	Tool tested with attachments resulting in most unfavourable conditions	Not applicable	N/A
5.9	Tool tested with appropriate flexible cord, except as specified.....		P
5.10	Accessible metal parts of class I tools not connected to an earthing terminal checked for compliance with the appropriate requirements for class II construction	Class II tool	N/A
	Accessible non-metallic parts of class I tools checked for compliance with appropriate requirements specified for class II construction		P
5.11	Parts of tools class I or class II tools operating at safety extra-low voltage checked for compliance with requirements specified for class III tools		P
5.13	Heating element tested with the motor running	Not applicable	N/A

IEC 60745-2-9			
Clause	Requirement + Test	Result - Remark	Verdict
	Heating elements incorporated in the tool connected to a separate supply, unless otherwise specified	Not applicable	N/A
5.14	Attachments performing a function within the scope of a relevant parts 2, tested according to that part 2	Not applicable	N/A
	Other attachments tested in accordance with manufacturer's instructions	Not applicable	N/A
	In the absence of manufacturer's instructions, tool operated continuously using a load resulting in rated input or rated current (VA, A)	Not relevant	N/A
5.15	Tool loaded avoiding additional stresses such as side thrust when torque was to be applied	Not relevant	N/A
5.16	Tools operating at safety extra-low voltage and sold with their supply transformer tested using the supply transformer	Not applicable	N/A

7	CLASSIFICATION		-
7.1	Tool is Class I, II, or III with respect to protection against electric shock	Class II	P
7.2	Degree of protection against harmful ingress of water per IEC 60529.....	IP20	P
	Required degree of protection other than IPX0 specified by manufacturer or in relevant part 2	See above	N/A

8	MARKINGS AND INSTRUCTIONS		-
8.1	Tool marked with rated voltage(s) or rated voltage range(s) (V).....	110-120V~ and 220-240V~	P
	Tool for star-delta connection clearly marked with the two rated voltages (e.g. 230 Δ / 400 Y V).....		N/A
	Nature of supply/frequency with symbol for nature of supply placed next to rated voltage (Hz).....	50-60 Hz	P
	Rated input or current marked (W or A)	1100W	P
	Rated input or rated current corresponds to highest loading possible for a tool with alternative components selectable by a control device	Not applicable	N/A
	Manufacturer's name, or trade mark, or identification mark and address of manufacturer or an agent responsible for marketing the tool	Lee Yeong Industrial	P
	Model or type reference	PT600 (The type reference is indicated at a separate label)	P
	Class II symbol for class II tools	Symbol in acc. with this clause	P
	IP number other than IPX0.....	IP 20	P

IEC 60745-2-9			
Clause	Requirement + Test	Result - Remark	Verdict
	Tool provided with "WARNING – To reduce the risk of injury, user must read instruction manual" or the sign M002 of ISO 7010 ⁸)		P
	Maximum diameter of thread which can be cut (mm): (IEC 60745-2-9:2003)		P
	Additional markings not leading to misunderstanding permitted.....:		P
8.2	Rated operating time, or rated operating time and rated resting time, respectively, marked on a short-time or intermittent operation tool, except when operating time limited by construction of tool.....:		-
	Rated operating time precedes rated resting time, and they are separated by an oblique stroke.....:	Continuous operation	N/A
8.3	Correct use of symbol for voltage ranges and different voltage levels.....:	Voltage range of 110-120V~ and 220-240V~ is used.	P
8.4	Change in voltage clearly discernible	The tool can't be adjusted to suit different rated voltages.	N/A
	Correct Wiring diagram fixed to tool	See above	N/A
8.5	Rated power input	Single rated power is marked	N/A
8.6	Use of correct symbols		P
	Correct dimensions and use for Class II symbol		P
	Other units and their symbols same as international standardised system		P
	No misunderstanding with use of additional symbols		P
8.7	A connection diagram affixed to a tool with more than two supply conductors, except when correct mode of operation is obvious as specified	Single supply	N/A
	The earthing conductor not a supply conductor	Class II tool	N/A
	Wiring diagram indicates how the windings are to be connected for tools for star-delta connection		N/A
8.8	Terminals, except for type Z attachments, marked on non-removable part with specified symbols	No such terminal.	N/A
	Terminal exclusively for neutral connection marked with "N"	No neutral conductor is provided	N/A
	Earthing terminal marked with specified symbol	Class II tool	N/A
8.9	Switches, which may result in a hazard, marked accordingly using universally comprehensible symbol, or located to indicate which part of tool they control	Switch marked accordingly using universally comprehensible symbol.	P

IEC 60745-2-9			
Clause	Requirement + Test	Result - Remark	Verdict
8.10	“Off” position indicated by figure O of IEC 60417-5008 (DB:2002-10) when a hazard could result by unexpected start up	Off position is obvious.	P
	Figure O not used for any other indication	Fulfil.	P
	Position of moving contacts of mains switch correspond to indications for different positions of its operating means	Fulfil.	P
8.11	Regulating devices and the like provided with markings as specified.....:	Not applicable	N/A
	Figures used for different positions with O for “off” position, and figures reflecting greater output for other positions	See above	N/A
8.12	Instruction manual and safety instructions provided together with an explanation of the symbols.....:	The instruction manual is provided with the tool. The safety instructions are included in user manual.	P
	Instructions legible and contrasting in the official language(s) of the country where tool is sold, and include name and address of manufacturer, or supplier, or agent marketing the tool	The instruction is legible and contrast with the background	P
8.12.1	Safety instructions in English are verbatim and in any other official language are equivalent	Safety rules in English are verbatim	P
	Format of all Safety Warnings differentiate the context of all clauses by font or similar means and as illustrated in 8.12.1.1	See user manual	P
8.12.1.1	General Power Tool Safety Warnings	See user manual	P
8.12.1.2	Order of the Safety Instructions are in accordance with this clause	See user manual	P
8.12.2	Warnings required by this clause included in Instruction Manual when Safety Instructions are separate from instruction Manual	See user manual	P
	Warnings in English are verbatim and in any other official language are equivalent.....:	See user manual	P
	Instruction Manual provided with the required information in a) to d) of this clause as appropriate	See user manual	P

IEC 60745-2-9			
Clause	Requirement + Test	Result - Remark	Verdict
8.13	Markings easily legible and withstood durability test	Test conditions: Rubbing of marking by 15 s with a piece of cloth soaked with water. Rubbing of marking by 15 s with a piece of cloth soaked petroleum spirit Test results: Marking is easily legible Marking is not easily removable No curling of marking	P
	Signs are in contrast to their background, clearly legible from a distance of not less than 500 mm		P
	Label material, grade designation, ink and printing process		P
	Signs complied with blue colour requirements of ISO 3864-2		P
8.14	Markings in 8.1 to 8.5 on a main part of the tool	On the enclosure	P
	Markings in 8.1, 8.2, 8.3, and 8.5 placed together	Placed together on the nameplate	P
	Markings clearly discernible from outside of the tool, but if necessary, after removal of a cover without aid of a tool		P
	Indications for switches and controls placed on or in vicinity of components	No indications for switches and controls	N/A
8.15	Thermal link or fuse-link marked appropriately	Not applicable	N/A
9	PROTECTION AGAINST ACCESS TO LIVE PARTS		-
9.1	Accessible part not considered live	See below	N/A
	- extra-low a.c. voltage: peak values not exceeding 42.4 V	Not applicable	N/A
	- extra-low d.c. voltage: not exceeding 42.4 V	Not applicable	N/A
	- or separated from live parts by protective impedance, d.c. current not exceeding 2 mA	No protective impedance provided	N/A
	- or separated from live parts by protective impedance, a.c. peak value not exceeding 0.7 mA	No protective impedance provided	N/A
	- for peak value 42.4 V up to and including 450 V capacitance not exceeding 0.1 μ F	No protective impedance provided	N/A
	- for peak value 450 V up to and including 15 kV capacitance not exceeding 0.1 μ F	No protective impedance provided	N/A
9.2	Probe of Fig 1 did not contact live parts with detachable parts removed	No accidental contact with such metal parts is expected to occur	P

IEC 60745-2-9			
Clause	Requirement + Test	Result - Remark	Verdict
	Probe of Fig 1 did not contact live parts of the lamp with detachable parts removed	No lamp	N/A
	Screw type fuses or screw-type miniature circuit breakers accessible without aid of a tool excluded from this requirement	Not applicable	N/A
	Probe of Fig 1 did not contact live parts or live parts protected only by lacquer, enamel, ordinary paper, cotton, oxide film, beads, or sealing compound applied through an opening with 20 N force	Live parts or parts protected by the materials listed not accessible with the test pin	N/A
9.3	Test pin of Fig 2 did not contact live parts, through openings in class II tools or class II constructions	Test of apertures with the test pin (\varnothing 3 mm)	P
9.4	Probe of Fig 1 did not contact basic insulation through openings in Class II tools or Class II constructions with all detachable parts removed	No contact of the test finger with basic insulation.	P
10	STARTING		-
10.1	Motors start under normal voltage conditions	See below	P
	Starting ten times at 0.85 times rated voltage without load (V)	Tool was tested 10 times under the conditions of: 0.85×110V~(60 Hz) 0.85×220V~(60 Hz)	P
10.2	Centrifugal and other automatic starting switches operated reliably 10 times at 1.1 of the rated voltage (V)	Not applicable	N/A
10.3	Overload protection devices did not operate under normal starting conditions as confirmed by 10.1 and 10.2	No overload protection device	N/A
11	INPUT AND CURRENT		-
11.1	Marked power input or current is at least 110% of measured no-load input or current.....	See appended Table 11.1	P
12	HEATING		-
12.1	Excessive temperatures not attained under normal load	See appended Table 12.1	P
	Measurements for heating elements repeated as specified		P
12.2	Loading conditions during temperature test.....	The most unfavourable condition: 0.94×110V~/60Hz condition: 0.94×220V~/60Hz See Table 12.1	P

IEC 60745-2-9			
Clause	Requirement + Test	Result - Remark	Verdict
	Heating elements tested to IEC 60335-1 at 1.06 times rated voltage	No heating element	N/A
12.3	When possible, temperature rises of uniform windings determined by resistance method.....:	See Table 12.3	P
	Temperature rise of electrical insulation, other than windings, measured on surface of insulation.....:	No space reducing	N/A
12.4	Tool operating time.....: (IEC 60745-2-9:2003)	See Table 12.1	P
	The tool is operated intermittently until the temperature stabilises or , (IEC 60745-2-9:2003)	No excessive temperature	P
	-for 30 cycles (IEC 60745-2-9:2003)	Not applicable	N/A
	Each cycle comprising 30s operation and 90s off (IEC 60 745-2-9:2003)	Not applicable	N/A
	Continuously operating (manufacturer's option) (IEC 60 745-2-9:2003)	Continuously operating for 30min	P
12.5	Temperature rises did not exceed values in Table 1, except as allowed by 12.6	No excessive temperature	P
	Protective devices did not operate	Not applicable	N/A
	Sealing compounds did not flow	Not applicable	N/A
12.6	When winding temperatures exceeded values in Table 1, three additional samples successfully subjected to following tests:	Winding temperature doesn't exceed values in table 1	N/A
	a) Heat treatment for 240 h at the specified cabinet temperature (°C):.....:		N/A
	b) No inter-turn short circuit after oven treatment		N/A
	c) Humidity treatment in accordance with 14.3		N/A
	d) No excessive leakage current after humidity treatment.....:		N/A
	No flashover or breakdown occurred during electric strength after humidity treatment	See Table 15.2A	N/A
13	LEAKAGE CURRENT		-
13.1	Leakage current was not excessive	See Tables 13.1A-D	P
	Protective impedance disconnected	No protective impedance provided	N/A
13.2	Leakage current measured using circuit of Fig. 10		-
14	MOISTURE RESISTANCE		-
14.1	Degree of protection for tool enclosure according to tool classification (IP Code).....:	IP20	P

IEC 60745-2-9			
Clause	Requirement + Test	Result - Remark	Verdict
14.1.1	Tool not connected to the supply and turned continuously through most unfavourable positions		N/A
	Lightest permissible flexible cord with smallest cross-sectional area specified on Table 8 used on the tool with type X attachment (A, mm ²).....:		N/A
	Other tools tested as delivered		N/A
14.1.2	Tool rated IPX1 through IPX7 subjected to applicable tests of IEC 60529		N/A
	For IPX7 test, tool immersed in water containing 1.0 % NaCl		N/A
	Tool withstood electric strength test of 15 after moisture treatment		N/A
	No trace of water on insulation causing reduction of creepage and clearance below values in 28.1		N/A
14.2	No trace of water on insulation causing reduction of creepage and clearance below those in 28.1 after spillage of liquid test	Tool is not intended to be spilled over by liquids	N/A
	Tool withstood electric strength test of 15 after spillage treatment	See above	N/A
	Tool subjected to test of 14.3 after standing in normal test –room atmosphere for 24 h		N/A
14.3	Tool subjected to humidity treatment test for 48 h	See below	P
	Relative humidity (93 ± 2) %	95%	P
	Temperature (20 - 30 °C ± 1K)	25°C	P
	No excessive leakage after humidity treatment.....:	See Table 13.1D	P
	No flashover or breakdown occurred during electric strength after humidity treatment	See Table 15.2B	P
14.4	User not subject to an increased risk of electrical shock by liquid system during foreseeable use	Not applicable	N/A
	Tool operated for 1 min in each mode and did not exceed maximum allowed leakage current	Not applicable	N/A
	Tool did not exceed maximum allowable leakage current after drying for 24 h at ambient temperature	Not applicable	N/A
14.5	Liquid system withstood the pressure in normal use without leaking	Not applicable	N/A
	Tool did not exceed maximum allowable leakage current during pressure application	Not applicable	N/A
	Tool did not exceed maximum allowable leakage current after drying for 24 h at ambient temperature	Not applicable	N/A
14.6	Residual current devices complied with IEC 61540 and met requirements a) to c)	Not applicable	N/A

IEC 60745-2-9			
Clause	Requirement + Test	Result - Remark	Verdict
	a) RCD disconnected only both mains conductors when leakage exceeded 10 mA with a maximum response of 300 ms	Not applicable	N/A
	Test conducted according to 9.9.2 of IEC 61540, and earthing conductor stayed connected	Not applicable	N/A
	b) RCD operated correctly for all 50 cycles	Not applicable	N/A
	c) RCD cannot be removed during use or routine normal maintenance (i.e., residual current device fixed to tool or power supply cord connected to tool)	Not applicable	N/A
	RCD fitted in supply cord provided with Type Y or Z attachment for connection to supply cord and interconnecting cord	Not applicable	N/A

15	ELECTRIC STRENGTH		-
15.1	Protective impedance disconnected	No protective impedance	N/A
15.2	No flashover or breakdown occurred during the test with the output current at least than 200 mA and the applied measured voltage +/- 3%		P
	The insulation coating withstood the applied potential with the 5 kPa force applied	No insulation coating	N/A
	For the tool with integral heating elements, test voltages specified in IEC 60335-1 applied to the heating elements only and not to other parts of tool	No heating element	N/A

16	OVERLOAD PROTECTION OF TRANSFORMERS AND ASSOCIATED CIRCUITS		-
16.1	No excessive temperatures occurred during short circuit in transformer or circuits associated with it for a tool supplied from a transformer	The tool doesn't incorporate circuits supplied from transformer	N/A
	Power limited by (short-circuit protective device).....		N/A
	Insulation on conductors was within 15 K of Table 1		N/A
	Transformer windings complied with Clause 18.9		N/A
	Transformer complies with IEC 61558-1		N/A

17	ENDURANCE		-
17.1	No hazards due to extended normal use	See clause 17.2	P
17.2	No load intermittent operation (2 x 24 h)	See below	P

IEC 60745-2-9			
Clause	Requirement + Test	Result - Remark	Verdict
	Number of operations.....:	The tool is operated without fasteners at voltage of 1)240Va.c. x 1,1 for 10000 actuations and 220Va.c. x 0,9 for 10000 actuations. 2) 120Va.c. x 1,1 for 10000 actuations and 110Va.c. x 0,9 for 10000 actuations. Each cycle consists of the tool operating at a rate of one actuation every 1 s for 1 minute and a rest period of 3 minutes with the tool switched off.	P
	Number of hours for each operation	See above	P
	Test voltage at each operation (V).....:	See above	P
	Rate of operation (100s "on", 20s "off")	See above	N/A
	Test positions selected.....:	See above	N/A
	Operation time for each position	See above	N/A
	Servicing of carbon brushes and lubricant.....:	Not required	N/A
	Forced cooling or rest periods if temperature exceeded values in Table 1	No exceeded temperature	N/A
	No electrical or mechanical failure		P
	No insulation damage		P
	No loose contacts or connections		P
	No flashover or breakdown occurred after spillage treatment.....:	See Table 15.2C	P
	No operation of overload protection devices	Not applicable	N/A
17.3	Tools with Centrifugal switches operated for 10,000 cycles	No such switches	N/A
	Number of operations under normal load		N/A
	Rate of operations (s "on", s "off").....:		N/A
	Test voltage 0.9 x rated Voltage (V).....:		N/A
	No electrical or mechanical failure		N/A
	No insulation damage		N/A
	No loose contact or connections		N/A
	No flashover or breakdown occurred.....:		N/A
	No opening of overload protection devices		N/A
18	ABNORMAL OPERATION		-
18.1	No hazard due to abnormal operation	No hazard	P

IEC 60745-2-9			
Clause	Requirement + Test	Result - Remark	Verdict
	Fuses, thermal cut-outs, over current protection devices used to provide the necessary protection	Not applicable	N/A
18.2	Tool with heating elements	No heating element	N/A
	Tool with a control device limiting temperature.....:		N/A
	Only one abnormal condition simulated each time		N/A
	Tests of Clauses 18.2-18.6 conducted consecutively when more than one test applicable to the same tool		N/A
	Tool tested until a non-self-resetting thermal cut-out operated, or until steady conditions.....:		N/A
	Test repeated on a second sample when a heating element permanently open-circuited		N/A
	Only one abnormal condition simulated each time		N/A
18.3	Tool with heating elements tested under the conditions of heating test, except with restricted heat dissipation	No heating element	N/A
	Test voltage provided a power 0.85 times rated power input (V)		—
18.4	Tool cooled down to room temperature and test of 18.3 repeated	Not applicable	N/A
	Test voltage provided a power input of 1.24 times rated power input (V)		N/A
18.5	Tested as in heating test, under normal operation with control limiting the temperature short-circuited	No such device	N/A
	Test voltage provided a power input of 1.15 times rated power input (V)		—
	Multiple controls short-circuited one at a time		N/A
18.6	Test on class I tool with tubular sheathed and embedded heating elements	Not applicable	N/A
	Test repeated with the supply polarity reversed and other end of element connected to earth		N/A
18.7	No load test for 1 min on cutting tools incorporating a commutator motor	See below	P
	Test voltage 1.3 times rated voltage, or upper limit of voltage range (V)	Test voltage: 1.3×240V~(50Hz)	—
	After the tests of 18.2 to 18.7, safety of tool not impaired, and windings and connections not loose	After the test, safety of tool not impaired, and windings and connections not loose	P
18.8	Test on tools with induction motor and with moving parts locked	Not applicable	N/A
	a) Tool with a starting torque less than full-load torque		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Duration of locked conditions (s).....:		—
	b) Tool started by hand		N/A
	Duration of locked condition (s).....:		—
	c) tool with moving parts liable to be jammed, or moving parts that can be stopped by hand with the motor switched on		N/A
	Duration of locked condition (s).....:		—
	After the test, or at the instant of operation of fuses, thermal cut-outs, motor operated devices, and the like, the temperature of the windings complied with the values in Table 3		N/A
	Max winding temperature recorded (°C).....:		N/A
18.9	Test on tools with 3-phase motors with one phase disconnected	Not applicable	N/A
	30 s tests for tool switched on by hand or continuously loaded by hand; cold started		N/A
	5 min test for other tools.....:		N/A
	After the test, or at the instant of operation of fuses, thermal cut-outs, motor protection devices, and the like, the temperature of the windings complied with the limits in Table 3		N/A
	Max winding temperature recorded (°C).....:		—
18.10	No hazards occurred under fault conditions of 18.10.2		N/A
	Circuits complied with 18.10.1 and not subjected to fault conditions of 18.10.2		N/A
	Test of 18.10.3 conducted when safety of tool under a fault condition depended on operation of a miniature fuse-link complying with IEC 60127-3		N/A
	Tool withstood the particular test as a conductor of a PCB open-circuited, and		N/A
	– base material of PCB withstood test of Annex F,		N/A
	– creepage or clearances between live parts and accessible metal parts not reduced below values in 28 due to loosened conductors, and	No such device	N/A
	– tool withstood tests of 18.10.2 with the open-circuited conductor bridged		—
18.10.2	Fault conditions a) to f) conducted as applicable		N/A
18.10.3	Tests repeated with fuse-link replaced by an ammeter when during fault conditions of 18.10.2, safety of the tool depended on operation of a miniature fuse-link complying with IEC 60127-3,		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	– Circuit not considered to be adequately protected when current measured was 2.1 times the rated current of fuse-link, and test conducted with fuse-link short-circuited (A)		N/A
	– Circuit considered adequately protected when current measured was 2.75 times the rated current of fuse-link (A)		N/A
	– Fuse-link short-circuited when current measured was 2.1-2.75 times the rated current of fuse-link, and test conducted as follows (A)		N/A
18.10.4	Tools incorporating electronic devices are so designed that no hazard results in the event of a failure in the electronic equipment		N/A
	Tool operated for 1 min, at a voltage equal to the rated voltage or the mean value of the voltage range, at no-load with the electronic device short-circuited.		N/A
	No hazard resulted when test repeated with electronic device open-circuited		N/A
	No damage due to fire and mechanical damage impairing safety and protection against electric shock following the tests of 18.10.1 to 18.10.4, and		N/A
	- Current through protective impedance was less than limits of Clause 9.1 (A)		N/A
	Tool considered to have withstood the test when speed-limiting device operated		N/A
18.11	Switches and devices for motor reversal withstood stresses occurring when rotation reversed 25 times under running conditions at rated voltage or upper limit of rated voltage range at no-load (V).....	No such device	N/A
18.12	Class I tool with class II construction and class II tool operated under extreme overload conditions without impairing protection against electric shock	Class II tool	P
	A separate sample operated for 15 min, until the tool open-circuited, or flame appeared	Tool operate for 2 min, then the overload protector activated.	N/A
	Test circuit (KVA).....	15kVA	—
	160% normal load test current (A)	The tool is locked	—
	Overload condition existed for (_min, _sec)	See above.	—
	Condition continued until the tool open-circuited, or flame appeared or 15 minutes expired	See above.	N/A
	Elements that opened in case an open circuit occurred.....	No such elements	N/A
	When flames appeared, immediately extinguished by CO ₂ extinguisher	As required.	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Maximum leakage current measured throughout the abnormal test (mA).....:	Not applicable	N/A
	Tool that did not operate after 15 min, cooled to room temperature and subjected to a 1500 V Electric Strength test (live parts and accessible parts).....:	Not applicable	N/A
	Tool that operated after 15 min, cooled to room temperature and subjected to a 2500 V Electric Strength test (live parts and accessible parts).....:		N/A

19	MECHANICAL HAZARDS		-
19.1	Adequate protection against injury provided against moving and dangerous parts	Adequate protection of moving parts	P
	Protective enclosures, covers, and the like have adequate mechanical strength and cannot be removed without the aid of a tool	The enclosure provides sufficient mechanical strength and is only removable with the aid of a tool	P
	No dangers from adjusting the guards	No adjusting guard	N/A
	No dangers due to movement or release of working elements during normal use	By practical inspection	P
	No contact with dangerous moving parts using standard test finger (Fig 1)	No access to dangerous moving parts with the test finger	P
19.2	No sharp edges, burrs, flashes and the like	No such edges or the like	P
19.3	No contact of moving parts with test finger (Fig 1) with removal of dust collection system	No contact of moving parts with test finger.	P
19.4	Adequate grasping surfaces	The tool body and handle with adequate grasping surface are provided	P
19.5	Provision for visual checking of the contact of cutting tool with work piece	Visual check for contact with the work piece is ensured	P
19.6	The no-load speed of the spindle did not exceed 110 % of the rated no-load speed		P

20	MECHANICAL STRENGTH		-
20.1	Adequate mechanical strength in normal use	See below	P
	No flashover or breakdown occurred after tests of 20.2-20.4 and 15		P
	No damage impairing compliance with this standard, and no live parts became accessible		P
20.2	Three blows applied to every weak point of enclosure by spring-operated impact test apparatus in Clause 5 of IEC 60068-2-75	See below	P
	Brush cap impact energy (Nm)	0.5 Nm applied.	—

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Clause	Requirement + Test	Result - Remark	Verdict
	Other part impact energy (Nm)		—
	Blows applied to protective devices, handles, levers, and knobs when necessary.....	Impact energy is applied as the above-mentioned requirement. Three blows, 1.0 Nm, were applied on the following points: switch, enclosure, handles	P
	No damage impairing compliance with standard	No damage of the tool, no live parts have become accessible	P
	No accessibility of live parts	See above	P
	No cracks visible to naked eye	See above	P
	Inner cover withstood test	Not applicable	N/A
20.3	Hand-held tool withstood impact of 3 varied drops on a concrete surface from 1 m	Tested as required	P
	No damage impairing compliance with standard	No damage of the tool, no live parts have become accessible	P
	No accessibility of live parts	See above	P
	No cracks visible to naked eye	See above	P
	Inner cover withstood test	Not applicable	N/A
20.4	Adequate mechanical strength of brush holder and their caps		P
	Brush cap removed and replace 10 times applying specified tightening torque	See above	P
	Tightening torque (Nm)		—
	No damage impairing compliance with standard		P
	No accessibility of live parts		P
	No cracks visible to naked eye		P
	No damage to threads		P
21	CONSTRUCTION		-
21.1	Accidental changing of setting did not occur in tools with different voltages or different speed settings	The tool is designed with single voltage range	N/A
21.2	Accidental changing of settings of control devices did not occur	No control device is used.	N/A
21.3	Removal of parts ensuring required degree of protection against moisture not possible without aid of a tool	Secured by tool	P
21.4	Fixing of handles, knobs and the like, used to indicate position of switches or similar components in a wrong position, was not possible	No such handles, knobs or other devices	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
21.5	Replacement of a flexible cable or cord requiring displacement of a switch was possible without subjecting internal wiring to undue stress	No displacement of the switch is necessary for the replacement of the power cord, no stress to internal wiring	N/A
	After repositioning of the switch and before reassembling the tool, verification of correct positioning of internal wiring was possible	See above	N/A
21.6	Wood, cotton, silk, paper and similar fibrous or hygroscopic material not used as insulation, unless impregnated or chemically rendered non-fibrous	No use of such materials	N/A
21.7	Asbestos not used	Not applicable	P
21.8	Ordinary driving belts not relied upon to ensure electrical insulation	No driving belts are used	N/A
	Special belt design employed to allow use as electrical insulation	See above	N/A
21.9	Insulating barriers of Class II tools, and parts of Class II tools serving as supplementary or reinforced insulation are:	No such omissible parts	N/A
	- fixed such that they cannot be removed without being seriously damaged		N/A
	- so designed that they cannot be replaced in an incorrect position, and when omitted, the tool will be inoperable or manifestly incomplete		N/A
21.10	Use of the sheath (jacket) of a flexible cable or cord as supplementary insulation inside the tool is independent of mechanical and thermal stresses	Not applicable	N/A
21.11	No assembly gap with a width greater than 0.3 mm in supplementary insulation giving access to live parts	No assembly gap with a width greater than 0.3 mm	P
21.12	No hazards from parts of Class I tool such as wire, screw, nut, washer or spring becoming loose or falling out of position, and accessible metal not made live	See below	P
	Clearance and creepage distances of Class II tool or class II construction not reduced to less than 50% of values shown in Table 10	Class II tool	N/A
	Class II tool or Class II construction, other than those of the all-insulated type, provided with an insulating barrier between accessible metal and motor parts and other live parts	Reduction of creepages or clearances for other reasons are unlikely to occur	P
	Class I tool with adequately fixed parts, barriers, and sufficiently large creepage and clearances	Tool is of the insulation-encased type	N/A
	All wires secured in place independent of terminal connection or solder	As required	P

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Clause	Requirement + Test	Result - Remark	Verdict
21.13	Supplementary and reinforced insulation not impaired by deposition of dirt, or dust resulting from wear of parts within the tool to the extent that creepage and clearances would be reduced	No deposition of dirt and dust is probably expected	P
	Ceramic material not tightly sintered and similar materials, and beads alone, not used as supplementary or reinforced insulation	Not applicable	N/A
	Parts of natural or synthetic rubber used as supplementary insulation are resistant to aging	No natural or synthetic rubber is used	N/A
	Rubber parts so arranged and dimensioned that creepage distances not reduced below values in 28.1, even when cracks occurred	Not applicable	N/A
	Insulated material for embedded heating conductors serves only as basic insulation	Not applicable	N/A
	Aging test for rubber parts for 70 h at 100±2°C	Not applicable	N/A
	Rubber parts tested		—
21.14	Internal wiring, windings, and the like including insulation in general not exposed to oil, grease, and similar substances	No exposures of internal parts with liquids expected.	N/A
	Adequate insulation properties of oil, grease, and similar substances used for lubrication of gears and the like with no effect on insulation	See above	N/A
21.15	No access to brushes without aid of a tool		P
	When tightening screw-type brush-caps, two surfaces clamped together		P
	Locking device retaining brushes in position do not depend upon brush spring tension		P
	Screw-type brush-caps accessible from the outside of the tool made of or covered with insulating material of adequate strength, and not projecting beyond surrounding surface of the tool		P
	Properties of insulating materials		P
	– tested according to Cl. 20.2 and 20.4 for screw-type brush-caps accessible from outside of tool		P
	– tested as specified for supplementary insulation for class I and class III tools	Class II tool	N/A
	– tested as specified for reinforced insulation for class II tools		P
21.16	Tool employing a liquid system protects the user against increased risk of shock due to presence of liquid under normal use and faults of liquid system	Class II tool	N/A
	Tools employing liquid system constructed as Class III tools, or		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- class I or II and provided with a residual current device, and complying with 14.4-14.6, or		N/A
	- class I or class II and designed for use in combination with an isolating transformer and complying with 14.4 and 14.5		N/A
21.17	Accidental operation of switches and reset buttons on non-self-resetting controls did not occur when tool dragged across a horizontal surface	Tool placed on a horizontal support in the most unfavourable position, the switch was not actuated.	P
21.18	Tools, other than those provided with a flexible shaft, fitted with a mains switch which can be switched off by the user without releasing the grasp on the tool	The main switch can be actuated when holding the tool by the user in normal work position	P
	A switch locking in "on" position considered to meet the requirement of 21.18, provided it unlocks automatically when the trigger or actuating member is activated	No such arrange.	N/A
21.18.1	Switch could not be locked in "on" position and did not remain in "on" position after trigger released when a risk with continued operation existed	No switch lock ON device is used	N/A
21.18.2	Switch was locked in "off" position when a risk associated with inadvertent starting existed	Not applicable	N/A
21.19	Protection against electrical shock not affected when screws accessible from the outside replaced by longer screws simulating routine servicing	All screw holes are closed inside	P
	Creepage and clearances not reduced below values in 28.1	No such decreasing is possible	P
21.20	Tool marked with the first numeral of IP system complies with IEC 60529.....:	Not marked	N/A
21.21	No risk of electrical shock from charged capacitors when touching pins of the plug	See below	P
	Max. voltage measured between pins of the plug after one second after each disconnection (V)	Measured: <1V	P
	Line capacitors rated 0.1 μ F	Capacities : 0.47 μ F	N/A
21.22	Non-detachable parts secured reliably and withstood mechanical stress under normal use	Enclosures are secured by screws	P
	Snap-in devices have an obvious locked position and have fixing properties that do not deteriorate	Not applicable	N/A
	Parts disassembled and assembled 10 times prior to test showed no signs of deterioration		N/A
	Parts affected by temperature tested immediately after conditions of Clause 12		N/A
	All weak parts of the tool subjected to the 10 s push force of 50 N		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	50 N pull force applied to cover or weak part when shaped prevented easy slippage of fingertips		N/A
	30 N pull force applied to cover or weak parts when projection of the gripped part was less than 10 mm in the direction of removal		N/A
	Test fingernail of Fig. 7 inserted in apertures and joints with a force of 10 N to enable a force of 30 N for 10 s by means of a loop while applying push/pull forces		N/A
	A torque of 2 Nm applied at the same time as pull or push force on parts 50 mm or smaller and likely to be subjected to twisting,		N/A
	A torque of 4 Nm applied at the same time as pull or push force on parts larger than 50 mm and likely to be subjected to twisting,		N/A
	Projection was less than 10 mm and required a torque of (Nm)		N/A
	Parts not detached, and remained in locked position		N/A
21.23	Handles, knobs, etc., withstood axial force of 30 N for 1 minute	Securely fixed	N/A
21.24	Storage hooks and similar devices for flexible cords are smooth and well rounded	Not applicable	N/A
21.25	Current-carrying parts and other parts resistant to corrosion under normal use	No such parts	N/A
	After tests of Clause 30, no sign of corrosion on relevant parts	See above	N/A
21.27	Insulation between SELV and other parts of non-class II tool meets requirements for double or reinforced insulation	No such parts	N/A
21.28	Parts separated by protective impedance comply with requirements for double or reinforced insulation	No such parts	N/A
21.30	Shafts of operating knobs, handles, levers, and the like not live, except when removal of such parts does not make the shaft accessible to test finger	No such parts	N/A
21.31	Handles, levers, and knobs of non-class III tool held or actuated in normal use do not become live during an insulation fault	Handle is made of plastic	P
	Metallic handles, levers, and knobs with shaft and securing means likely to become live due to basic insulation fault, adequately covered by insulating material or their accessible parts separated from their shafts or securing means by insulation	See above	N/A
	Covering or insulating material complies with Electric Strength test in Clause 15, Table 2, item 4	See clause 15	P

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Clause	Requirement + Test	Result - Remark	Verdict
21.33	Capacitors in class II tools not connected to accessible metal parts, and their metallic casings are separated from accessible metal parts by supplementary insulation	Capacitor is not connected to accessible metal parts	P
	Capacitors tied to accessible metal parts comply with Clauses 9.1 and 21.36		N/A
21.34	Capacitors not connected between contacts of the thermal cut-outs	Capacitor is not connected to accessible metal parts	P
21.35	Lamp holders used only for connection of lamps	Not applicable	N/A
21.36	Protective impedance consists of at least two separate components with impedance unlikely to change significantly during lifetime of tool	Not applicable	N/A
	When a component short or open-circuited, values in Clause 9.1 were not exceeded		N/A
	Resistors comply with 14.1 of IEC 60065 and capacitors comply with 14.2 of IEC 60065		N/A
21.37	Air-intake ventilation openings not excessively large		P
	It was not possible to insert a steel ball 6 mm in diameter through air-intake openings other than those adjacent to fan	Pass.	P

22	INTERNAL WIRING		-
22.1	Wireways smooth and free from sharp edges, burrs, etc.	Wireways are smooth and without sharp edges	P
	Holes in metal through which insulated wires pass provided with bushings or, except as required by relevant part 2, have smooth, well-rounded edges with a radius of 1,5 mm	No such holes	N/A
	Wiring prevented from coming into contact with moving parts	Contact of wiring with moving parts is unlikely to occur	P
22.2	Internal wiring and electrical connections adequately protected or enclosed	Adequate protection of the wiring by proper shape of the surrounding enclosure	P
22.3	Internal wiring adequately rigid, fixed or insulated such that, in normal use, creepage and clearances cannot be reduced below values in 28.1	The internal wirings are properly insulated and fixed. Under normal use, creepage distances and clearances are not reduced.	P
	The insulation not damaged in normal use	No damage of insulation during normal use	P
	Insulation of internal wiring electrically equivalent to insulation of cords complying with IEC 60227 or IEC 60245		P

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Clause	Requirement + Test	Result - Remark	Verdict
	No breakdown resulted upon application of a 2000 V electric voltage for 15 min between conductor and metal foil wrapped around insulation	Not applicable	N/A
	Sleeves used as supplementary insulation on internal wiring remain in position by clamps at both ends requiring its removal by breaking or cutting	Not applicable	N/A
22.4	Use of green/yellow conductors for earthing terminals only	Class II tool	N/A
22.5	Aluminium wires not used for internal wiring	Not applicable	N/A
22.6	Stranded conductors with lead-tin soldering are only used with spring terminals with constant contact pressure, except when clamping means pose no risk of bad contact	Not applicable	N/A
23	COMPONENTS		-
23.1	Components comply with relevant IEC standards	See appended Table 23.1	P
	Components used in accordance with their markings		P
	Applied exceptions		N/A
23.1.1	Capacitors in auxiliary windings of motors marked with their rated voltage and rated capacitance	Not applicable	N/A
23.1.2	Fixed capacitors for radio interference suppression comply with IEC 60384-14	Approved capacitor is used	P
23.1.3	Small lamp holders similar to E10 lamp holders meet requirements for E10 lamp holders	No lamp holders	N/A
23.1.4	Insulating and safety insulating transformers comply with IEC 61558-1	Not applicable	N/A
23.1.5	Appliance couplers other than those used for IPX0 tools comply with IEC 60309, and those used for IPX0 comply with IEC 60320	Not applicable	N/A
	Instructions provided to inform user to connect the tool with non-IEC appliance couplers	See above	N/A
23.1.6	Automatic controls not complying with IEC 60730-1 tested according to this standard, and additionally according to 11.3.5 – 11.3.8 and 17 of IEC 60730-1	No automatic controls	N/A
	IEC 60730-1 tests conducted under conditions occurring in the tool		N/A
	Type of controls used and number of operations completed per Cl. 17 of IEC 60730-1 (cycles).....		N/A
	Correct markings used on automatic controls		N/A
	Tests of Clause 17 of IEC 60730-1 were not conducted on automatic controls because tool complies with this standard when protective device short-circuited		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Thermostats and temperature limiters tested in accordance with a specific exception in footnote b) of Table 1 of Clause 12		N/A
23.1.7	Unless otherwise specified, tests on components per other standards conducted separately according to the relevant standard	Not applicable	N/A
	Component, marked and used per its markings		N/A
	Components not mentioned in Table 1 of Clause 12 tested as part of the tool		N/A
23.1.8	If no IEC standard, or when component not marked or used not as marked, component tested under conditions occurring in the tool, and number of samples as required by similar specifications.....:	Approved components are used	N/A
23.1.9	Capacitor voltage did not exceed 1.1 times its rated voltage (V)	No capacitor connected in series with motor winding	N/A
23.1.10	Adequate breaking capacity of mains switches with no electrical mechanical failure	Approved component is used.	P
	Mains switches rated for min. 50K cycles of operations	Approved component is used.	N/A
	Switch operated 50 times with motor stalled	Approved component is used.	N/A
	For electronic control device switching off before opening the main contacts, switch operated five times with the electronic device short-circuited	Not applicable	N/A
23.1.11	Switches, not separately tested and found to comply with IEC 61058-1 under the conditions occurring in the tool, comply with Annex I	Approved component is used. Certificate is provided	N/A
	Test of 17.2.4.4 of IEC 61058-1 conducted for a min. of 50000 cycles of operation		N/A
	Switches operated only with the aid of a tool and intended for no load operation were not subjected to tests of Clause 17 of IEC 61058-1		N/A
	The above also applied to switches operated by hand and interlocked not to be operated under load		N/A
	Switches without interlock tested per IEC 61058-1, 17.2.4.4 for a min. of 100 cycles of operation.....:		N/A
	Tests of 17.2.4.4 of IEC 61058-1 not conducted on a switch when tool met the requirements of this standard when the switch short-circuited		N/A
23.2	Tool not fitted with switches or automatic controls in flexible cords	Not fitted	P
	Tool not fitted with devices causing the protection device in the fixed wiring to operate	Not fitted	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Tool not fitted with thermal cut-outs which can be reset by a soldering operation	Not fitted	P
23.3	Overload protection devices are non-self-resetting	No overload protection device	N/A
23.4	Plugs and socket-outlets used as terminal devices for heating elements and plugs and socket-outlets for ELV circuits not interchangeable with plugs and socket-outlets in IEC 60884, and with connectors and tool inlets complying with IEC 60320	Not applicable	N/A
23.5	Motors connected to the supply mains with insulation inadequate for the rated voltage comply with Annex B	Not applicable	N/A

24	SUPPLY CONNECTION AND EXTERNAL FLEXIBLE CORDS		-
24.1	Tool rated in voltage or frequency for connection to public supplies provided with a supply cord with a plug	See below	P
	Tool intended to be connection to non-public power supplies provided with a supply cord without a plug	Non-detachable cord with a plug is used	P
	Tool provided with appliance inlet for connection to a supply having at least same degree of protection against moisture as required for the tool, and with locking device preventing accidental disconnection	Not applicable	N/A
	Tool provided with a supply cord for connection to a supply ≤ 0.5 m and fixed with an in-line connector (cable coupler) and its mating counterpart	Not applicable	N/A
	The in-line connector provided with at least the same degree of protection against moisture as required for the tool	See above	N/A
	Locking devices complied with pull test of 24.14	See above	N/A
24.2	Supply cord assembled to the tool by attachment type (specify X, Y, or Z)	Type X attachment is used	P
	Supply cord with type X and type Y attachment is ordinary flexible cord or a special cord only available from the manufacturer or its agent.....	Not applicable	N/A
	Special cord includes part of the tool	Not applicable	N/A
24.3	Plugs fitted with only one flexible cord	As required	P
24.4	Supply cord not lighter than ordinary tough rubber sheathed flexible cord or ordinary PVC sheathed flexible cord	H05VV-F is provided	P
	PVC cords not used if external metal parts exceed 75 K temperature rise	No temperature rise of external parts exceeded 75 K during the test acc. to 11.1	P
	Power supply cords of single-phase tool with a plug and rated current ≤ 16 A supplied with a plug complying with IEC 60884 or IEC 60309	Approved plug is provided	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Class I tools fitted with plugs complying with IEC 60309, Sheet 2-1	Class II tool	N/A
	Class II tools fitted with plugs complying with IEC 60309, Sheet 2	Approved plug is provided	P
	Class III tools fitted with plugs complying with IEC 60309, Sheet 2-1	Class II tool	N/A
	Body of plug covered with, rubber, polyvinyl chloride, or a material with equivalent mechanical strength ...	H05VV-F with sufficient strength is provided	P
	Supply cords of class I, single-phase tool rated > 16 A ≤ 63 A, and multi-phase tool rated ≤ 63 A, provided with a plug complying with IEC 60309 and standard Sheet 2-III based on current	Class II tool	N/A
	Supply cords of class II, single-phase tool rated > 16 A ≤ 63 A, and multi-phase tool rated ≤ 63 A, provided with a plug complying with IEC 60309 and standard Sheet 2	Less than 16A	N/A
	Supply cords of class III, single-phase tool rated > 16 A ≤ 63 A, and multi-phase tool rated ≤ 63 A, provide with a plug complying with IEC 60309 and standard Sheet 2-III	Class II tool	N/A
24.5	Nominal cross-section area of supply cord per Table 6 (mm ²)	Acc. to the table 6, the cross sectional area of the conductors of the power cord is 1.0 mm ² , with a rated tool current of less than 10A	P
24.6	Supply cord of class I tool has green/yellow core connected to internal earthing terminal of the tool, and to earthing contact of plug	Class II tool	N/A
24.7	Lead-tin solder not used to consolidate leads under pressure, except when clamping means used prevent risk of a bad contact	Solder is not used	N/A
	Clamping screws alone not used for securing soldered leads		N/A
24.8	Moulding supply cord to any part has no effect on the insulation of the cord	No effect the insulation of the cord	P
24.9	Inlet openings provided with a bushing, or no risk of damaging protective covering of supply cord	Cord guard made of insulating material is provided	P
24.10	Inlet bushings shaped to prevent damage to supply cord	Not applicable	N/A
	Inlet bushings reliably fixed and not removable without the aid of a tool		N/A
24.12	Cord guards provided with adequate mechanical strength and retain these properties throughout extended normal use	Enclosure is made of plastic	N/A
	Flexing test performed in apparatus shown in Fig. 9		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Weight attached to cable or cord (kg).....:	The weight of 6kg is attached Remark: The weight of the tool is bigger than 6kg	—
	Oscillating member moved backwards and forwards through an angle of 90° (45° on either side of the vertical) with rate of flexings 60/minute	The tool is tested as required	P
	After 10,000 flexings, sample turned through 90° about the centre of the cord guard	The tool is tested as required	P
	After the test, cord guard not loosened, and no damage to cord guard and flexible cable impairing compliance with this standard	Cord guard not loosened, and no damage to cord guard and flexible cable	P
	Number of strands versus number of broken strands of each conductor not more than 10%.....:	Less than 5%	P
	Cord guard did not slip out from its location after completion of ten 1 sec lifts	No slip of cord guard after test	P
24.13	Cord guard of insulating material provided to protect against excessive bending at inlet opening	See below	P
	Guard fixed reliably and projects outside tool a distance beyond inlet opening of at least 5 times the overall diameter of cable or cord	Overall diameter: 6.6 mm (5x6.6mm=33mm) Projection measured: 66mm	P
	Cord guard integral to tool minimum 100 mm longer than guard	Not applicable	N/A
	Mass attached to the free end of cable or cord (g)..:	Attached mass: 440 g	—
	Temperature sensitive cord guard tested at 23±2°C	Not sensitive cord guard	N/A
	Curvature of cable or cord is nowhere less than 1.5 of external diameter of cable	Angle: 45° Required radius: min. 9.9mm R> 20 mm	P
24.14	Conductors relieved from strain, twisting and protected from abrasion	See below	P
	It is not possible to push the cord into the tool	By practical test, the cord can't be pushed into the tool	P
	Pull force was applied 25 times at the force prescribed in Table 7 (N).....:	The mass of tool is over 4kg. Pull force: 100 N Number of test cycles: 25 Torque: 0.35 Nm	—
	After pull test, cord, other than automatic cord reel, subjected to torque in Table 7 for 1 min (Nm)	Duration of torque test: 1 min	P
	The cord was not damaged during the tests	No damages	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Cord longitudinal displacement (mm)	No longitudinal displacement	P
	Conductors movement in the terminals (mm)	No noticeable movement of the conductors in the terminal	P
	No appreciable strain at the connection	No appreciable strain	P
	Creepage and clearances not reduced below values in Cl. 28.1	No reduction of creepage and clearances	P
24.15	Cord anchorage either accessible only with the aid of a tool, or the cord can only be fitted using a tool	Removal of the cord guard requires the use of a tool	P
24.16	Cord anchorage for type X attachment	Type X attachment is used	P
	Cord anchorage allows easy replacement of cord	The cord anchorage provides 2 clamping screws Only a screwdriver is required for the replacement of the cord	P
	It is evident how strain relief and prevention of twisting are accomplished by the cord anchorage	As required	P
	Anchorage is suitable for different types of cord, or tool designed to be fitted with only one type of cord	Tool is designed to be fitted with only one type of cord	P
	Cord anchorage screws separated by supplementary insulation	Plastic material is used for cord anchorage No accessible metal parts in the vicinity of the cord anchorage	P
	Cord is not clamped by metal screw bearing directly on the cord	No such bearing	P
	At least one part of cord anchorage securely fixed to the tool, unless it is part of the specially prepared cord	The cord anchorage provides 2 clamping screws	P
	Screws intended to fix the cord in place are not used to secure any other part, or it is clear the tool is inoperative	No fixing of other parts	P
	Parts fastened to the cord anchorage by the same screw could not be removed without the aid of a tool	No such parts	N/A
	Cord anchorage is such that in case of labyrinths, the labyrinths cannot be bypassed in a way that the requirement of Clause 24.14 is not met	Not applicable	N/A
	For type X attachment, gland not used as cord anchorage for power supply cord	Gland is not used	P
	Cord anchorage in class I tool is of insulating material or provided with an insulating lining	Class II tool	N/A
	Cord anchorage in class II tool is of insulating material, and when metallic, meet requirements for supplementary insulation	Plastic material is used for cord anchorage	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Type X has one or more nuts to secure cord anchorage to tool	No nuts used	N/A
	Clamping member complies with Figure 6		N/A
	Tests of Cl. 24.14 conducted with lightest type of cord of smallest cross-section and next heavier type as in Cl. 25.2 (sizes, mm ²)		N/A
	Specially prepared cord tested with the cord as delivered		N/A
	Conductors inserted into terminals, terminal screws tightened sufficiently to prevent conductors from easily changing their position, torque set at		N/A
24.17	Adequate cord anchorages are provided for type Y and Z attachments and complied with 24.14	Type X attachment is used	N/A
24.18	Knots and tying strings for type X attachment are not used	Not used	P
24.19	The insulated conductors of the supply cord are insulated from accessible metal parts by basic insulation for class I tool, and supplementary insulation for class II tools	Type X attachment is used	N/A
	- insulation consists of a separate insulating lining fixed to cord anchorage		N/A
	- a sleeve or grommet is fixed to the cord		N/A
	- for class I tools, insulation consists of sheath of the sheathed cord		N/A
24.20	For type X attachment space for supply cables or supply cord provided inside or as a part of tool	See below	P
	- space permits verification of correct connection and positioning of conductors	Enough space for verification of correct connection and positioning of conductors	P
	- space permits covers to be fitted without risk of damage to supply conductors or their insulation	Enough space for covers to be fitted	P
	- uninsulated end of conductor, when detached from a terminal, cannot come into contact with accessible metal parts	No contact with accessible metal parts	P
	Installation test conducted with cables or flexible cords of the largest cross-sectional area as per Clause 25.2 (mm ²)	Not applicable	N/A
	For pillar terminals (with conductors that are not separately clamped 30 mm or less from terminal), and for other terminals with screw clamping, a force of 2 N applied to the wire in any direction and adjacent to the terminal, screw or stud	Not applicable	N/A
	The uninsulated end of the conductor did not come into contact with accessible metal parts	Not applicable	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
24.21	Appliance inlet has no accessible live parts	Not applicable	N/A
	- appliance inlet allows easy insertion of connector		N/A
	- after insertion of connector, tool not supported by the connector during any position of normal use on a flat surface		N/A
	Standard test finger applied for tool inlet other than appliance inlet per IEC 60320		N/A
	Appliance inlet complies with IEC 60320		N/A

25	TERMINALS FOR EXTERNAL CONDUCTORS		-
25.1	Type X attachment, other than specially prepared cord, provided with terminal connections made by screws, nuts, or equally effective devices	The cord is provided with crimp terminals fixing by screws	P
	Use of screw-type terminals per IEC 60998-2-1	Not applicable	N/A
	Use of screwless-type terminals per IEC 60998-2-2	Not applicable	N/A
	Use of clamping units according to IEC 60999-1 considered equally effective devices	Not applicable	N/A
	Screws and nuts do not fix other components	See above	N/A
	Screws and nuts allowed to also clamp internal conductors when they are unlikely to be displaced when fitting supply conductors	Not applicable	N/A
	For tool with type X attachment, soldered connections allowed to be used for connection of external conductors, when soldering alone is not used to maintain conductor in position	Not applicable	N/A
	When provided, barriers prevent creepages and clearances between live parts and other metal parts from being reduced to < 50% of values in 28.1, the conductor can be fixed by soldering alone	Not applicable	N/A
	For type Y and Z attachments, soldered, welded, crimped and similar connections allowed for the connection of external conductors	Type X attachment is used	N/A
	Class II tools, conductor so positioned or fixed that soldering, crimping, or welding alone not relied upon to maintain the conductor in the position	Not applicable	N/A
	Barriers prevent creepages and clearances between live parts and other metal parts from being reduced to < 50% of values in 28.1 for the Class of tool using Type Y or Z attachments	Not applicable	N/A
	Conductors connected by soldering are held in place near termination independent of solder	Not applicable	N/A
	Conductor is "hooked in" before soldering and the hole through which it passes is not too large	Not applicable	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Terminals of a component built into the tool used to secure external conductors	Not applicable	N/A
	Leads additionally fixed near terminations	Not applicable	N/A
	Stranded conductors secured at insulation and conductor	Not applicable	N/A
25.2	Terminals for type X attachment fitted with special connection or accommodate nominal cross-sectional areas as in Table 8	See below	N/A
	Cables or cords of the specified smallest and largest cross-sectional areas can be fitted (mm ²)	Crimp termination is used	N/A
	Supply cord terminals withstood pull force of 5 N	No damage of the connection	P
25.3	For type X attachment, when clamping means tightened or loosened, terminal did not loosen up, no stress on internal wiring, and creepage and clearances not reduced	Crimp termination is used	N/A
	Torque applied per IEC 60999-1, Clause 9.6 at 2/3 torque of that in Table 4 of IEC 60999-1 (Nm)		N/A
	Terminals secured by two screws to prevent loosening	Not applicable	N/A
	Correct position of supply terminals maintained by switches and similar devices with recesses and verified after connection of supply cable and repositioning of device		N/A
	Sealing compound without other means of locking not used	Not applicable	N/A
	Self-hardening resins used only on terminals that are not subject to torsion in normal use	Not applicable	N/A
25.4	Type X attachment using terminals to clamp the conductor between metal surfaces do so without damage to conductor after torque test per Cl. 25.3	Not applicable	N/A
25.5	Type X attachments which require no special preparation of conductor for correct connection, and conductor does not slip out when clamping screws or nuts tightened	Crimp termination is used	N/A
	Type X specially prepared cord used.....		—
	There were no deep or sharp indentations on the conductors after torque test per Clause 25.3		N/A
25.6	End of conductor inserted in the hole of pillar type terminals is visible, or can pass beyond threaded hole for a distance of half nominal diameter of screw, or 2.5 mm, the greater of the two (mm).....	Crimp termination is used	N/A
25.7	For type X attachment, terminals clearly recognizable and accessible after opening the tool	As requirement by visual inspection	P

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Clause	Requirement + Test	Result - Remark	Verdict
	All terminals located behind one cover, or one part of the enclosure	Located behind the enclosure	P
25.8	Terminal devices not accessible without the aid of a tool	The terminal is accessible after the opening of the enclosure, requiring the aid of a screwdriver	P
25.9	For tool with type X attachment, terminal devices located or shielded to prevent a strand of wire from escaping	Crimp termination is used. Stranded wire test is not necessary.	N/A
	In case of class II tool, live parts and metal parts separated from accessible metal parts by supplementary insulation		N/A
	8 mm long free wire of the stranded supply conductor did not touch any accessible metal part		N/A
	8 mm long free wire of stranded conductor connected to an earthing terminal did not touch any live part		N/A

26	PROVISION FOR EARTHING		-
26.1	Accessible metal parts of class I tool permanently connected to an earthing terminal or termination within the tool	Class II tools	N/A
	Accessible metal parts of class I tool permanently connected to the earthing contact of the tool inlet		N/A
	Printed circuit boards are not used to provide continuity of protective earthing circuit		N/A
	No electrical connection between earthing terminals or contacts and neutral terminal		N/A
	No provisions for earthing in Class II and III tools		N/A
	Metal parts behind a decorative cover that do not withstand test of Clause 20 considered accessible metal parts		N/A
26.2	Clamping means of earthing terminals adequately locked against accidental loosening		N/A
	Earthing connections not possible to loosen without the aid of a tool		N/A
	Terminals with screw clamping comply with the relevant requirements of Clause 25, and screwless terminals comply with IEC 60998-2-2		N/A
	For specially prepared cords, terminals comply with IEC 60760		N/A
	Screwless terminals tested per IEC 60998-2-2		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
26.3	Earth connection of detachable parts was made before the current-carrying connections established when placing the part in position, and the current carrying connections separated before earth connection was broken when removing the part		N/A
	If cord slips out of cord anchorage, current-carrying conductors become taut before earthing conductor		N/A
26.4	No risk of corrosion between metal parts of earthing terminals and copper of earthing conductor		N/A
	Parts transmitting current in case of an insulation fault, other than parts of metal frame or enclosure, are coated or uncoated metal with adequate resistance to corrosion		N/A
	Thickness of electroplated coating (μm).....:		N/A
	Parts of coated or uncoated metal providing or transmitting contact pressure only, adequately protected against rusting		N/A
	Protection provided against risk of corrosion resulting from contact between copper and aluminium (or aluminium alloy)		N/A
	Parts subjected to a treatment such as chromate conversion coating are used only to provide or transmit contact pressure		N/A
	Thickness of coating of steel measured in accordance with ISO 2178 or ISO 1463 (μm).....:		N/A
	Resistance to rusting test.....:		N/A
26.5	Resistance of earthing circuit (max. 0.1 Ω).....:	See also Clause 30	N/A
	Test current (A).....:		N/A
	Voltage drop between the earthing terminal and accessible metal part (V).....:		—

27	SCREWS AND CONNECTIONS		-
27.1	Fixings and electrical connections (includes earthing connections) withstood mechanical stresses occurring in normal use	Screws for fixing can withstand mechanical stresses occurring in normal use	P
	Screws not made of soft metal such as zinc or aluminium	Screws is not made of soft metal such as zinc or aluminium	P
	Diameter of screws of insulation material (mm).:	No such materials used	N/A
	Screws transmitting electrical contact pressure screw into metal	Not applicable	N/A
	Screws made from insulating material are not used if their replacement by a metal screw could impair supplementary or reinforced insulation	No screws are made from insulating material used	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Screws removed when replacing the supply cord with type X attachment, or during maintenance, are not of insulating material where their replacement by a metal screw could impair basic insulation	No screws made from insulating material used	P
	Screws and nuts tightened and loosened 10 times for screw engaged with a thread of insulating material	Screw tested: a fixing screw, with a diameter of 3.3mm/4.5mm. Test torque: 0.8Nm/1.8 Nm	P
	Nuts and other screws tightened and loosened five times	Not applicable	N/A
	Screws engaging with a thread of insulating material completely removed and reinserted each time	Tested as required	P
	When testing terminal screws and nuts, a flexible conductor of the largest cross-sectional area per Clause 25.2 placed in the terminal (mm ²).....:	Not applicable	N/A
	Torque per column I of Table 9 applied to metal screw without head (Nm)	Not applicable	N/A
	Torque per column II of Table 9 applied to other metal screws and nuts (Nm)	Test torque: 1.2 Nm	P
	Torque per column II of Table 9 applied to screws of insulating material, having a hexagonal head with dimension across flats exceeding the overall thread diameter (Nm)	No screws made from insulating material used	N/A
	Torque (column II, Table 9) applied to screws of insulating material, with cylindrical head and a socket for a key, having cross-corner dimension exceeding overall thread diameter (Nm)	No screws made from insulating material used	N/A
	Torque per column II of Table 9 applied to screws of insulating material, with a head having a slot or cross slots, the length of which exceeds 1.5 times the overall thread diameter (Nm)	No screws made from insulating material used	N/A
	Torque per column III of Table 9 applied to other screws of insulating material (Nm).....:	Not applicable	N/A
	Conductor moved each time the screw or nut was loosened	Not applicable	N/A
	No damage impairing further use of fixing or electrical connections	Not applicable	N/A
27.2	Contact pressure not transmitted through insulating material other than ceramic, unless compensated for shrinkage or distortion	Not applicable	N/A
27.3	Space-threaded screws not used for connection of current-carrying parts	No such screws are used	N/A
	No thread-cutting screws used for connection of current-carrying parts	Not applicable	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Use of two space-threaded or thread-cutting screws in earthing circuits	Not applicable	N/A
27.4	Screws making both mechanical and electrical connections are locked against loosening	Not applicable	N/A
	Rivets for current-carrying connections subjected to torsion in normal use locked against loosening	Not applicable	N/A

28	CREEPAGE DISTANCES, CLEARANCES AND DISTANCES THROUGH INSULATION		-
28.1	Creepage and clearances not less than the values in Table 10, except for cross-over points of motor windings	See appended Table 28.1	P
	When a resonance voltage occurs, creepage and clearance are not less than specified for the voltage imposed by the resonance; these values increased by 4 mm in case of reinforced insulation		P
	Creepage and clearances for a tool with an appliance inlet measured with an appropriate connector inserted	No resonance voltage	N/A
	Creepage and clearances on tools with Type X attachment measured with supply conductor of largest cross-section per Clause 25.2 (mm ²)	No appliance inlet	N/A
	Measurements repeated without the conductors		N/A
	Creepage and clearances on a tool with other attachment measured on the "as delivered" tool	No appliance inlet	N/A
	Measurements on tool with belt made with the belt in place and belt tension adjusted to the most unfavourable position within its adjustment range	No belts provided	N/A
	Measurements repeated with the belt removed		N/A
	Movable parts placed in the most unfavourable position; nuts and screws with non-circular heads tightened in the most unfavourable position	As required	P
	Clearances between terminals and accessible metal parts also measured with screws and nuts unscrewed as far as possible and they were not less than 50% of Table 10	See Table 28.1	P
	Distances through slots or openings in external parts of insulating material measured to metal foil in contact with accessible surface with the foil pushed into corners using standard test finger	As required	P
	2 N force applied by test finger to bare conductors and uninsulated capillary tubes of thermostats and similar devices while measurement made	No such parts or devices	N/A
	30 N force applied by test finger to enclosure	30 N force applied on the enclosure	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Measurements made according to Annex A	See Table 28.1	P
	Creepage on an interposed barrier consisting of two parts not cemented together also measured through the joint	Not applicable	N/A
	Clearances on an interposed barrier measured over the barrier or, when barrier consisted of two parts with mating surfaces not cemented together, through the joint.	Not applicable	N/A
	Creepage and clearances on a tool having parts with double insulation and no metal between basic insulation and supplementary insulation	Not applicable	N/A
	PWB with peak voltage stresses ≤ 150 V per mm between parts of different potential provided with a min. distance of 0.2 mm, when protected against deposition of dirt	Not applicable	N/A
	-PWB with 100 V per mm provided with a min. distance of 0.5 mm, when not protected against deposition of dirt	Not applicable	N/A
	Values of the table applied when limits mentioned above resulted in higher values than in the table	Not applicable	N/A
	Reduced creepage distances applied for peak voltages ≤ 50 V if Proof Tracking Index (PTI) of PWB, per Annex G, greater than 175 (PTI).....:	Not applicable	N/A
	Distances reduced further since the tool complied with the requirements of Clause 18 distances short-circuited one at a time	Not applicable	N/A
	Creepage and clearances within optocouplers not measured when individual insulation adequately sealed, with air excluded between material layers	Not applicable	N/A
	For live parts of different polarity separated by basic insulation only, creepage and clearances reduced as tool complied with Clause 18 when creepage and clearances short-circuited	Not applicable	N/A
28.2	Distance through insulation between metal parts was 1.0 mm for working voltages ≤ 130 V when separated by supplementary insulation	Not applicable	N/A
	Distance through insulation between metal parts was 1.5 mm for working voltages ≤ 130 V when separated by reinforced insulation	Not applicable	N/A
	Distance through the insulation was 1.0 mm for reinforced insulation used between windings and accessible metal	Not applicable	N/A
	Distance through insulation between metal parts was 1.0 mm for working voltages > 130 V ≤ 250 V when separated by supplementary insulation, and 2.0 mm when separated by reinforced insulation	Not applicable	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	– requirement waived as insulation applied was in thin sheet form, other than mica or similar, and for supplementary insulation consisting of at least two layers, one layer having withstood electrical strength test for supplementary insulation	Not applicable	N/A
	– requirement waived as insulation applied was of at least three layers and for reinforced insulation, two layers in contact having withstood the electric strength test for reinforced insulation	Not applicable	N/A
	– requirement waived as max. temperature rise determined during test of Cl. 12 did not exceed values in 12.5 for inaccessible supplementary or reinforced insulation	Not applicable	N/A
	–requirement waived as inaccessible reinforced or supplementary insulation, after conditioning for 168h at temperature 50 K greater than max rise determined per Cl. 12, withstood an electric strength test per Cl. 15 at the oven temperature and room temperature (°C).....:	Not applicable	N/A
	For optocouplers, 168 h of conditioning at 50 K higher than the max. temperature rise measured on optocouplers during tests of Clauses 12 and 18, while operating under most difficult conditions	Not applicable	N/A

29	RESISTANCE TO HEAT, FIRE AND TRACKING		-
29.1	External parts of non-metallic material, insulating material supporting live parts, connections and thermoplastics providing supplementary or reinforced insulation sufficiently resistant to heat	See below	P
	Relevant parts subjected to ball-pressure test subsequent to a 24 h exposure to 15 °C-35 °C, and a relative humidity between 45 % and 75 %	The switch is an approved component. The plastic cover of the handgrip was tested according to the requirements of this clause at 75°C for 1 hour. See table 29.1	P
	For coil formers, parts supporting or retaining terminals in position subjected to test		N/A
29.2	Part of non-metallic material, except for decorative trims, knobs, and other parts not likely to be ignited or propagate flames originating from inside the tool, are resistant to ignition and spread of fire	Certificates are provided	P
	Parts of non-metallic material other than material classified at least HB40 per IEC 60695-11-10, provided test sample not thicker than relevant part, comply with glow-wire test of IEC 60695-2-11:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Soft, foamy, and similar materials which cannot be subjected to glow wire test complied with ISO 9772 for category HBF material with test sample not thicker than relevant part	See table 29.2	P
29.3	Insulating materials resistant to tracking		N/A
	Proof tracking test of Annex G conducted on insulating materials used under severe or extra-severe duty conditions:		N/A
	For parts of insulating material used under severe duty conditions, test voltage was 175 V	Certificates are provided	P
	When specimens did not withstand above test and there was no hazard other than fire, surrounding parts subjected to needle-flame test of Annex F	See Table 29.3A	N/A
	For parts of insulating material used under extra-severe duty conditions, test voltage was 250 V		N/A
	When specimens did not withstand above test, but withstood test conducted at 175 V, and there was no hazard other than fire, surrounding parts subjected to needle-flame test of Annex F	See Table 29.3A	N/A
	Needle-flame test on all parts of non-metallic material positioned within a distance of 50 mm from any place where a tracking path may occur		N/A
	A separate barrier or enclosure shielding parts from the tracking path, subjected to needle-flame test		N/A

30	RESISTANCE TO RUSTING		-
30.1	Ferrous parts adequately protected against rusting	The enclosure is made of plastic.	P
	Parts subjected to test.....:		—
	All grease removed from the parts to be tested by immersing them in a degreasing agent for 10 min		N/A
	Parts were immersed for 10 min in a 10 % solution of ammonium chloride in water at (20 ± 5) °C		N/A
	Without drying, all drops shook off, and parts placed for 10 min in a box containing air saturated with moisture at (20 ± 5) °C		N/A
	After parts dried for 10 min in a heating cabinet at (100 ± 5) °C, no evidence of rust on surfaces		N/A
	Small helical springs and the like and parts exposed to abrasion covered by a layer of grease		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
31	RADIATION, TOXICITY, AND SIMILAR HAZARDS		-
31.1	Tool did not emit harmful radiation, present a toxic or similar hazard	The tool passed the relevant EMC test no.: 11032689 001	P
31.2	Tool fitted with a laser of category II or lower, according to IEC 60825-1		N/A

ANNEX B	MOTORS NOT ISOLATED FROM THE SUPPLY MAINS AND HAVING BASIC INSULATION NOT DESIGNED FOR THE RATED VOLTAGE OF THE TOOL		-
B.1.1	Motors with working voltage 42 V		N/A
B.9.1	Metal parts of motor considered bare live parts		N/A
B.12.3	Temperature rise of body of motor determined in place of the temperature rise of the windings		N/A
B.12.5	Temperature rise of the body of the motor in contact with insulating materials did not exceed values in Table 1 for the relevant insulating material	See Table 12.1	N/A
B.18. 201	Tool operated at rated voltage with the terminals of motor and its capacitors short circuited		N/A
	Tool operated at rated voltage with the supply to the motor open circuited		N/A
	Tool operated at rated voltage with shunt resistor open circuited during operation of motor		N/A
B.21.101	For class I tools with a motor supplied by a rectifier circuit, dc circuit insulated from accessible parts of the tool by double or reinforced insulation		N/A

ANNEX F	NEEDLE-FLAME TEST		-
	Needle-flame test according to IEC 60695-11-5	Certificates are provided	N/A

ANNEX G	PROOF TRACKING TEST		-
	Proof tracking test according to IEC 60112 and as modified in this Annex	Certificates are provided	N/A

ANNEX I	SWITCHES		-
	Switches tested to comply with this standard and the following Clauses of IEC 61058-1, as modified	Approved switch is provided	N/A
	Prior to test with tool, switch operated 20 times with no load		N/A
8	Incorporated switch marked with manufacturer's name or trade mark and the type reference		N/A
15	The dielectric strength of mechanical and electronic switches was adequate		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
17.1.1	Switches are for declared specific loads.....:		N/A
17.1.2	Sequence of tests for all switches except electronic switches as indicated in this Annex		N/A
17.2.1.1	Switches loaded at rated voltage under the conditions occurring in the tool		N/A
	Circuits and contacts not intended for external loads operated with the designated loads		N/A
	Switches for 20 Ma load as classified in 7.1.2.6 not subjected to electrical endurance tests		N/A
17.2.4.4	Test at accelerated speed (TC4)		N/A
	For all switches except electronic switches, the electrical conditions were as specified in 17.2.1		N/A
	For electronic switches, electrical conditions were as specified in Table 15		N/A
	Thermal conditions were as specified in 17.2.2		N/A
	Total number of operations were 50 000		N/A
	Method of operation was as specified for accelerated speed in 17.2.3		N/A
20	Clearances, creepage distances, solid insulation and coatings of rigid printed board assemblies		N/A
	Requirements applied to creepage and clearances for live parts of different potential, for operational insulation and across full disconnection and micro-disconnection		N/A

ANNEX K	BATTERY TOOLS AND BATTERY PACKS		-
K.8.1	Detachable or separable battery packs marked with the information required by the standard	Not relevant	N/A
	Rated voltage(s) or voltage range(s), (V).....:		—
	Symbol for nature of supply.....:		—
	Name, trademark or other identification mark		—
	Model or type reference		—
	Manufacturer's address or country of origin		—
	Any mandatory marks		—
K.8.12.1.1	Safety Rules for battery tool use and care.....:	See Attached	N/A
K.9	No two conductive, simultaneously accessible parts where the voltage between them is hazardous		N/A
	Conductive, simultaneously accessible parts provided with protective impedance		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Short circuit current between two simultaneously accessible parts (Ma)		N/A
	Capacitance between two simultaneously accessible parts (μ F)		N/A
K.12.1	No operation of thermal cut-outs and overload releases during heating test		N/A
	Temperature rises met values in Table K.1		N/A
K.15.1	Electric strength test on insulating materials for 1 min to 750 V with a substantially sinusoidal wave from having a frequency of 50 Hz or 60 Hz		N/A
K.18.1	No charring or burning of gauze or tissue paper resulted when battery tool and battery pack were subjected any abnormal operations	See Table K.18.1	N/A
K.19.201	Tools marked with a direction of movement and it is not possible to connect a battery pack such that the marking is not correct		N/A
K.20.1	Battery tools and battery packs have adequate mechanical strength after tests of 20.2 and K.20.3		N/A
	Battery tools and battery packs met requirements of clauses K.9, K.19 and either K.18.1 (f) or K.28.1 after tests of 20.2 and 28.1		N/A
K.20.3	Adequate mechanical strength after drop tests on a concrete surface from a height of 1 m		N/A
	The test was repeated successfully with the battery pack removed from the tool		N/A
	The test was repeated successfully on the battery pack by itself		N/A
K.21.201	Tool will not accept general purpose batteries		N/A
K.23.1.10	Power switches have adequate breaking capacity and present no electrical or mechanical failure		N/A
K.23.1.11	Power switches withstood, without excessive wear or other harmful effect, the mechanical, electrical, and thermal stresses occurring in normal use		N/A
	Cycle rate and voltage applied		—
K.24.201	External flexible cable or cord have anchorages such that the conductors are relieved from strain, including twisting, where they are connected within the tool, and protected from abrasion		N/A
K.28.1	Creepage distances and clearances not less than the values in millimetres shown in Table K.2		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	For part having a hazardous voltage between them, the sum total of the measured distances between each of these parts and their nearest accessible surface is not less than 1,5 mm clearance and 2,0 mm creepage (Fig. K.1)		N/A
K.29.1	External parts of tools and battery pack made of non-metallic materials subject to ball pressure test	See Table 29.1	N/A
K.29.2	The distance between parts of opposite polarity on external enclosure (Figure K.1).....:		N/A

ANNEX L	BATTERY TOOLS AND BATTERY PACKS PROVIDED WITH MAINS CONNECTION OR NON-ISOLATED SOURCES		-
L.8.1	Non-isolated sources that can supply a tool, or tool that can be supplied directly from the mains, marked with as required by the standard:		N/A
	Rated voltage(s) or voltage range(s), (V).....:		—
	Symbol for nature of supply.....:		—
	Rated input, (W) or rated current (A)		—
	Name, trademark or other identification mark		—
	Model or type reference		—
	Symbol for class II		—
	Manufacturer's address or country of origin		—
	Any mandatory marks		—
L.8.1.201	Tools, other than those that can be supplied directly from the mains, detachable battery packs marked with required information		—
	Rated voltage(s) or rated voltage range(s), (V)		N/A
	Symbol for nature of supply.....:		—
	Name, trademark or other identification mark		—
	Model or type reference		—
	Manufacturer's address or trade mark.....:		—
	Additional markings that do not give rise to misunderstanding		—
L.8.12.1.1	Safety Rules for battery tool use and care		—
L.9	Battery tool and/or battery pack constructed and enclosed with adequate protection against electric shock	See attached	N/A
	Tool operated under normal conditions		N/A
	Tool also evaluated with the battery pack removed when removal without the use of a tool was possible		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
L.9.1.201	There are no two conductive simultaneously accessible parts where the voltage between them is hazardous, except when provided with protective impedance		N/A
	Short circuit current between two simultaneously accessible parts (mA).....:		N/A
	Capacitance between two simultaneously accessible parts (μ F)		N/A
	Test finger, figure 1, applied without force		N/A
	Test finger, figure 1, applied with 20 N force		N/A
	Contact with the test finger determined with all detachable parts removed and the battery tool operated in all possible positions of normal use		N/A
L.10	Applied only when tool directly connected to mains, or to a non-isolated source		N/A
L.11	Applied only when tool directly connected to mains, or to a non-isolated source		N/A
	Test on tool capable of charging the battery while performing its function conducted while charging a discharged battery pack		N/A
L.12	Applied only when tool directly connected to mains, or to a non-isolated source		N/A
	Test on tool capable of charging the battery while performing its function conducted while charging a previously discharged battery pack with the charger connected and operated at no-load until the tool stopped operating due to the charging of the battery pack, or until thermal stabilization achieved, whichever occurred first		N/A
	Test repeated, allowing the battery pack to charge while the tool was not operating		N/A
L.13	Applied only when tool directly connected to mains, or to a non-isolated source		N/A
L.14	Applied only when tool directly connected to mains, or to a non-isolated source		N/A
L.15	Applied only when tool directly connected to mains, or to a non-isolated source		N/A
	Electronic devices bypassed when their premature failure prevented the application of the test voltage across insulation to enable the test to be conducted		N/A
L.16	Applied only when tool directly connected to mains, or to a non-isolated source		N/A
L.17	Applied only when tool directly connected to mains, or to a non-isolated source		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Tools not capable of continuous operation operated under battery power for the duration of the test, except evaluated for electric strength with their charger connected		N/A
L.18	Applied only when tool directly connected to mains, or to a non-isolated source		N/A
L.18.201	No charring or burning of gauze or tissue paper resulted when battery tool and battery pack were subjected to abnormal operations	See Table L.18.201	N/A
L.19	Mechanical hazards		N/A
L.19.201	Tool is marked with a direction of movement and it is not possible to connect a battery pack such that the marking is not correct		N/A
L.20	Applied only when tool directly connected to mains, or to a non-isolated source		N/A
L.20.201	Battery tool with its battery pack attached dropped three times on a concrete surface from 1 m changing the position to vary the point of impact		N/A
	Test repeated successfully three more times with the battery pack removed from the tool		N/A
	The test was repeated successfully three times on the battery pack by itself		N/A
	Battery tool and battery pack met requirements of L.9, L.19, L.28.1, and either L.18.201(f) or L.28.201		N/A
L.21	Applied only when tool directly connected to mains, or to a non-isolated source		N/A
L.22	Applied only when tool directly connected to mains, or to a non-isolated source		N/A
L.23	Components		N/A
L.23.1.10.2 01	Switches controlling the primary operating means of the tool, except as indicated in L.23.1.10, have adequate breaking capacity and presented no electrical or mechanical failure		N/A
L.23.1.11.2 01	Switches controlling the primary operating means of the tool, except as indicated in L.23.1.11, withstood the mechanical, electrical, and thermal stresses occurring in normal use without excessive wear or other harmful effect		N/A
	Switch subjected to 6 000 cycles of operation making and breaking the current encountered in the fully charged battery tool operated at no-load		N/A
	The switch operated at a uniform rate of 30 operations per minute		N/A
	During the test, switch operated correctly		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	There was no undue wear, no discrepancy between the position of the operating means and that of the moving contacts, no loosening of electrical or mechanical connections, and no seepage of sealing compound after the test		N/A
L.24	Supply connection and external flexible cords		N/A
L.24.1	The flexible cord between a non-isolated power source and the tool also subjected to the requirements of this Subclause		N/A
L.24.3	The flexible cord between a non-isolated power source and the tool also subjected to the requirements of this Subclause		N/A
L.24.4	This subclause applied, except flexible cord provided between a non-isolated power source and the tool not provided with a plug that can be connected directly to the mains		N/A
L.24.5	Not applied to flexible cord provided between a non-isolated power source and the tool		N/A
L.24.21	Requirements of this Subclause applied, except the flexible cord between a non-isolated power source and the tool not provided with an appliance inlet that can allow direct connection to mains		N/A
L.24.201	External flexible cable and cord have anchorages such that the conductors are relieved from strain, including twisting, where they are connected within the tool, and protected from abrasion		N/A
L.25	Not applied to interconnecting cords		N/A
L.26	Applied to the tool directly connected to the mains or to a non-isolated source		N/A
L.28	Creepage distances, clearances and distances through insulation		N/A
L.28.1	Applied when tool is directly connected to the mains or to a non-isolated source		N/A
	Battery packs connected to the tool during the evaluation		N/A
	Tool also evaluated with the battery pack removed when the removal could be accomplished without the use of a tool		N/A
L.28.201	Creepage distances and clearances not less than the values in millimetres shown in Table L.1		N/A
	Specified clearances not applied to the air gap between the contacts of thermal controls, overload protection devices, switches of micro-gap construction, and the like, or to the air gap between the current-carrying members of such devices where the clearances vary with the movement of the contacts		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Creepage and clearances also not applied to the construction of battery cells or the interconnections between cells in a battery pack		N/A
	Values specified in Table L.1 not applied to cross-over points of motor windings		N/A
	For parts having a hazardous voltage between them, the sum of the measured distances between each of these parts and their nearest accessible surface is not less than 1.5 mm clearance and 2.0 mm creepage (Fig. L.1)		N/A
	Creepage distances and clearances measured as indicated in Annex A		N/A
	For parts of different polarity, clearance and creepage distances less than those given in Table L.1 considered acceptable when the shorting of the two parts did not result in the starting of the tool		N/A
	Distances through slots or openings in external parts of insulating material measured to metal foil in contact with the accessible surface		N/A
	Foil pushed into corners and the like by means of the standard test finger of Figure 1, except not pressed into openings		N/A
	The sum total of distances measured between parts operating at hazardous voltage and accessible surfaces determined by measuring the distance from each part to the accessible surface		N/A
	Distances added together to determine the sum total (See Figure L.1)		N/A
	One of the distances was 1,0 mm or greater (see Annex A, cases 1 to 10)		N/A
	A force applied to the points on bare conductors and to the outside of metal enclosures, in an endeavour to reduce the creepage distances and clearances, as necessary, while taking the measurements		N/A
	Force applied by means of a test finger having a tip as shown in Figure 1 and the following values:		N/A
	– 2 N for bare conductors		N/A
	– 30 N for enclosures		N/A
	An interposed barrier in two parts not cemented together, the creepage distance also measured through the joint		N/A
	Clearances measured over the interposed barrier, or when the barrier was in two parts with mating surfaces not cemented together, through the joint		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	When assessing creepage distances and clearances, the effect of insulating lining of metal enclosures or covers were taken into consideration		N/A
	Means provided for securing the tool to a support considered to be accessible		N/A
L.29	Resistance to heat, fire and tracking		N/A
L.29.1	Applied only to tool directly connected to mains or to a non-isolated source		N/A
	In case of the tool that can charge the battery while performing its intended function, the battery pack evaluated with the charger connected to the mains and with a battery in a condition resulting in the most unfavourable temperatures		N/A
	Tool capable of charging the battery and performing its intended operation also evaluated with battery power alone when this created more unfavourable temperatures		N/A
	A part energized only by a battery source not considered to be live		N/A

ANNEX M	SAFETY OF WORKING STANDS FOR OPERATION WITH HAND-HELD MOTOR-OPERATED ELECTRIC TOOLS		N/A
M.5.201	When test results for the working stand were dependent on the tool used on the working stand, the tool/working stand combination stated in M.8.12.2 a) 201) leading to the most unfavourable results tested		N/A
	The working stand did not adversely affect the safety of the tool when used in combination		N/A
M.7.1	Parts of the electrical system supplying the tool are of Class I when working stand is designed for Class I tools, or Class I and II tools		N/A
	Parts of the electrical system supplying the tool are Class I or Class II when the working stand is designed for Class II tools		N/A
	Compliance verified by inspection and the relevant tests		N/A
M.8.1	The working stand is marked with capacities, such as power, weight, dimensions, as specified in part 2	See attached part 2	N/A
M.8.12.1.1	All required General Working Stand Safety Warnings are provided		N/A
M.8.12.2a)	Information, instructions and warnings provided as stated in 201) and 202)		N/A
M.10	This clause not applied		N/A
M.11	This clause not applicable.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
M.17.2	The test was performed in the normal operating position of the working stand		N/A
M.19.201	The working stand can be used without being secured to the floor or to the tool and it has adequate stability		N/A
	The working stand did not overturn after the tests of this Subclause		N/A
M.19.202	Screws making a mechanical connection between different parts of the working stand did not become loose in normal use		N/A
M.19.203	All required protective devices are delivered with the working stand as stated in the relevant part 2		N/A
M.19.204	The use of the tool with the stand did not impair the safety of the hand-held tool when removed from the stand and used as a stand-alone product		N/A
M.21.17	Switches are located so that accidental operation is unlikely to occur		N/A
	It was not possible to start the electric tool by applying the sphere 100 mm ± 1 mm in diameter to the switch		N/A
M.21.18	The mains switch of the working stand or the tool is located so that it can be switched on and off by the user from the operator's position		N/A
	The switch with a locking arrangement to lock it in the "on" position and capable of being unlocked automatically when the trigger or actuating member is activated considered having met the requirements of this Subclause		N/A
	The relevant part 2 states whether the working stand needs to be fitted with a switch to start and stop the installed electric tool		N/A
	The arrangement inspected, and manual tests conducted		N/A
M.21.201	There is no risk of injury to the operator and it is not necessary to traverse an area that may involve a risk of injury when reaching for a control		N/A
	The area involving a risk of injury is guarded or so located that it cannot be entered unintentionally		N/A
M.21.202	The working stand is equipped with facilities needed to fix the hand-held electric tools which are intended to be installed		N/A
M.21.203	The reactivation of the electric tool/working stand does not cause a hazard after a voltage recovery	See attached Part 2	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
M.21.204	The working stand is designed such that in normal use the dust-collection device on the tool can be used without any restriction		N/A
	Alternatively, the working stand fitted with a dust-collection device, either integral or to be connected to external dust collection equipment that performs in an equivalent manner		N/A
	Additional measures necessary for dust collection are stated in the relevant part 2	See attached Part 2	N/A
	The arrangement inspected and manual tests conducted		N/A
M.23.1.10	Main switches are rated for at least the tool with the highest rated input or rated current recommended by the manufacturer and are rated for 10 000 cycles of operation		N/A
	The mains switches did not have electrical or mechanical failure after the test		N/A
	Mains switches marked with individual ratings were also tested in accordance with IEC 61058-1		N/A
M.23.1.11	IEC 61058-1 compliant switches were not separately tested, but comply with Annex I		N/A
	Test of 17.2.4.4 of IEC 61058-1 was carried out for 10 000 cycles of operation		N/A
M.24.12	This subclause not applied		N/A
M.25.201	Terminals for external conductors comply with IEC 60204-1		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

9.1	TABLE: Protection against access to live parts				N/A
Measurement between relevant parts and poles of supply source	Rated voltage U (V)	Measured voltage (V)	Measured current (A)	Measured capacitance (μF)	
Supplementary information:					

11.1	TABLE: Input data under normal load conditions						P
Rated voltage U(V)				Rated input (W) or current I (A)	Measured input (W) or current (A)	Deviation	Load condition / Remarks
Single Voltage (V)	Lower Voltage Limit (V)	Upper Voltage Limit (V)	Mean Value of Range				
-	110	-	-	1100W	468W	-42.5%	Test with no load.
-	-	120	-	1100W	548W	-49.8%	Test with no load.
-	220	-	-	1100W	508W	-46.2%	Test with no load.
-	-	240	-	1100W	564W	-51.2%	Test with no load.
Supplementary information:							
Optional: Locked Rotor Current <u> 18 </u> Amps							

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Clause	Requirement + Test	Result - Remark	Verdict

12.1	TABLE: Temperature rise measurements under the conditions of 12.2, 12.4, & 12.5		P
Test voltage	110V x 0.94 times = 103V		—
Ambient temperature (°C)	29.3		—
Operating time	30min		—
No Load Speed.....			—
Input current (A) / Input Wattage (W).....	1100W		—
Torque (Nm).....			—
Measurement at:	Temperature rise in °C	Allowed Limit	
Stator winding (thermocouple)	43.0	90	
Stator winding (thermocouple)	63.6	90	
Stator Laminations	27.4	-	
X2 capacitor	2.6	50	
Internal wiring(motor lead)	2.8	105	
Main switch	3.0	55	
Enclosure, plastic part	6.6	50	
Enclosure, metal part	23.1	30	
Brush holder, plastic part	20.7	90	
Handle	2.7	50	
Ambient Temperature	0.0	-	
Supplementary Information: Note: See Table 13.1A for Leakage Current Test after Temperature Test			

12.1	TABLE: Temperature rise measurements under the conditions of 12.2, 12.4, & 12.5		P
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Clause	Requirement + Test	Result - Remark	Verdict
Test voltage	220V x 0.94 times = 207V		—
Ambient temperature (°C)	28.3		—
Operating time	30min		—
No Load Speed.....	4723		—
Input current (A) / Input Wattage (W).....	1100W		—
Torque (Nm).....			—
Measurement at:	Temperature rise in °C	Allowed Limit	
Stator winding (thermocouple)	61.9	90	
Stator winding (thermocouple)	69.5	90	
Stator Laminations	24.9	-	
X2 capacitor	1.5	50	
Internal wiring(motor lead)	1.7	105	
Main switch	1.6	55	
Enclosure, plastic part	6.1	50	
Enclosure, metal part	21.0	30	
Brush holder, plastic part	16.0	90	
Handle	2.6	50	
Ambient Temperature	0.0	-	
Supplementary Information: Note: See Table 13.1A for Leakage Current Test after Temperature Test			

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Clause	Requirement + Test	Result - Remark	Verdict

12.3	TABLE: Temperature Rise of Windings						P
Part under test (windings and core laminations)	R ₁ (Ω)	R ₂ (Ω)	dT (K) by resistance	dT (K) by thermocouples	Allowed dT (K)	Insulation Class	
(110V)							
Stator	0.56	0.69	60.8	63.6	90	E	
Rotor	0.71	0.95	85.6	-	90	E	
(220V)							
Stator	1.52	1.92	69.0	69.5	90	E	
Rotor	2.47	3.18	75.1	-	90	E	
Supplementary Information: Note: See Table 13.1A for Leakage Current Test after Temperature Test							

13.1A	TABLE: Leakage Current – Clause 12.1					P
Points of application	Test voltage (1.06 X rated V)	Freq. (Hz)	Selector Switch Position (ON/ OFF ¹)	Allowed leakage current (mA)	Measured leakage (mA)	
L/N to enclosure	1.06 X 240 V	60	ON (position 1,2) OFF(position 1,2)	0.25	0.015/0.010 0.015/0.015	
L/N to enclosure	1.06 X 120 V	60	ON (position 1,2) OFF(position 1,2)	0.25	0.02/0.015 0.02/0.02	
Supplementary Information: Note ⁽¹⁾ – Testing with tool in the “OFF” position is required when tool employs a single pole switch and a capacitor						

13.1B	TABLE: Leakage Current – Clause 12.6 d)					N/A
Points of application	Test voltage (1.06 X rated V)	Freq. (Hz)	Selector Switch Position (ON /OFF ¹)	Allowed leakage current (mA)	Measured leakage (mA)	
Supplementary Information: Note ⁽¹⁾ – Testing with tool in the “OFF” position is required when tool employs a single pole switch and a capacitor						

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Clause	Requirement + Test	Result - Remark	Verdict

13.1C	TABLE: Leakage Current – Clause 14.3					P
Points of application	Test voltage (1.06 X rated V)	Freq. (Hz)	Selector Switch Position (ON / OFF ¹)	Allowed leakage current (mA)	Measured leakage (mA)	
L/N to enclosure	1.06 X 240 V	60	ON (position 1,2)	0.25	0.015/0.010	
			OFF(position 1,2)		0.015/0.015	
L/N to enclosure	1.06 X 120 V	60	ON (position 1,2)	0.25	0.02/0.015	
			OFF(position 1,2)		0.02/0.02	

Supplementary Information:
Note (1) – Testing with tool in the “OFF” position is required when tool employs a single pole switch and a capacitor

13.1D	TABLE: Leakage Current – Clauses 14.4, 14.5 and 18.12						N/A
Points of application	Test voltage (V)	Freq. (Hz)	Selector Switch Position (ON/OFF ¹)	Allowed leakage current ² (mA)	Measured leakage current (mA)	Mode ³ , test condition ⁴ and/or additional Comments	

Supplementary Information:
Note (1) – Testing with tool in the “OFF” position is required when tool employs a single pole switch and a capacitor
Note (2) – 2 mA for a class II tool, 5 mA for a class I tool
Note (3) – Applicable mode, see Clause 14.4
Note (4) – Test condition such as 1.0 % NaCl solution at specified pressure for 1 h (Clause 14.5), disable residual current device (Cause 14.5), measurement after tool allowed to dry for 24 h at room temperature, etc.

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Clause	Requirement + Test	Result - Remark	Verdict

15.2A	TABLE: Electric Strength Test – Applied after Clause 12.6 d)			N/A
Test voltage applied between:	Class of tool	Test voltage (V)	Results after Clause 12.6 d)	Remarks
Between live parts and accessible parts separated from live parts by basic insulation only	Class III	500		
	Other tools	1250		
Between live parts and accessible parts separated from live parts by reinforced insulation	Class II and II Builds	3750		
	Other tools	3750		
For parts with double insulation, between metal parts separated from live parts by basic insulation only, and live parts	Class II and II Builds	1250		
	Other tools	1250		
For parts with double insulation, between metal parts separated from live parts by basic insulation only, and accessible parts	Class II and II Builds	2500		
	Other tools	2500		
Between metal enclosures or covers lined with insulating material and metal foil in contact with the inner surface of the lining	Class II and II Builds	2500		
	Other tools	1250		
Between metal foil in contact with handles and the like and their shafts	Class II and II Builds	2500		
	Other tools	2500		
Between accessible parts and internal diameter of cord guard wrapped with metal foil	Class II and II Builds	2500		
	Other tools	1250		
Between winding/capacitor connection and accessible parts	Class II and II Builds	2U + 1000		
Between winding/capacitor connection and metal parts separated from live parts by basic insulation only	Other tools	2U + 1000		
Supplementary Information:				

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Clause	Requirement + Test	Result - Remark	Verdict

15.2B	TABLE: Electric Strength Test – Applied after Clause 14.1.2, 14.2, & 14.3					P
Test voltage applied between:	Class of tool	Test voltage (V)	Results after Clause 14.1.2	Results after Clause 14.2	Results after Clause 14.3	
Between the conductors and basic insulation of internal wiring	Class II	1250	-	-	P	
Between the body and internal diameter of cord guard wrapped with metal foil	Class II	2500	-	-	P	
Between plug and the body	Class II	3750	-	-	P	
Supplementary Information:						

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Clause	Requirement + Test	Result - Remark	Verdict

15.2C	TABLE: Electric Strength Test – Applied after Clause 17.2			P
Test voltage applied between:	Class of tool	Test voltage (V)	Results	
Between the conductors and basic insulation of internal wiring	Class II	938	P	
Between the body and internal diameter of cord guard wrapped with metal foil	Class II	1875	P	
Between plug and the body	Class II	2813	P	
Supplementary Information:				

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Clause	Requirement + Test	Result - Remark	Verdict

15.2D	TABLE: Electric Strength Test – Applied after Clause 17.3			N/A
Test voltage applied between:	Class of tool	Test voltage (V)	Results	
Between live parts and accessible parts separated from live parts by basic insulation only	Class III	500		
	Other tools	1250		
Between live parts and accessible parts separated from live parts by reinforced insulation	Class II and II Builds	3750		
	Other tools	3750		
For parts with double insulation, between metal parts separated from live parts by basic insulation only, and live parts	Class II and II Builds	1250		
	Other tools	1250		
For parts with double insulation, between metal parts separated from live parts by basic insulation only, and accessible parts	Class II and II Builds	2500		
	Other tools	2500		
Between metal enclosures or covers lined with insulating material and metal foil in contact with the inner surface of the lining	Class II and II Builds	2500		
	Other tools	1250		
Between metal foil in contact with handles and the like and their shafts	Class II and II Builds	2500		
	Other tools	2500		
Between accessible parts and internal diameter of cord guard wrapped with metal foil	Class II and II Builds	2500		
	Other tools	1250		
Between winding/capacitor connection and accessible parts	Class II and II Builds	2U + 1000		
Between winding/capacitor connection and metal parts separated from live parts by basic insulation only	Other tools	2U + 1000		
Supplementary Information:				

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Clause	Requirement + Test	Result - Remark	Verdict

15.2E	TABLE: Electric Strength Test – Applied after Clause 20.2, 20.3 and 20.4					P
Test voltage applied between:	Class of tool	Test voltage (V)	Results after 20.2	Results after 20.3	Results after 20.4	
Between the conductors and basic insulation of internal wiring	Class II	1250	P	P	P	
Between the body and internal diameter of cord guard wrapped with metal foil	Class II	2500	P	P	P	
Between plug and the body	Class II	3750	P	P	P	
Supplementary Information:						

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Clause	Requirement + Test	Result - Remark	Verdict

16.1	TABLE: Overload Protection of Transformers and Associated Circuits		N/A
Test voltage			—
Ambient temperature (°C)			—
Input current (A) / Input Wattage (W).....			—
Applied short-circuit or overload.....			—
Measurement at:	Temperature rise, (°C)	Allowed Limit	
Transformer winding (thermocouple)			
Transformer winding (T ₁)R-R			
Transformer winding (T ₂)R-R			
Transformer Lamination			
Internal wiring			
Capacitor			
Printed circuit board			
SELV circuits			
Supplementary Information:			

18.10.2	TABLE: Fault Condition Tests				N/A
	Ambient temperature (°C)				—
Component	Fault Condition	Test Voltage (V)	Test Duration	Fuse-link Current (A)	Comment/Result
Supplementary Information:					

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Clause	Requirement + Test	Result - Remark	Verdict

23.1	TABLE: List of Critical Components					P
Object/Part No.	Manufacturer/ Trademark	Type/Model	Technical Data	Standard	Mark(s) of Conformity ¹⁾	
Enclosure material	Formosa	#2200+(f2) #2500+(f2)	HB	UL94	UL E135541	
Motor						
1. Stator details:						
- wedges	Jindal Polyester	JPEL	105°C	UL94	UL E176671	
- magnet wire	TA YA Electric Wire & Cable	PEW, UEW	155°C	UL1446	UL E84201	
2. Armature details:						
- shaft insulation	BMC China CO	FTI901	130°C	UL94	UL E253513	
- wedges	Jindal Polyester	JPEL	105°C	UL94	UL E176671	
- magnet wire	TA YA Electric Wire & Cable	PEW, UEW	155°C	UL1446	UL E84201	
Power plug	Ta An Electric	TP-41	AC250V/16A	VDE0620-1	VDE	
Alternative	Ta An Electric	TP-51	AC250V/16A	VDE0620-1	VDE	
Alternative	Ta An Electric	TP-52	AC250V/16A	VDE0620-1	VDE	
Power plug (for UK)	Ningbo Znpon	P1134	AC130V/16A	IEC 60309	SEMKO	
Power cord	I-Sheng Electric	H05VV-F	2x1.0 mm ²	VDE0281-5	VDE	
Alternative	Lu Chiang Electric	H05VV-F	2x1.0 mm ²	VDE0281-5	VDE	
Alternative (for France)	Nexans	H07RN-F	2x1.0 mm ²	HD 22.4 S4:04	LCIE	
Switch	Defond	DGU-1115-BC	125V/15A 250V/8A	EN 61058-1	ENEC	
PCB base plate	Hansonic PC Board	FR-4-86	V-0	UL796	UL E131242	
Alternative	Nan Ya Plastics	UV Block FR-4- 86(#1)	V-0	UL796	UL E98983	
Internal wiring	YI HUAN PRECISION	1015,1018	600V	UL758	UL E250011	
Alternative	Wonderful Hi- Tech	1015,1018	600V	UL758	UL E77981	
Wire connector	Propanda Ind	Wire end cap	600V, 105°C	UL224	UL E122477	
Capacitor	Carli Electronics	X2	0.47µ F	DIN EN 132400	VDE	
Alternative	Aid Electronic	MEX	0.47µ F	DIN EN 132400	VDE	
Relay	Song Chuan Precision	881-2CC-C	24Vdc, 8A 250Vac, T85	DIN EN 60947- 4-3	VDE	
¹⁾ An asterisk indicates a mark which assures the agreed level of surveillance						

28.1	TABLE: Clearance and Creepage Distance Measurements						P
Clearance cl and Creepage Distance (dcr) Between:	Up (V)	U r.m.s. (V)	Required cl (mm)	cl (mm)	Required dcr (mm)	Dcr (mm)	

IEC 60745-2-9						
Clause	Requirement + Test			Result - Remark		Verdict
Between live parts of different polarity (terminals of switch)	AC 240V	AC 230V	2.5	10.0	3.0	12.0
Between internal wiring and enclosure fixing screw (over basic insulation)	AC 240V	AC 230V	3.0	15.0	4.0	15.0
Between internal wiring and accessible enclosure (over basic insulation)	AC 240V	AC 230V	3.0	4.2	4.0	4.2
Between live parts of different polarity (terminals of switch)	AC 120V	AC 115V	2.5	10.0	3.0	12.0
Between internal wiring and enclosure fixing screw (over basic insulation)	AC 120V	AC 115V	3.0	15.0	4.0	15.0
Between internal wiring and accessible enclosure (over basic insulation)	AC 120V	AC 115V	3.0	4.2	4.0	4.2
Supplementary information: - Creepage and clearance values of Table 10 do not apply to crossover points of motor windings.						

28.2	TABLE: Distance Through Insulation Measurements				N/A
Distance Through Insulation di Between:	U r.m.s. (V)	Test Voltage (V)	Required di (mm)	Di (mm)	
Supplementary information:					

IEC 60745-2-9			
Clause	Requirement + Test	Result - Remark	Verdict

29.1	TABLE: Ball Pressure Test			P
Part under test	Plastic material type	Test Temperature (°C)	Impression Diameter (mm)	
Enclosure	HB (see table 23.1)	75	<2mm	
Supplementary information:				

29.2	TABLE: Glow Wire Test					P
Test Conditions..... :		Test according to IEC 60695-2-11				—
Test temperature (°C)		550°C				—
Test Specimen	Material type	Specified Layer placed underneath Test Specimen	Material ignited, Yes/No	Specified Layer under Test Specimen ignited, Yes/No	Other remarks	
Main enclosure	550	No	No	No	P	
Supplementary information:						

29.3A	TABLE: Proof Tracking Test, Annex G					N/A
Test Conditions..... :		Test according to IEC 60112				—
Test solution						—
Test Voltage (V)..... :						—
Specimen under test	Material type	Tracking occurred, Yes/No	Rate of Tracking	Other remarks		
Supplementary information:						

IEC 60745-2-9			
Clause	Requirement + Test	Result - Remark	Verdict

29.3B	TABLE: Needle-flame Test, Annex F					N/A
Test Conditions.....:	Test according to IEC 60695-2-2					—
Duration of flame application (s)						—
Test temperature (°C)						—
Specimen under test	Material type	Material ignited, Yes/No	Tissue Paper Ignited, Yes/No	Pine-wood Scorched, Yes/No	Other remarks	
Supplementary information:						

K12.1	TABLE: Normal Temperature Test for Battery Tool					N/A
Test voltage						—
Ambient temperature (°C)						—
Input current (A) / Input Wattage (W).....:						—
Speed control setting:						—
Measurement at:	Temperature rise, (°C)			Allowed Limit		
Enclosure, outside, gripping surface						
Enclosure , outside, near motor						
Enclosure outside, gear housing						
Enclosure, inside, near motor						
Enclosure, inside, near heat sink						
Internal wiring						
Switch body						
External, metal gear case						
Battery terminal support						
Battery pack						
Supplementary Information: Status of overload protector at end of test [] No change [] Opened during the Test [] N/A						

IEC 60745-2-9			
Clause	Requirement + Test	Result - Remark	Verdict

K.18.1	TABLE: Battery Tool Abnormal Operation					N/A
Abnormal conditions	Resistance (max. 10 mΩ)	Protector Operated?	Test repeated 3 more times	Charring or burning of test materials?	Other remarks	
a) Terminals of detachable battery pack with exposed terminals shorted						
b) Motor terminals shorted						
c) Motor rotor locked	N/A					
d) Cord between battery tool and separable battery pack shorted						
e) Cord provided the tool and the charger shorted						
f) Any two uninsulated parts of opposite polarity in battery tools shorted						
Supplementary Information:						

L.18.201	TABLE: Battery Tool Abnormal Operation					N/A
Abnormal conditions	Resistance (max. 10 mΩ)	Protector Operated?	Test repeated 3 more times	Charring or burning of test materials?	Other remarks	
a) Terminals of detachable battery pack with exposed terminals shorted						
b) Motor terminals shorted						
c) Motor rotor locked	N/A					
d) Cord between battery tool and separable battery pack shorted						
e) Cord provided the tool and the charger shorted						
f) Any two uninsulated parts of opposite polarity in battery tools shorted						
Supplementary Information:						



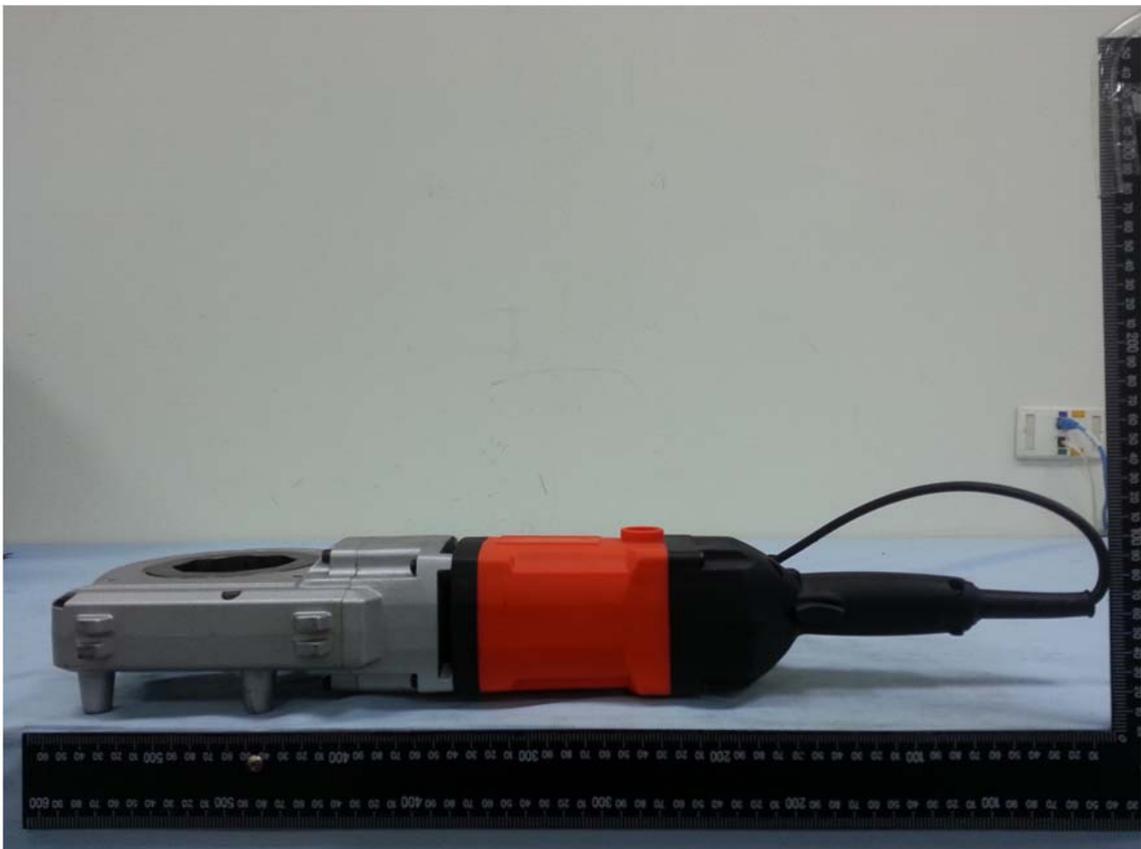
Picture 1



Picture 2



Picture 3



Picture 4

Report Number: 11034887.001

Model: PT600



Picture 5