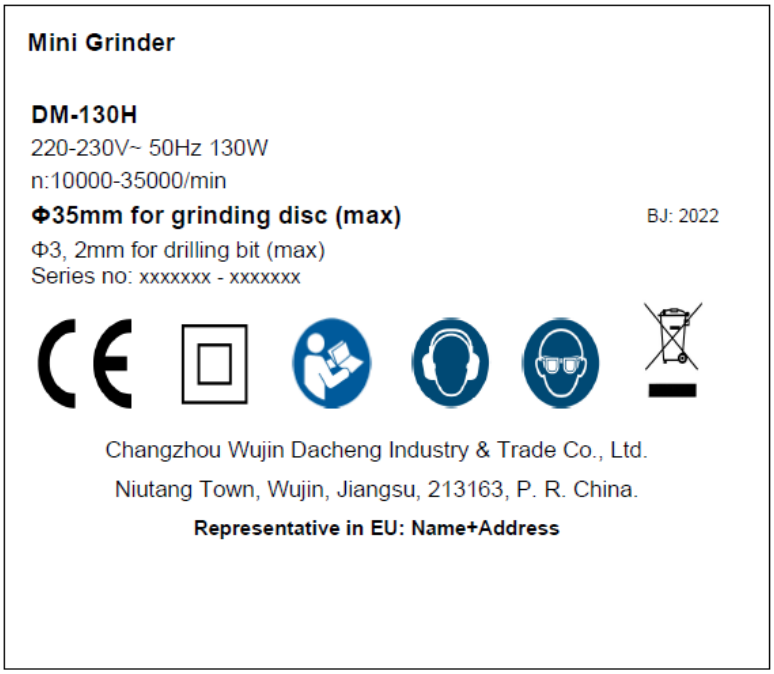
TEST REPORT
EN 60745-2-23
Safety of Hand-Held Motor-Operated Electric Tools
Part 2-23: Particular requirements for die grinders and small rotary tools

Report Reference No. ..... :	220602651SHA-001	
Compiled by (+ signature) ..... :	Jonathan Chu	Jonathan Chu .....
Approved by (+ signature) ..... :	Michael Shen	.....
Date of issue..... :	July 18,2022	
Testing Laboratory..... :	Intertek Testing Services Shanghai Limited	
Address ..... :	Building No.86, 1198 Qinzhou Road (North), Shanghai 200233, China	
Applicant's name..... :	Changzhou Wujin Dacheng Industry & Trade Co., Ltd.	
Address ..... :	Niutang Town, Wujin, Jiangsu, 213163, P. R. China.	
Test specification:		
Standard..... :	PART ONE: EN 60745-1:2009+A11:2010	
	PART TWO: EN 60745-2-23:2013	
Test procedure ..... :	CE-MD	
Non-standard test method…….. :		

Test Report Form No.....:	TTRF EN60745_2_23A
TRF Originator.....:	Intertek
Master TRF.....:	2013-12
Test item description .....:	Mini Grinder
Trade Mark .....:	N/A
Manufacturer .....:	Changzhou Wujin Dacheng Industry & Trade Co., Ltd. Niutang Town, Wujin, Jiangsu, 213163, P. R. China.
Model/Type reference .....:	DM-130H,DL-DM03-E1
Ratings .....:	220-230V~, 50Hz, n: 10000-35000min^{-1}, Φ35mm for grinding disc(max), Φ3,2mm for drilling bit(max), Class II,130W
Remark.....:	DL-DM03-E1 is identical with DM-130H except for the model name.

Copy of marking plate (representative)



Summary of testing:

All tests are carried out in according to the standard: EN 60745-1:2009+A11:2010 and EN 60745-2-23:2013, and the test results meet the requirements specified in the above-mentioned standards.

Determination of the test conclusion is based on IEC Guide 115 in consideration of measurement uncertainty.

Test item particulars ..... :	
Class of tool ..... :	Class II
Method of supply cord attachment ..... :	Type Y
Duty conditions ..... :	Severe
Type of operation ..... :	Continuous
Degree of protection ..... :	IP20
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 ..... :	Jun 8,2022
Date(s) of performance of test ..... :	Jun 8,2022 --- Jul 18,2022
General remarks:	
This test report shall not be reproduced except in full without the written approval of the testing laboratory.	
The test results presented in this report relate only to the item tested.	
"(see remark #)" refers to a remark appended to the report.	
"(see appended table)" refers to a table appended to the report.	
Throughout this report a comma is used as the decimal separator.	
Determination of the test result include consideration of measurement uncertainty from the test equipment and methods.	
General product information:	
The products covered in this report are hand-held motor-operated electric mini grinders. Intended use: Polishing, grinding, sharpening, engraving, cutting, working with wire brush,drilling etc	
The factory name: Changzhou Wujin Dacheng Industry & Trade Co., Ltd. The factory address: Niutang Town, Wujin, Jiangsu, 213163, P. R. China	

PART One: EN 60745-1:2009+A11:2010			
Clause	Requirement + Test	Result - Remark	Verdict
4	**GENERAL REQUIREMENTS**		
	Tools shall be constructed that in normal use they function safely so as to cause no danger to persons or surroundings, even in the event of foreseeable misuse.		P
5	**GENERAL CONDITIONS FOR TESTS**		
	Tests performed according to cl. 5., e.g. correct ambient temperature range, nature of supply, sequence of testing, most unfavourable position etc		P
6	**ENVIRONMENTAL REQUIREMENTS**		
6.1	**Noise measurement**		
6.1.1	Noise reduction at tools is an integral part of the design process and shall be achieved by particular applying measures at source to control noise, see for EN ISO 11688-1.		P
6.1.2	Noise test code (grade 2)		P
6.1.2.1	General, noise source		P
6.1.2.2	Sound power level determination		
	The sound power level shall be measured according to EN ISO 3744, where the acoustic environment, instrumentation, quantities to be measured, quantities to be determined, and the measurement procedure are specified.		P
	The sound power level shall be given as A-weighted sound power level in dB reference 1 pW. The A-weighted sound pressure levels from which the sound power is to be determined, shall be measured directly, and not calculated from frequency band data. Measurements shall be made in an essentially free field over a reflecting plane needed.		P
	For all hand-held electric power tools, the sound power level shall be determined by using a hemispherical /cylindrical measurement surface according to figure Z2		P

PART One: EN 60745-1:2009+A11:2010			
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	The hemispherical / cylindrical measurement surface is described by a hemisphere standing on a cylindrical pedestal (fig Z2). Five microphone positions shall be located 1 m from the geometric centre of the power tool. Four positions shall be spaced at regular intervals on a plane defined as passing through the geometric centre of the power tool and parallel to the reflecting plane, the fifth position shall be located at a distance 1m above geometric centre of the power tool.		P
	The A-weight sound power level, L_{wA}, shall be calculated, in accordance with 8.6 of EN ISO 3744		P
6.1.2.3	Emission sound pressure level determination		
	A-weighted emission sound pressure level, L_{pA}: Surface sound pressure level at 1m, or Estimate at r1(m),		P
	C-weighted peak emission sound pressure level measurement, if required		N/A
6.1.2.4	Installation and mounting conditions of the power tools during noise tests		
	New power tool, equipped with accessories which affect the acoustic properties, tested under the recommended stable condition set up		P
	Tools held by the operator or suspended in such a way as to correspond to normal use, as specified in the relevant part 2	Specified in part 2	P
	If the power tool is used horizontally, it shall be positioned so that its axis is at 45 degree between the microphone positions 1-4, 2-3; its geometrical centre shall be 1 m above the ground. if these requirements are impracticable or the tool is not used horizontally, the adopted positions shall be recorded and described in the test report		P
6.1.2.5	Operating conditions		
	Operating condition shall be identical for the determination of both sound power level and emission sound pressure level at the work station		P
	Measurements carried out on a new tool, and tested under load and no load condition specified in part 2.	No load condition	P
	When the tests are carried out on a test bench it shall be done on a test bench according to figure Z1		P
	Emission Steady condition period ≥15s		P

PART One: EN 60745-1:2009+A11:2010			
Clause	Requirement + Test	Result - Remark	Verdict
	Three tests for no-load or five for load shall be carried out	Three tests for no-load	P
6.1.2.6	Measurement uncertainties, less than 1,5dB		P
6.1.2.7	Noise test record		P
	Deviations from this noise test record or from the basic standards		N/A
6.1.2.8	Noise test report		P
6.1.2.9	Declaration and verification of noise emission values		
	Noise emssion value L (L_{pA}, L_{pCpeak} and L_{wA}) .....:	L_{pA}: 72 dB(A) L_{wA}: 83 dB(A)	P
	Respective uncertainty K (K_{pA}, K_{pCpeak} and K_{wA}) ...:	K_{pA}: 3 dB(A) K_{wA}:3 dB(A)	P
6.2	**Vibration measurement**		
6.2.1	Vibration reduction		P
6.2.2	Vibration measurement – General		
	Details for particular types of tool are given in the relevant part 2.		N/A
	Guidance of declaration of vibration emission is given by EN12096		P
	ah (m/s^2) shall be quoted in the user instruction		P
	The uncertainty K is provided as an indication of the measured deviation from the mean during the test.		P
6.2.3	Symbols defined		
6.2.4	Characterization of vibration		
6.2.4.1	Direction of measurement defined in figure Z3		P
	Defined in the relevant Part 2		N/A
6.2.4.2	Location of measurement		
	-Measurement shall be made in three directions at each hand position and simultaneously		P
	-transducer shall be at correct position		P
	-for vibration isolated stick type side handles, the transducer may alternatively be placed half way along the length of the handle. The transducer shall be placed inside the handle.		N/A
	-soft surface material from the grip area removed		P
	In case of vibration isolated handle,		

PART One: EN 60745-1:2009+A11:2010			
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	-average of results at two position is introduced, or		N/A
	-place transducer inside the handle		N/A
6.2.4.3	Magnitude of vibration		
	The quantity used to describe the magnitude of vibration shall be the frequency- weighted acceleration a_{hw} in m/s^2		P
	Frequency weighted in accordance with EN ISO 5394-1 shall be used.		P
	The root mean square value a_{hw} in according with this European standard is defined as the root mean square value of the frequency-weighted acceleration signal.		P
	An integrating device equipped with linear integration facilities shall be used in order to obtain root mean square values of signals substantially varying with time.		P
	The measurement time shall be as long as reasonably possible and normally not less than 8s for hand-transmitted vibration measurements.		P
	If the measurement time of 8s for individual machines is not possible, e.g. because of short duration of operation, this shall be specified in the relevant Part 2 of this standard.		P
6.2.4.4	Combination of vibration directions		
	The total vibration value a_{hv} is determined from the root-sum-of squares of the a_{hw} values for the three measured axes of vibration		P
6.2. 5	Instrumentation requirements		
6.2. 5.1	Vibration measurement equipment shall be in accordance with EN ISO8041		P
	Characteristics of Instrumentation are not covered by EN ISO8401 shall be specified in part 2		N/A
6.2.5.2	Transducers		
6.2.5.2.1	Specification of transducers		
	Vibration values shall be measured with transducer and other equipment conforming to EN ISO 8041		P
	Mass of transducer and its mounting shall not be sufficient to influence the measurement		P
	Transducer shall not be more than 5g for measurement.		P

PART One: EN 60745-1:2009+A11:2010			
Clause	Requirement + Test	Result - Remark	Verdict
	All factors shall be considered in the selection of transducers		P
6.2.5.2.2	Transducers shall be properly fastened according EN ISO5349-2		P
6.2.5.2.3	Calibration of the measurement chain		
	The whole measurement system shall be checked both before and after a sequence of measurements using a calibrator which produces a known acceleration at a known frequency.		P
	The transducer shall be calibrated in accordance with ISO 5347 and ISO16063-1. The whole measurement system shall be checked according to the requirements in EN ISO 8041.		P
6.2.6	Testing and operating conditions of the machinery		
6.2.6.1	Measurements shall be carried out on a new tool		P
	Operating conditions and working procedure shall be specified in sufficient detail as to achieve appropriate reproducibility if no Part 2 provided		P
	Tests are carried out under more than one operation condition or set of operating conditions as defined in the relevant Part 2.		N/A
	Means or devices to reduce the vibration emission during testing		N/A
	During measurement hand's guide as specified in the instructions supplied with the machine is needed		N/A
6.2.6.2	The attachment or accessories to be used with the machine shall be as recommended in the user instruction.		N/A
	If these attachments are of a vibration reduction type, it shall be reported together with the declared vibration value	No such device	N/A
	The location of the work piece on its support does not affect the results of the test, detail given in the relevant Part 2		N/A
6.2.6.3	Operation conditions		
	Test condition shall be carried according relevant part 2		P
	At least 1min operation needed to warm up		P
6.2.6.4	Operator		

PART One: EN 60745-1:2009+A11:2010			
Clause	Requirement + Test	Result - Remark	Verdict
	The operator shall be skilled and able to operate the machine properly.		P
	The gripping force shall be under long term working conditions and not be excessive.		P
6.2.7	Measurement procedure and validity		
6.2.7.1	Reported vibration value		P
	Three series of five consecutive tests shall be carried out using a different operator for each series. If it can be shown that the vibration is not affected by operator characteristics, it is acceptable to perform all 15 measurements with one operator only. Details are specified in the relevant Part 2.		P
	Measurements shall be made in three axes.		P
	Results are accepted if C_v<0,15 or S_{N-1}<0,3m/s^2		P
	The result shall be the arithmetic mean of the total values over the tests and operators.		P
6.2.7.2	Declaration of the vibration emission value		
	The result ah is the basis of declared value. If values have been obtained for different hand positions, the greatest value shall be the basis for the declaration.		P
	The vibration total value ah of the handle with the highest emission and the uncertainty K shall be declared.	a_h: 1,42 m/s^2 K: 1,5 m/s^2	P
6.2.8	Measurement report, shall ,as a minimum, shall include :		
	a) reference to this standard including any relevant part 2		P
	b) specification of the machine tested		P
	c) attachment or accessories		P
	d) operating and testing condition		P
	e) measuring institution		P
	f) date of measurement and name of operator		P
	g) instrumentation		P
	h) description of transducers		P
	i) report all the measured values		P
	j) a_h and K shall be included		P
	deviation from the vibration test code shall be reported with the technical justification		N/A

PART One: EN 60745-1:2009+A11:2010			
Clause	Requirement + Test	Result - Remark	Verdict
7	**CLASSIFICATION**		
7.1	Protection against electric shock, covered tool Class I, II, or III ..... :	Class II	P
7.2	Degree of protection against harmful ingress of water per EN 60529 ..... :	IP20	P
8	**MARKINGS AND INSTRUCTIONS**		
8.1	Rated voltage(s) V ..... :	See copy of marking plate	P
	Nature of supply/frequency (Hz)..... :	~/50Hz	P
	Input (W)..... :	See copy of marking plate	P
	Rated current (A)..... :	Not marked	N/A
	Business name and address (sufficient to ensure to contact) of the manufacturer or authorized representative..... :	See copy of marking plate	P
	Designation of tool ..... :	See copy of marking plate	P
	Designation of series or type ..... :	See copy of marking plate	P
	Class II symbol..... :	See copy of marking plate	P
	IP number other than IPX0 ..... :	IP20, Not marked	N/A
	Warning sentence or the sign M002 of ISO7010…. :	See copy of marking plate	P
	Manufacturer's address ..... :	See copy of marking plate	P
	Year of manufacture ..... :	See copy of marking plate	P
	Any mandatory mark showing compliance with legislation by reference to this standard..... :	CE, WEEE	P
	Additional marking..... :	See copy of marking plate	P
8.2	Correct use of symbols for rated operating time..... :	Continuous operating	P
8.3	Correct use of symbol for voltage ranges and different voltage levels ..... :	See copy of marking plate	P
8.4	Change in voltage clearly discernible		N/A
8.5	Marked with rated power ..... :	See copy of marking plate	P
8.6	Use of correct symbols		P
	Correct dimensions and use for Class II symbol .... :	See copy of marking plate	P
	Other units and their symbols same as international standardised system ..... :	See copy of marking plate	P
	Use of additional symbols		P
8.7	Use of more than two supply conductors	Class II	N/A

PART One: EN 60745-1:2009+A11:2010			
Clause	Requirement + Test	Result - Remark	Verdict
	The earthing conductor not a supply conductor		N/A
8.8	Terminal marking .....:		N/A
8.9	Unless it is obviously unnecessary, switches which may give rise to a hazard when operated shall be marked, or so placed as to indicate clearly which part of the tool they control.	Marked with “I” and “O” on main switch	P
	Indications used for this purpose shall, wherever practicable, be comprehensible without a knowledge of languages, national standards, etc.		P
8.10	“Off ” position indicated due to hazard of start up. Use of symbol IEC 60417-5008 (DB:2002-10) .....:	Symbol “O” used to indicate off position	P
	The figure O not be used for any other indication		P
	The position of the moving contact of the main switch shall correspond to the indications for the different positions of its operating means		N/A
8.11	Regulating devices and the like marking	Marked with “1, 2…max”	P
	Use of figures for different positions		N/A
8.12	Requirements for instruction manual and general safety instructions .....:	See copy of manual	P
	“Original instructions” exist in official language where tool sold/used, or		P
	Translation to official language provided by the manufacturer, his representative or the person bringing into the area		N/A
	The manual include business name and address (sufficient to ensure to contact) of the manufacturer or authorized representative.....:	See copy of manual	P
	Designation of tool, series or type, description of machine as 8.1	See copy of manual	P
8.12.1	Safety Rules in English are verbatim and in any other official language are equivalent.....:	In German	P
8.12.1.1	General power tool safety warnings needed		P
8.12.1.2	Order of safety of instruction shall either item(A) item (B) and item(c)		P
8.12.2	Additional information provided as appropriate .....:	See copy of manual	P
	In operating instruction, -limits on size of workpiece and type of material		N/A
8.12.2 Za)	Emissions:		

PART One: EN 60745-1:2009+A11:2010			
Clause	Requirement + Test	Result - Remark	Verdict
	1) noise emission:		
	-L_{pA}, K_{pA} if L_{pA}>70dB(A), or indicate L_{pA} does not exceed 70dB(A)		P
	-L_{wA}, K_{wA} if L_{wA}>80dB(A)		P
	-L_{pCpeak}, K_{pCpeak} if L_{pCpeak} >63Pa		N/A
	2) Recommendation concerning hearing protection		P
	3) vibration level: state <2.5m/s^2 or give a value	Value in the manual	P
	4) The following information - that the declared vibration total value has been measured in accordance with a standard test method and may be used for comparing one tool with another - that the declared vibration total value may also be used in a preliminary assessment of exposure		P
	5) A warning - that the vibration emission during actual use of power tool can differ from the declared total value depending on the ways in which the tool is used; and - of the need to identify safety measures to protect the operator that are based on an estimation of exposure in the actual conditions of use		P
8.13	Markings legible and durability		P
8.14	Markings in 8.1 to 8.5 on a main part of the tool		P
	Markings in 8.1, 8.2, 8.3 and 8.5 placed together		P
8.15	Markings of required thermal link or fuse-link .....:	No fuse-link used	N/A

9	**PROTECTION AGAINST ACCESS TO LIVE PARTS**		
	Adequate protection against accidental contact with live parts		P
9.1	Accessible part not considered live if:		
	- extra-low a.c. voltage: peak values not exceeding 42.4 V		N/A
	- extra-low d.c. voltage: not exceeding 42.4 V		N/A
	- or separated from live parts by protective impedance, d.c. current not exceeding 2 mA		N/A
	- or separated from live parts by protective impedance, a.c. peak value not exceeding 0.7 mA		N/A

PART One: EN 60745-1:2009+A11:2010			
Clause	Requirement + Test	Result - Remark	Verdict
	- for peak value 42.4 V up to and including 450 V capacitance not exceeding 0.1 μF		N/A
	- for peak value 450 V up to and including 15 kV capacitance not exceeding 0.1 μF		N/A
9.2	No contact of live parts with probe, Fig 1 with detachable parts removed		P
	No contact of live parts of the lamp with probe, Fig 1, with detachable parts removed.		N/A
	No accessible screw type fuses and screw-type miniature circuit breakers		N/A
	No contact of live parts or live parts protected only by lacquer, enamel, ordinary paper, cotton, oxide film, beads, or sealing compound with probe, Fig 1, through an opening with 20 N force applied		P
9.3	No contact of live parts with the test pin, Fig 2, for opening in class II or class constructions		P
9.4	No contact of basic insulation with probe, Fig 1, for openings in Class II or Class II constructions with all detachable parts removed		P
10	**STARTING**		
10.1	Motors start under normal voltage conditions		P
	Starting ten times at 0.85 times rated voltage without load (V) .....:	220V×0,85=187 V 10 times with no load	P
10.2	With centrifugal and other automatic starting switches: ten times at 1.1 rated voltage (V) .....:	No such switch used	N/A
10.3	No operation of the overload protection device. Rated ampacity of protection device	No overload protection device used	N/A
11	**INPUT AND CURRENT**		
11.1	Measured power input or current at rated voltage greater than 110% of marked.....:	See Table 11.1	P
12	**HEATING**		
12.1	No excessive leakage currents after heating test...:	See Table 12.1	P
	Heating element tested to Cl.16.1 of EN 60335-1	No such device used	N/A
12.2	Loading conditions during temperature test.....:	See Table 12.1	P
	Heating elements tested to EN 60335-1 and 1.06 times rated voltage		N/A

PART One: EN 60745-1:2009+A11:2010			
Clause	Requirement + Test	Result - Remark	Verdict
12.3	Temperature rise by resistance for windings .....:	See Table 12.3	P
	Temperature rise by thermocouples for all parts except windings.....:	See Table 12.1	P
	Electrical insulation measured if such failure reduces spacings .....:		N/A
12.4	Tool operating time .....:	See Table 12.1	P
12.5	Protective devices do not operate		N/A
	No excessive temperature in the most unfavourable voltage		N/A
	No flow of sealing compound		N/A
12.6	Winding temperatures exceeding values in Table 1		N/A
	a) Maximum temperature rise of the windings.....:		N/A
	b) Heat treatment for 240 h		N/A
	b) Heating cabinet temperature (°C) .....:		N/A
	c) No inter-turn short circuit after oven treatment		N/A
	d) No excessive leakage current after oven treatment		N/A
	- No flashover or breakdown occurred during electric strength after oven treatment		N/A
	e) Humidity treatment (93%±2% at 25 °C).....:		N/A
	f) No excessive leakage current after humidity treatment .....:		N/A
	- No flashover or breakdown occurred during electric strength after humidity treatment.....:		N/A
13	**LEAKAGE CURRENT**		
13.1	Leakage current test	See Table 13.1	P
13.2	Leakage current measured by means of circuit described in Figure 10		P
14	**MOISTURE RESISTANCE**		
14.1	Degree of protection for tool enclosure according to tool classification .....:	IP20	P
14.1.2	Tool rated IPX1 through IPX7 (i.e., tool other than IPX0) subject to applicable tests of EN 60529		N/A
	For IPX7 test, tool immersed in water containing 1 % NaCl		N/A

PART One: EN 60745-1:2009+A11:2010			
Clause	Requirement + Test	Result - Remark	Verdict
	No flashover or breakdown occurred after moisture treatment		N/A
	No trace of water on insulation causing reduction of creepage and clearance below those 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		N/A
	No flashover or breakdown occurred after spillage treatment		N/A
14.3	48 hours humidity treatment test		P
	Relative humidity (93 ± 2) %.....:	93%	—
	Temperature (20 - 30 °C ± 1K).....:	25°C	—
	No excessive leakage after humidity treatment.....:	See Table 13.1	N/A
	No flashover or breakdown occurred during electric strength after humidity treatment.....:	See Table 15.2	P
14.4	Liquid systems shall not subject the user to an increased risk of electrical shock during foreseeable misuse	No liquid system used	N/A
	Leakage current during test.....:		N/A
14.5	Liquid systems shall be constructed of components capable of withstanding the pressure in normal use without leaking		N/A
	Leakage current during test.....:		N/A
14.6	RCD shall comply with IEC 61540 and	No RCD used	N/A
a)	The RCD shall disconnect both mains conductors, but not the earth conductor if provided, when the leakage exceeds 10 mA and with a maximum response of 300 ms.		N/A
b)	The RCD shall be reliable for its intended use.		N/A
c)	The RCD shall be installed such that it is unlikely to be removed during use or routine normal maintenance.		N/A

15	**ELECTRIC STRENGTH**		
15.1	Electric strength is adequate when tested with protective impedance disconnected		P
15.2	No flashover or breakdown occurred during the test with the output current is less than 100 mA.....:	See Table 15.2	P
	The insulation coating withstood the applied potential		P

PART One: EN 60745-1:2009+A11:2010			
Clause	Requirement + Test	Result - Remark	Verdict
	For the tool whit integral heating elements, test voltages specified in EN 60335-1 applied to the heating elements only and not to other parts of tool		N/A
16	**OVERLOAD PROTECTION OF TRANSFORMERS AND ASSOCIATED CIRCUITS**		
16.1	No excessive temperatures in a tool supplied from a transformer during short circuit ..... :		N/A
	Transformer complies with EN 61558-1		N/A
17	**ENDURANCE**		
17.1	No hazards due to extended normal use		P
17.2	No load intermittent operation (2 x 24 h)		P
	Number of operations..... :	1440	—
	Number of hours for each operation..... :	24h	—
	Test voltage at each operation (V)..... :	1,1X230=253V 0,9X220=198V	—
	Rate of operation (s “on”, s “off”)..... :	100s “on”, 20s “ off”	—
	Test positions selected..... :	Vertical up / Horizontal / Vertical down	—
	Operation time for each position ..... :	8h	—
	Servicing of carbon brushes and lubricant ..... :	No such conditions occur	N/A
	Forced cooling or rest periods if temperature exceeded values in Table 1 ..... :	No such conditions occur	N/A
	No electrical or mechanical failure		P
	No insulation damage		P
	No loose contacts or connections		P
	No flashover or breakdown occurred after the test	See Table 15.2	P
	Overload protection devices do not operate		N/A
17.3	Tools with a centrifugal or other automatic starting switch	No such device used	N/A
	Number of operations under normal load..... :		N/A
	Rate of operations (s “on”, s “off”)..... :		N/A
	Test voltage (V) ..... :		N/A
	No electrical or mechanical failure		N/A

PART One: EN 60745-1:2009+A11:2010			
Clause	Requirement + Test	Result - Remark	Verdict
	No insulation damage		N/A
	No loose contact or connections		N/A
	No flashover or breakdown occurred after the test		N/A
	Overload protection devices do not operate		N/A
18	**ABNORMAL OPERATION**		
18.1	No hazard due to abnormal operation		P
	Fuses, thermal cut-outs, over current protection devices used to provide the necessary protection	No such device used	N/A
18.2	Tool with heating elements	No heating element used	N/A
	Tool with a control device limiting temperature		N/A
	Only one abnormal condition simulated each time		N/A
	Tests made 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 steady conditions ..... :		N/A
	Test repeated on a second sample when a heating element permanently open-circuited		N/A
	Only on 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		N/A
	Test voltage to provide a power 0.85 times rated power input (V) ..... :		
18.4	Tool cooled down to room temperature and test of 18.3 repeated		N/A
	Test voltage to provide 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		N/A
	Test voltage to provide power input 1.15 times rated power input (V) ..... :		
	Multiple controls short-circuited one at a time		N/A
	Controls short-circuited ..... :		N/A
18.6	Test on class I tool with tubular sheathed and embedded heating elements	Class II	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Test repeated with the supply polarity reversed and other end of element connected to earth		N/A
18.7	1 min no load test on cutting tools incorporating a commutator motor		P
	Test voltage 1.3 times rated voltage, or upper limit of voltage range (V) ..... :	1,3X230=299 V, 1min	
	After the tests of 18.2 to 18.7, safety of tool not impaired, and windings and connections not loose		N/A
18.8	Test on tools with induction motor and with moving parts locked	Series motor	N/A
	a) Tool with a starting torque less than the full-load torque		N/A
	Duration of locked conditions (s)..... :		
	b) Tool stared 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	Single-phase motor	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, ant the like, the temperature of the windings complied with the limits in Table 3		N/A
	Max winding temperature recorded (°C)..... :		
18.10	No hazard resulting from failure of electronic equipment in the tool	Electronic equipment on PCB of speed adjustment	P
	Evaluation of the fault conditions specified in 18.10.2 for all circuits or parts of circuits, unless they comply with the conditions specified in 18.10.1		P

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Clause	Requirement + Test	Result - Remark	Verdict
	If the safety of the tool under any of the fault conditions depends on the operation of a miniature fuse-link complying with IEC 60127-3, the test of 18.10.3 is made		N/A
	If a conductor of a printed circuit board becomes open-circuited, the tool is considered to have withstood the particular test, provided all three of the conditions are met		N/A
18.10.1	Fault conditions are not applied to circuits or parts of circuits when both of the following conditions are met		N/A
	– the electronic circuit is a low-power circuit		N/A
	– the protection against electric shock, fire hazard, mechanical hazard or dangerous malfunction of other parts of the tool does not rely on the correct functioning of the electronic circuit		N/A
18.10.2	The fault conditions are considered and consequential faults being taken into consideration		P
a)	short-circuit of creepage distances and clearances between conductive parts of different polarity		P
b)	open-circuit at the terminal of any electronic component		P
c)	short-circuit of capacitors, unless they comply with IEC 60384-14		P
d)	short-circuit of any two terminals of an electronic component,		P
e)	failure of triacs in the diode mode		N/A
f)	failure of an integrated circuit.		N/A
	Fault condition f) is applied to encapsulated and similar components if the circuit cannot be assessed by other methods		N/A
	PTC's are not short-circuited		N/A
	Each low-power circuit is short-circuited by connecting the low power point to the pole of the supply		N/A
	Duration of the test		P
	The test is ended if interruption of the supply occurs within the tool		N/A
18.10.3	Repeated tests if safety of the appliance depends on the operation of a miniature fuse-link:		N/A
	- current does not exceed 2,1 times rated fuse-link		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- current is at least 2,75 times rated fuse-link		N/A
	- current between 2,1 and 2,75 times rated fuse-link		N/A
	Other fuses are considered to be intentionally weak parts		N/A
18.10.4	No hazard resulting from failure of electronic equipment in the tool	Electronic speed adjusting device	P
	No load operation for 1 min with electronic device short-circuited	Tool operate at full speed	P
	No load operation for 1 min with electronic device open-circuited	Tool cannot operate	P
	Following the tests of 18.10.1 to 18.10.4, the tool shall:		P
	No damage due to fire, no mechanical damage impairing safety, and protection against electric shock		P
	Any current flowing through protective impedance shall not exceed the limits		N/A
	Operation of speed-limited device in the tool met requirement	No such device used	N/A
18.11	Motor reversal switched and other devices withstood stresses occurring when rotation reversed 25 times under running conditions	No such switch used	N/A
	Test voltage (V) ..... :		
	No electrical or mechanical failure		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		P
	A separate sample operated for 15 min, until the tool open-circuited, or flame appeared ..... :	Flame appeared and tool cannot operate	P
	Test circuit (KVA) ..... :	15KVA	
	160% normal load test current (A) ..... :	0,97A	
	Overload condition existed for (_min, _sec) ..... :	5 min 12 sec	
	Condition continued until the tool open-circuited, or flame appeared	Flame appeared and tool cannot operate	P
	Elements that opened in case an open circuit occurred ..... :		N/A
	When flames appeared, immediately extinguished by CO_2 extinguisher		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Maximum leakage current measured throughout the abnormal test (mA) ..... :	See Table 13.1	P
	Tool that did not operated after 15 min was cooled to room temperature and subject to a 1500 V Electric Strength test (live parts and accessible parts)..... :	See Table 15.2	P
	Tool that operated after 15 min was 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 a moving or dangerous parts		P
	No protective enclosure removal without the aid of a tool		P
	No dangers from the adjusting guards	No guards used	N/A
	No movement or released of guard in normal use		N/A
	No contact of dangerous moving parts with standard test finger (Fig 1)		P
19.2	No sharp edges, burrs, flashes and the like		P
19.3	No contact of moving parts with test finger (Fig 1), when removal of dust collection	No dust collection used	N/A
19.4	Adequate grasping surfaces		P
19.5	Provision for visual check of the contact of cutting tool with the work piece		P
19.6	For all tools where the relevant part 2 requires the tool to be marked with the rated no load speed, the no-load speed of the spindle at rated voltage or at the upper limit of the rated voltage shall not exceed 110 % of the rated no-load speed. Compliance is checked by measuring the speed of the spindle after the tool has been operating for 5 min at no-load.	See also Part Two clause 19.106	P
20	**MECHANICAL STRENGTH**		
20.1	Adequate mechanical strength in normal use		P
20.2	Three blows applied to brush caps and every weak point of enclosure by spring-operated impact test apparatus in Clause 5 of EN 60068-2-75		P
	Brush cap impact energy (Nm) ..... :	0,5	—
	Other part impact energy (Nm) ..... :	1,0	—

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Clause	Requirement + Test	Result - Remark	Verdict
	Blows applied to protective devices, handles, levers, knobs..... :	Actuator of switch, air-intake opening and air-outlet opening	—
	No flashover or breakdown occurred after test ..... :	See Table 15.2	P
	No damage impairing compliance with standard		P
	No accessible of live parts		P
	No cracks to the naked eye		P
	Inner cover to withstand test		N/A
20.3	Hand-held tool to withstand impact of 3 varied drops on a concrete surface from 1 m	The tool has no obvious damage after 3 times drop test	P
	No flashover or breakdown occurred after test ..... :	See Table 15.2	P
	No damage impairing compliance with standard		P
	No accessible of live parts		P
	No cracks to the naked eye		P
	Inner cover to withstand test		N/A
20.4	Adequate mechanical strength of brush holder and their caps		P
	Tightening and removing brush cap 10 times		P
	Tightening torque applied (Nm) ..... :	0,6	—
	No flashover or breakdown occurred after test ..... :	See Table 15.2	P
	No damage impairing compliance with standard		P
	No accessible of live parts		P
	No cracks to the naked eye		P
	No damage to threads		P
20.5	The part providing insulation between grasping area and the output shaft shall have adequate mechanical strength.		P
	Dropping test shall be applied to each handle and each recommended grasping surface.		P
	No flashover or breakdown occurred after dropping test		P

21	**CONSTRUCTION**		
21.1	Accidental changing of the setting unlikely to occur in tools with different voltages or different speed settings		P

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Clause	Requirement + Test	Result - Remark	Verdict
21.2	Accidental changing of the settings of control devices unlikely to occur		P
21.3	Removal of parts which ensure the required degree of protection against moisture secured by tools		P
21.4	The fixing of handles, knobs and the like used to indicate the position of switches or similar components in a wrong position not possible	Impossible to fix wrong	P
21.5	Replacement of a flexible cable or cord requiring the displacement of a switch possible without subjecting internal wiring to undue stress		N/A
	After repositioning of the switch and before reassembling the tool, construction allows verification whether the internal wiring is correctly positioned		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 such material used	N/A
21.7	Asbestos not used		P
21.8	Driving belts not relied upon to ensure electrical insulation	No belt used	N/A
21.9	Insulating barriers of Class II tools, and parts of Class II tools which serve as supplementary insulation or reinforced insulation	Class II	P
	- fixed in such a way that they cannot be removed without being seriously damaged		P
	- so designed that they cannot be replaced in a n incorrect position, and when omitted, the tool inoperable or manifestly incomplete		P
21.10	Use of the sheath (jacket) of a flexible cable or cord inside the tool as supplementary insulation independent of mechanical and thermal stresses		N/A
21.11	Assembly gap with a width greater than 0.3 mm in supplementary insulation		P
21.12	Hazards from parts such as wire, screw, nut, washer or spring becoming loose or falling out of position		P
	In Class I tools: accessible metal not made live		N/A
	In Class II tools: clearance and creepage distances not reduced to less than 50% of values shown in Table 10		P
	Class II tools, other than those of the all-insulated type provided with an insulating barrier which encloses the motor and all other live parts		P

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Clause	Requirement + Test	Result - Remark	Verdict
	All wires secured in place independent of terminal connection or solder		P
21.13	Supplementary and reinforced insulation not likely to be impaired by deposition of dirt, or by dust resulting from wear of parts within the tool		P
	Ceramic material not tightly sintered and similar materials, and beads alone, not used as supplementary insulation or reinforced insulation		N/A
	Parts of natural or synthetic rubber used as supplementary insulation in Class II tools resistant to aging	No rubber used as supplementary insulation	N/A
	Rubber parts so arranged and dimensioned that creepage distances are not reduced below the values specified in Sub-clauses 28.1, even if cracks occur		N/A
	Aging test for rubber parts for 70 h at 100±2°C		—
	Parts tested..... :		—
21.14	Internal wiring etc. not exposed to oil, grease and similar substances for constructions		P
	Adequate insulation properties of oil, grease and similar substances used for lubrication of gears and the like, and no effect on insulation		N/A
21.15	No access to brushes without the aid of a tool		P
	When tightening screw-type brush-caps, two surfaces clamp 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 insulating material or covered with insulating material of adequate mechanical and electrical strength		P
21.16	Tools employing liquid systems	No liquid system used	N/A
	·Class III tool with water supply		N/A
	·Class I or class II construction provided with residual current device and comply with 14.4,14.5 and 14.6.		N/A
	·Tool other than Class III construction designed for use in conjunction with an isolating transformer and comply with 14.4 and 14.6		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
21.17	Accidental operation of switches reset buttons unlikely to occur when tool dragged across horizontal surface		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 his grasp on the tool		P
21.18.1	Switch not provided with a device to lock it in ON position and does not remain in ON position when trigger released	See Part Two	N/A
21.18.2	Switch provided with a locking device to lock it in OFF position	See Part Two	N/A
21.19	Protection against electrical shock not affected when screws intended to be replaced from the outside during routine servicing are replaced by longer screws		P
	Creepage distances and clearances not reduced below the values specified in Sub-clause 28.1		P
21.20	Tool marked with the first numeral of IP system complies with EN 60529	Not marked	N/A
21.21	No risk of electrical shock from charged capacitors when touching pins of the plug		P
	Max. voltage measured between pins of the plug after one second after each disconnection (V)	<10V (max)	P
	Line capacitors rated less than or equal to 0,1 μF		N/A
21.22	Non-detachable part secured reliably and withstand mechanical stress in normal use		P
	Snap-in devices have an obvious locked position that do not deteriorate	No snap-in device used	N/A
	Parts affected by temperature tested immediately after Clause 12		N/A
	All weak parts of the tool subjected to the 10 s push force of 50 N		P
	50 N pull force applied to cover or weak part when shaped prevented easy slippage of fingertips		P
	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		P
	The test fingernail inserted in any apertures or 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		P

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Clause	Requirement + Test	Result - Remark	Verdict
	For cover or part 50 mm or smaller and likely to be subjected to twisting, a torque of 2 Nm applied at the same time as pull or push force		N/A
	For cover or part larger than 50 mm and likely to be subjected to twisting, a torque of 4 Nm applied at the same time as pull or push force		P
	Projection was less than 10 mm and required a torque (Nm) of..... :		N/A
	Parts did not become detached, and remained in locked position		P
21.23	Handles, knobs, etc., withstood axial force of 30 N for 1 minute		P
21.24	Storage hooks and similar devices for flexible cords are smooth and well rounded	No such device used	N/A
21.25	Current-carrying parts and other parts resistant to corrosion under normal use		P
	After tests of Clause 30, no sign of corrosion on relevant parts		P
21.27	Insulation between SELV and other parts of non-class II tool meets requirements for double or reinforced insulation	Class II	N/A
21.28	Parts separated by protective impedance comply with requirements for double or reinforced insulation	No protective impedance used	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		P
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		N/A
	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		N/A
	Covering or insulating material complies with Electric Strength test in Clause 15, Table 2, item 4		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
21.32	For all tools that are likely to cut into concealed wiring or their own cord, handles and grasping surfaces, as specified in the instruction manual, shall be formed of insulating material or, when of metal, shall be either adequately covered by insulating material or their accessible parts shall be separated by insulating barrier(s) from accessible metal parts that may become live by the output shaft. These insulating barriers are not to be regarded as basic, supplementary or reinforced insulation.		P
	An insulated, stick type, auxiliary handle shall be provided with a flange having a height not less than 12 mm above the grasping surface between the grasping area and accessible parts that may become live by the output shaft. Compliance is checked by inspection and the tests of 20.5.		N/A
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		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		N/A
21.35	Lampholders used only for connection of lamps	No lampholder used	N/A
21.36	Protective impedance consists of at least two separate components having an impedance unlikely to change significantly during lifetime of tool	No protective impedance used	N/A
	When any of the two components short or open-circuited, values in 9.1 not exceeded..... :		N/A
	Resistors comply with 14.1 of EN 60065 and capacitors comply with 14.2 of EN 60065		N/A
21.37	Air-intake ventilation openings not excessively large		P
	Not possible to insert a steel ball, 6 mm in diameter, through air-intake openings other than those adjacent to fan		P
21.Z1	Tools, as identified in the relevant Part 2 or in case of tools not covered by Part 2, where in normal use a considerable amount of dust hazardous to health is expected to be produced, shall have either:		
	a) integral dust collection devices, or		N/A
	b) devices which allow the connection of external dust collection equipment		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	If solutions a) or b) are not reasonably practicable, the tools shall be designed in such a way that the dust is not thrown in the direction of the operator		N/A
22	**INTERNAL WIRING**		
22.1	Wireways smooth and free from sharp edges, burrs, etc.		P
	Holes in metal through which insulated wires pass provided with bushings of insulating material	No such conditions occurred	N/A
	Wiring prevented from coming into contact with moving parts		P
22.2	Internal wiring and electrical connections adequately protected or enclosed		P
22.3	Internal wiring so rigid, so fixed or so insulated that, in normal use, creepage and clearance distances cannot be reduced below values specified in Sub-clause 28.1		P
	The insulation not damaged in normal use		P
	Insulation of internal wiring electrically equivalent to insulation of cords complying with HD 21 or HD 22		N/A
	No breakdown as a result of a voltage of 2000 V applied for 15 min between conductor and metal foil wrapped around insulation	2000V, 15min for internal wire	P
	When sleeving used as supplementary insulation on internal wiring, it was retained in position by clamps at both ends, or other means requiring its removal by breaking or cutting		N/A
22.4	Use of green/yellow conductors for earthing terminals only	Class II	N/A
22.5	Aluminium wires not used for internal wiring	No Aluminium wires used as internal wires	P
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 due to cold flow of solder		N/A
23	**COMPONENTS**		
23.1	Components comply with the relevant EN/IEC standards	See Table 23.1	P
	Components used in accordance with their markings		P

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Clause	Requirement + Test	Result - Remark	Verdict
23.1.1	Capacitors in auxiliary windings of motors marked with their rated voltage and rated capacitance..... :		N/A
23.1.2	Fixed capacitors for radio interference suppression comply with IEC 60384-14		P
23.1.3	Small lampholders similar to E10 lampholders meet requirements for E10 lampholders		N/A
23.1.4	Insolating transformers and safety insulating transformers comply with EN 61558-1		N/A
23.1.5	Appliance couplers other than those used for IPX0 tools comply with EN 60309, and those used for IPX0 comply with EN 60320		N/A
	Instructions provided to inform user to connect the tool with non-IEC appliance couplers		N/A
23.1.6	Automatic controls not complying with EN 60730-1 tested according to this standard, and additionally according to 11.3.5 – 11.3.8 and 17 of EN 60730-1		N/A
	EN 60730-1 tests conducted under conditions occurring in the tool		N/A
	Type of controls used and number of operations completed per Clause 17 of EN 60730-1 (cycles).. :		N/A
	Correct markings are used on automatic controls.. :		N/A
	Tests of Clause 17 of EN 60730-1 was not required on automatic controls because tool complies with this standard with protector short-circuited		N/A
23.1.7	Unless otherwise specified, tests on components per other standards conducted separately according to the relevant standard		P
	Component, marked and used per its markings		P
	Components not mentioned in Table 1 of Clause 12 tested as part of the tool		P
23.1.8	In the absence of an IEC standard, or when component not marked or used per its marking, component tested under conditions occurring in the tool, and number of samples required by similar specifications ..... :	Motor, enclosure tested with appliance	P
23.1.9	Capacitor voltage does not exceed 1.1 times rated voltage of the capacitor (V) ..... :		N/A
23.1.10	Adequate breaking capacity of mains switches with no electrical mechanical failure	Approved switch used	P
	Mains switches rated for min. 50K cycles of operations ..... :	5E4	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Switch operated 50 times with motor stalled		P
	For electronic control device switching off before opening the main contacts, switch operated five times with the electronic device short-circuited		N/A
23.1.11	Switches, not separately tested and found to comply with EN 61058-1 under the conditions occurring in the tool, comply with Annex I		P
	Test of 17.2.4.4 of EN 61058-1 (min. 50000 cycles of operation)		P
	Switches operated only with the aid of a tool and intended for no load operation subjected to the tests of Clause 17 of EN 61058-1		P
	The above also applies to switches operated by hand and interlocked not to be operated under load		P
	Switches without interlock tested per EN 61058-1, 17.2.4.4 (min. 100 cycles of operation)..... :		N/A
	Tests of 17.2.4.4 of EN 61058-1 not conducted on a switch when tool met the requirements of this standard under short-circuit conditions		N/A
23.2	Tool not fitted with switches or automatic controls in flexible cords		P
	Tool not fitted with devices causing the protection device in the fixed wiring to operate		N/A
	Tool not fitted with thermal cut-outs which can be reset by a soldering operation		N/A
23.3	Overload protection devices not of the non-self-resetting type	No overload protection device used	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 EN 60320	No such device used	N/A
23.5	Motors connected to the supply mains with insulation inadequate for the rated voltage comply with Annex B		N/A

24	**SUPPLY CONNECTION AND EXTERNAL FLEXIBLE CORDS**		
24.1	Tool provided with a supply cord fitted with a plug for connection to the supply		P
	Tool provided with a supply cord without a plug for connection to non-public supplies		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Tool provided with an appliance inlet for connection to a supply having at least same degree of protection against moisture as required for the tool, and a locking device preventing inadvertent disconnection		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		N/A
	The in-line connector provided with at least the same degree of protection against moisture as required for the tool		N/A
	Locking devices complied with pull test of Sub-clause 24.14		N/A
24.2	Supply cord assembled to the tool by attachment type (specify X, Y, or Z) ..... :	Type Y attachment	P
24.3	Plugs fitted with only one flexible cord		P
24.4	Supply cord not lighter than ordinary tough rubber sheathed flexible cord or ordinary PVC sheathed flexible cord	H05VV-F	P
	PVC cords not used if external metal parts exceed 75 K temperature rise		P
	Supply cord of tool intended to be connected to a water supply is not lighter than ordinary polychloroprene-sheathed flexible cord (H05RN-F)		N/A
	Power supply cords of single-phase tool with a plug and rated current ≤ 16 A supplied with a plug complying with IEC 60884 or EN 60309		P
	Class I tools fitted with plugs complying with EN 60309, Sheet 2-1		N/A
	Class II tools fitted with plugs complying with EN 60309, Sheet 2		P
	Class III tools fitted with plugs complying with EN 60309, Sheet 2-1		N/A
	Body of plug covered with, rubber, polyvinyl chloride or a material with equivalent mechanical strength . :	PVC	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 EN 60309 and standard Sheet 2-III based on current		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 EN 60309 and standard Sheet 2		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	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 EN 60309 and standard Sheet 2-III		N/A
24.5	Nominal cross-section area of supply cord per Table 6 (mm^2) ..... :	0,75 mm^2	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		N/A
24.7	Solder is not used to consolidate leads under pressure, unless spring terminals ensures good contact		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 moulding	N/A
24.9	Supply cord protected at inlet openings	Cord guard used	P
24.10	Inlet bushings shaped to prevent damage to supply cord		P
	Inlet bushings reliably fixed and not removable without the aid of a tool		P
24.12	Cord guards provided with adequate mechanical strength and retain these properties throughout extended normal use		P
	Flexing test performed in apparatus shown in Fig. 9		P
	Weight attached to cable or cord (kg) ..... :	2,0	—
	Oscillating member moved backwards and forwards through an angle of 90° (45° on either side of the vertical) with rate of flexings 60 per minute		P
	After 10,000 flexings, sample turned through 90° about the centre of the cord guard		P
	Total number of completed operations ..... :	20000	—
	After the test, cord guard not loosened, and no damage to cord guard and flexible cable impairing compliance with this standard		P
	Number of broken strands of each conductor not more than 10% ..... :	0%	P

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Clause	Requirement + Test	Result - Remark	Verdict
	After the test, the cord anchorage and terminal screws loosened without removing the conductors of the flexible cable or cord except when cord guard clamped under cord anchorage		P
	Cord guard did not slip out of its location after 10 lifts		P
24.13	Insulated cord guard provided to protect against excessive bending		P
	Guard not integral part of power supply cable or cord for type X attachment	Type Y	N/A
	Guard fixed reliably and projects outside tool a distance beyond inlet opening of at least 5 times the overall diameter of cable or cord	Diameter of the cord: 6,2mm Length of the guard: 38,0mm>6,2×5mm	P
	Cord guard integral to tool minimum 100 mm longer than guard		P
	Mass attached to the free end of the cable or cord (10 D^2 g) ..... :	$10D^2$=384,4g	—
	Temperature sensitive cord guard tested at 23 ± 2°C		—
	Curvature of cable or cord is nowhere less than 1.5 of external diameter of cable	Curvature: 12 mm	P
24.14	Conductors relieved from strain, twisting and protected from abrasion		P
	It is not possible to push the cord into the tool		P
	Pull force per Table 7 (N) ..... :	60N	—
	After pull test, cord, other than automatic cord reel, subject for 1 min to the torque in Table 7 (Nm) ..... :	0,25Nm	—
	The cord was not damaged during the tests		P
	Cord longitudinal displacement (mm) ..... :	No obvious displacement	P
	Conductors movement in the terminals (mm) ..... :	No obvious displacement	P
	No appreciable strain at the connection		P
	Creepage and clearances not reduced below 28.1		P
24.15	Cord anchorage either accessible only with the aid of a tool, or the cord can only be fitted by using a tool		P
24.16	Cord anchorages for type X attachment	Type Y	N/A
	The cord anchorage allows easy replacement of cord		N/A
	The cord anchorage is such that it is clear how strain relief and prevention of twisting can be accomplished		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	The anchorage is suitable for different types of cord, or tool designed to be fitted with only one type of cord		N/A
	The cord anchorage screws separated by supplementary insulation		N/A
	The cord is not clamped by metal screw bearing directly on the cord		N/A
	At least one part of cord anchorage securely fixed to the tool, unless it is part of the specially prepared cord		N/A
	Screws intended to fix the cord in place are not used to secure any other part, or it is clear the tool is inoperative		N/A
	Parts fastened to the cord anchorage by the same screw could not be removed without the aid of a tool		N/A
	The 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		N/A
	For type X attachment, gland not used as cord anchorage for power supply cord		N/A
	Cord anchorage in class I tool is of insulating material or provided with an insulating lining		N/A
	Cord anchorage in class II tool is of insulating material, and when metallic meet requirements for supplementary insulation		N/A
	Type X has one or more nuts to secure cord anchorage		N/A
	Clamping member complies with Figure 6		N/A
	Tests of Clause 24.14 conducted with lightest permissible type of cord of smallest cross-section and next heavier type as in Clause 25.2 (sizes, mm^2) ..... :		N/A
	Specially prepared cord tested with the cord as delivered		N/A
	Conductors introduced into terminals, terminal screws tightened sufficiently to prevent conductors from easily changing their position		N/A
24.17	Adequate cord anchorages are provided for type Y and Z attachments		P
24.18	Knots and tying strings for type X attachment are not used	Type Y	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
24.19	For type Y and Z attachments, insulated conductors of supply cord insulated from accessible metal parts by basic insulation for class I tool, and supplementary insulation for class II tools		P
	- 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		N/A
	- Space permits verification of correct connection and positioning of conductors		N/A
	- Space permits covers to be fitted without risk of damage to supply conductors or their insulation		N/A
	Uninsulated end of conductor, when detached from a terminal, cannot come into contact with accessible metal parts		N/A
	Installation test conducted with cables or flexible cords of the largest cross-sectional area as per Clause 25.2 (mm^2)..... :		N/A
	Portable tool with type X attachment and pillar terminals (where conductors not separately clamped at a distance of 30 mm or less) subjected to force of 2 N without contact of accessible metal conductors		N/A
24.21	Appliance inlet has no accessible live parts		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 EN 60320		N/A
	Appliance inlet complies with EN 60320		N/A
25	**TERMINALS FOR EXTERNAL CONDUCTORS**		
25.1	Type X attachment, other than specially prepared cord, terminal connections made by screws, nuts, or equally effective devices	Type Y	N/A
	Use of screw-type terminals according to EN 60998-2-1		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Use of screwless-type terminals according to EN 60998-2-2		N/A
	Use of clamping units according to EN 60999-1 considered equally effective devices		N/A
	Screws and nuts do not fix other components	No such connection methods used.	N/A
	Screws and nuts allowed to also clamp internal conductors when they are unlikely to be displaced when fitting supply conductors		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		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		N/A
	For type Y and Z attachments, soldered, welded, crimped and similar connections allowed for the connection of external conductors		P
	Class II tools, conductor so positioned or fixed that soldering, crimping, or welding alone not relied upon to maintain the conductor in the position		P
	Barriers prevent creepages and clearances between live parts and other metal parts from being reduced to < 50% of values in 28.1		P
	Conductors connected by soldering are held in place near termination independent of solder		P
	Conductor is “hooked in” before soldering and the hole through which conductor passes is not too large		P
	Terminals of a component built into the tool used to secure external conductors		P
	Leads additionally fixed near terminations ..... :		N/A
	Stranded conductors secured at insulation and conductor		N/A
25.2	Terminals for type X attachment fitted with special connection or accommodate nominal cross-sectional areas as in Table 8		N/A
	Cables or cords of the specified smallest and largest cross-sectional areas can be fitted (mm^2) ..... :		N/A
	Terminals for supply cord withstood pull force of 5 N		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
25.3	For tool with type X attachment, when clamping means tightened or loosened, the terminal did not work loose, no stress on internal wiring, and creepage and clearances not reduced below values specified in 28.1		N/A
	Torque applied per EN 60999-1, Clause 9.6 at 2/3 torque of that in Table IV of EN 60999-1 (Nm)..... :		N/A
	Terminals prevented from loosening by fixing		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		N/A
	Self-hardening resins used only on terminals that are not subject to torsion in normal use		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 Clause 25.3		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		N/A
	Type X specially prepared cord used		N/A
	There were no deep or sharp indentations on the conductors after torque test per Clause 25.3		N/A
25.6	End of conductor introduced into 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) .. :	3,0 mm	P
25.7	For type X attachment, terminals clearly recognizable and accessible after opening the tool		N/A
	All terminal located behind one cover, or one part of the enclosure		N/A
25.8	Terminal devices not accessible without the aid of a tool		P
25.9	For tool with type X attachment, terminal devices located or shielded to prevent a strand of wire to escape		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	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	N/A
	Accessible metal parts of class I tool permanently connected to the earthing contact of the tool inlet		N/A
	Printed circuit boards 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		P
	Metal parts behind a decorative cover withstood test of Clause 20 and are not considered accessible metal parts		N/A
26.2	Clamping means 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 EN 60998-2-2		N/A
	For specially prepared cords, terminals comply with EN 60760		N/A
	Screwless terminals tested per EN 60998-2-2		N/A
26.3	Placing detachable parts with earth connection in position makes earth connection of detachable parts before current-carrying connectors established		N/A
	When removing the part, current-carrying connections separate before the earth connection is broken		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	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 proven by 30.1		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) ..... :		N/A
	Test current (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) can withstand mechanical stresses occurring in normal use		P
	Screws not made of soft metal such as zinc or aluminium		P
	Diameter of screws of insulation material (min. 3 mm)..... :	No screws made of insulating material	N/A
	Screws transmitting electrical contact pressure screw into metal		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 made of insulating material	N/A

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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		N/A
	Screws and nuts tightened and loosened 10 times for screw engaged with a thread of insulating material	Screws of enclosure	P
	Nuts and other screws tightened and loosened five times	Screws of terminal block	P
	Screws engaging with a thread of insulating material completely removed and reinserted each time		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)..... :	0,75 mm^2	P
	Torque per column I of Table 9 applied to metal screw without head (Nm)..... :		N/A
	Torque per column II of Table 9 applied to other metal screws and nuts (Nm) ..... :	Screws on enclosure: 1,2Nm (10 times) Screws on terminal block 0,5Nm (5 times)	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)..... :		N/A
	Torque per column II of Table 9 applied to screws of insulating material, with cylindrical head and a socket for a key, socket having cross-corner dimension exceeding overall thread diameter (Nm) ..... :		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) ..... :		N/A
	Torque per column III of Table 9 applied to other screws of insulating material (Nm)..... :		N/A
	Conductor moved each time the screw or nut was loosened		P
	No damage impairing further use of fixing or electrical connections		P
27.2	Contact pressure not transmitted through insulating material other than ceramic, unless compensated for shrinkage or distortion	No such material used	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
27.3	Space-threaded screws not used for connection of current-carrying parts		P
	No thread-cutting screws used for connection of current-carrying parts		P
	Use of two space-threaded or thread-cutting in earthing circuits		N/A
27.4	Screws making both mechanical and electrical connections are locked against loosening		N/A
	Rivets for current-carrying connections subjected to torsion in normal use are locked against loosening		N/A
28	**CREEPAGE DISTANCES, CLEARANCES AND DISTANCES THROUGH INSULATION**		
28.1	Creepage and clearances not less than the values in Table 10 ..... :	See 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 ..... :		N/A
	Type X attachment and an appliance inlet measured with supply conductor of largest cross-section per Clause 25.2 (mm^2) ..... :		N/A
	Measurements repeated without the conductors		P
	For other tool with an appliance inlet, an appropriate connector inserted, and measurements made on the tool as delivered		N/A
	Measurements on tool with belt made with the belt in place, and belt tension adjusted to the most unfavourable position within its range of adjustment	No belt used	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		P
	Clearances between terminals and accessible metal parts also measured with screws and nuts unscrewed as far as possible ..... :	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 ..... :	See Table 28.1	P

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Clause	Requirement + Test	Result - Remark	Verdict
	2 N force applied by test finger to bare conductors and uninsulated capillary tubes of thermostats and similar devices while measured		P
	30 N force applied by test finger to enclosures		P
	Measurements made in accordance to Annex A		P
	PWB has peak voltages stress ≤ 150 V per mm between parts of different potential with a min. distance of 0.2 mm, when protected against deposition of dirt	No PWB	N/A
	-PWB with 100 V per mm with a min. distance of 0.5 mm, when not protected against deposition of dirt		N/A
	Peak voltages exceeded 50 V on PWB		N/A
	Distances reduced further since the tool complied with the requirements of Clause 18		N/A
	Creepage and clearances within optocouplers were not measured when individual insulation adequately sealed, and when air was excluded between individual layers of material		N/A
	For live parts of different polarity separated by basic insulation only, creepage and clearances reduced, because the tool complies with Clause 18 when creepage and clearances are short-circuited in turn		N/A
28.2	Distances through insulation ..... :	See Table 28.2	P
	Insulation applied in thin sheet form, other than mica or similar, and for supplementary insulation of at least two layers, one layer having withstood the electrical strength test for reinforced insulation		N/A
	Inaccessible supplementary or reinforce insulation had maximum temperature rise determined during tests of Clause 12 not exceeding values in 12.5		N/A
	Inaccessible supplementary or reinforced insulation, after 168 h of conditioning at 50 K greater than max. temperature rise determined per Cl. 12, withstood an electric strength test per Cl. 15 at the oven temperature and room temperature (temperature and applied voltage) ..... :		N/A
	For optocouplers, 168 h of conditioning at 50 K greater than max. temperature rise measured on optocouplers during tests of Clauses 12 and 18, optocoupler operated under most difficult conditions		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
29	**RESISTANCE TO HEAT, FIRE AND TRACKING**		
29.1	External parts of non-metallic material, insulating material supporting live parts, including connections and thermoplastics providing supplementary or reinforced insulation have sufficient resistant to heat		P
	Relevant parts subjected to ball-pressure test ..... :	See Table 29.1	P
	For coil formers, parts supporting or retaining terminals in position subjected to test..... :		N/A
29.2	Part on non-metallic material, except for decorative trims, knobs, and other parts not likely to be ignited or propagated flames originating from inside the tool, are adequately resistant to ignition and spread of fire		P
	Glow-wire test of IEC60695-2-11 at 550 °C	See Table 29.2	P
	The glow-wire test is not carried out on parts of material classified at least HB40		N/A
	Parts made of soft or foamy material shall meet the requirements specified in ISO 9772 for category HBF material		N/A
29.3	Insulating materials subjected to tracking have adequate resistance to tracking		P
	All tools are considered to be normal duty unless otherwise stated in the relevant part 2.	See Table 29.3	P
	Proof tracking test of Annex G on insulating material used under severe or extra-severe duty conditions:		P
	For parts of insulating material used under severe duty conditions, test voltage was 175 V		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.... :		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 ..... :		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
	Where parts shielded by a separate barrier or enclosure from the tracking path, the barrier or enclosure subjected to needle-flame test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

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)	Ratio	Load condition / Remarks
Single rated voltage	Lower Voltage Limit	Upper Voltage Limit	Mean Value of Range				
---	220	230	225	130W	60,3 W	215,6%	No load
Supplementary information: No rated current marked.							

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Clause	Requirement + Test	Result - Remark	Verdict

12.1	**TABLE: Temperature Rise Measurements (0,94 x 220V)**		P
Test voltage (V) .....:		206,8	
t1 (°C) .....:		24,0	
t2 (°C) .....:		22,9	
Operating time .....:		Until steady conditions are established	
Torque(N.m).....:		---	
Input current (A) / Input Wattage (W) .....:		0,572 / 114,4	

Measurement at:	Temperature rise in K	Allowed Limit
Stator core	28,6	Refer to Clause 29.1
Brush holder	10,1	Refer to Clause 29.1
Power cord	0,4	50
Capacitor	0,1	60
Switch ambience	0,2	30
Internal wiring	8,3	50
Enclosure	5,3	60
Handles	3,3	50
Printed circuit board	0,4	120
Supplementary Information: None		

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
Stator	35,466	45,070	71,1	—	90	Class 120
Rotor (1-4 segment)	21,960	24,952	36,3	—	90	Class 120
Supplementary Information: See Table 13.1 for Leakage current test after Temperature test						

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Clause	Requirement + Test	Result - Remark	Verdict

12.1	TABLE: Temperature Rise Measurements		P
Test voltage (V) .....:		243,8	
t1 (°C) .....:		24,0	
t2 (°C) .....:		22,8	
Operating time .....:		Until steady conditions are established	
Torque (N.m).....:		---	
Input current (A) / Input Wattage (W) .....:		0,661/ 155,5	

Measurement at:	Temperature rise in K	Allowed Limit
Stator core	35,5	Refer to Clause 29.1
Brush holder	10,9	Refer to Clause 29.1
Power cord	0,1	50
Capacitor	0,2	60
Switch ambience	0,5	30
Internal wiring	6,3	50
Enclosure	5,3	60
Handles	3,7	50
Printed circuit board	0,3	120
Supplementary Information: None.		

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
Stator	35,466	47,160	86,4	—	90	Class 120
Rotor (1-4 segment)	21,960	26,472	54,3	—	90	Class 120
Supplementary Information: See Table 13.1 for Leakage current test after Temperature test						

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Clause	Requirement + Test	Result - Remark	Verdict

13.1	**TABLE: Leakage Current**				P
Sequence – Test conducted after:	Figure No.	Test voltage 1.06 x rated voltage (V)	Selector switch position	Allowed leakage current (mA)	Measured leakage (mA)
Test of Clause 12.1	3	243,8	1&2	0,25	0,003
Test of Clause 14.3	3	230	1&2	0,25	0,003
Test of Clause 18.12	3	230	1&2	2,0	0,12

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Clause	Requirement + Test	Result - Remark	Verdict

15.2	TABLE: Electric Strength Test				P
Test voltage applied between:		Sequence – test conducted after:	Test voltage (V)	Breakdown Yes / No	Specific parts tested and other remarks
Between live parts and accessible parts separated from live parts by reinforced insulation		14.12, 14.3, 20.2, 20.3	3750	No	L/N ↔ Enclosure Commutator ↔ Rotor shaft
		17.2	2813		
		18.12	1500		
For parts with double insulation, between metal parts separated from live parts by basic insulation only, and live parts		14.12, 14.3, 20.2, 20.3	1250	No	L/N ↔ Stator core Commutator ↔ Rotor core
		17.2	938		
For parts with double insulation, between metal parts separated from live parts by basic insulation only, and accessible parts		14.12, 14.3, 20.2, 20.3	2500	No	Stator core ↔ Enclosure Rotor core ↔ Rotor shaft
		17.2	1875		
Between metal enclosures or covers lined with insulating material and metal foil in contact with the inner surface of the lining		—	—	No	—
Between metal foil in contact with handles and the like and their shafts		14.12, 14.3, 20.2, 20.3	2500	No	Internal ↔ Enclosure
		17.2	1875		
		20.5	1250	No	Handle ↔ Output shaft
Between accessible parts and internal diameter of cord guard wrapped with metal foil		14.12, 14.3, 20.2, 20.3	2500	No	Outer ↔ Internal of cord guard
		17.2	1875		
Between winding/capacitor connection and accessible parts		—	—	No	—
Between winding/capacitor connection and metal parts separated from live parts by basic insulation only		14.12, 14.3, 20.2, 20.3	3750	No	Winding ↔ Enclosure
		17.2	2813		
		18.12	1500 / 2500		
Supplementary Information: Electric Strength Test was conducted after clauses 14.12, 14.2, 14.3, 17.2, 18.12, 20.2, 20.3 and 20.5. The test voltage is reduced to 75% of the specified values after clause 17.2. The test value after clause 18.12 is made according to the requirements of clause 18.12.					

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Clause	Requirement + Test	Result - Remark	Verdict

23.1	TABLE: List of Critical Components				P
Object/Part No.	Manufacturer/Trade mark	Type/Model	Technical Data	Standard	Mark(s) of Conformity
Switch	Changzhou Wujin Dacheng Industry & Trade Co., Ltd.	KP-DC	250V~, 2(1)A, 5E4	EN 61058-1	SE-S-2001849
Capacitor	Changzhou Dejie Optoelectronics Technology Co.	MPX / MKP	AC275V, 0,1µF X2, 40/110/21/C	EN 60384-14	TUV/ R 50297652
Alternative Capacitor	AID Electronics Corporation	MEX	AC275V, 0,1µF X2, 40/085/21/C	EN 60384-14	VDE/ 40028973
Alternative Capacitor	Shanghai Jiabao Pan Ocean Electron Co., Ltd.	MPX / X2	0,1 µF, X2, AC 275V, 40/100/56	EN 60384-14	VDE/ 40043363
Power Plug	Yuyao Yuxiang Electric Appliances Co., Ltd.	YXD-02	AC250V,16A PVC	DIN VDE 0620-1	VDE/ 40009922
Alternative Power Plug	Wuxi Zhonghui Wire&Cable Co.,Ltd.	ZH-2	AC250V,16A PVC	DIN VDE 0620-1	VDE/ 40022004
Power Cord	Yuyao Yuxiang Electric Appliances Co., Ltd.	H05VV-F	2×0,75 mm² PVC	EN 50525-2-11	VDE/ 40005361
Alternative power cord	Wuxi Zhonghui Wire&Cable Co.,Ltd.	H05VV-F	2×0,75 mm² PVC	EN 50525-2-11	VDE/40032232
Internal wire	Changzhou Hongchang Electric Cable Co., Ltd.	RV90	0,5 mm²	EN 60745-1 EN 60745-2-23	Tested in appliance
Alternative	Changzhou City Xuexiang Telecommunication Component Co.,Ltd.	RV90	0,5 mm²	EN 60745-1 EN 60745-2-23	Tested in appliance
Alternative	CHANGZHOU SHI XUEXIANG DIANXUN YUANJIAN YOUXIAN GONG SI	RV90	0,5 mm²	EN 60745-1 EN 60745-2-23	Tested in appliance
Terminal block	NINGBO XINLAIYA ELECTRONIC TECH. CO. , LTD.	XY301	AC250V, 0,75mm²	EN 60998-1 EN 60998-2-1	VDE/ 40021616

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Clause	Requirement + Test	Result - Remark	Verdict

Alternative	Suzhou Mingdong Electrical Appliance Co., Ltd.	TCT-1	AC250V, 0,75mm²	EN 60998-1 EN 60998-2-1	TUV/R 50085905
Alternative	Cixi Wanjie Electronic Co. Ltd.	WJ301-5.0	AC250V, 0,75mm²	EN 60998-1 EN 60998-2-1	VDE/ 40042007
Motor	YUYAO LANSHAN MOTOR CO., LTD	---	Class 120, 24,0ºC Stator: 35,466Ω Rotor(diagonal): 35,999Ω	EN 60745-1 EN 60745-2-23	Tested in appliance
Enclosure of tool	Changzhou Wujin Dacheng Industry & Trade Co., Ltd.	PA6-GF30	Min.thickness: 2,4mm	EN 60745-1 EN 60745-2-23	Tested in appliance

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)
L-N	230	---	2,5	>4,0	3,0	>4,0
Rotor winding-Core	230	---	2,0	2,2	2,0	2,2
Stator winding-Core	230	---	2,0	3,0	2,0	3,0
Rotor winding-Axis	230	---	6,0	>8,0	6,0	>8,0
Stator winding to outer enclosure:	230	---	6,0	>8,0	6,0	>8,0
Internal wiring-Enclosure	230	---	4,0	5,0	4,0	5,0
Stator core-Enclosure	230	---	4,0	>6,0	4,0	>6,0
Commutator-Bearing	230	---	8,0	8,2	8,0	8,2
L/N-Enclosure	230	---	8,0	>10,0	8,0	>10,0

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Clause	Requirement + Test	Result - Remark	Verdict

28.2	TABLE: Distance Through Insulation Measurements			P
Distance Through Insulation di Between:	U r.m.s. (V)	Test Voltage (V)	Required di (mm)	Di (mm)
Live parts — Shaft (rotor)	225	---	2,0	2,3
Rotor core—Shaft (rotor)	225	---	1,0	1,25
Brush holder – enclosure	225	---	2,0	6,8
Supplementary information: None.				

29.1	TABLE: BALL PRESSURE TEST		P
Part under test	Plastic material type	Test Temperature (°C)	Impression Diameter (mm)
Enclosure	PA6-GF30	75	1,2
Brush holder	Bakelite	125	1,3
PCB	Epoxy-resin	125	1,3
Supplementary information: None.			

29.2B	TABLE: Glow Wire Test				P
Test temperature (°C)..... :	550°C				—
Specimen under test	Material type	Material ignited, Yes/No	Tissue Paper Ignited, Yes/No	Pine-wood Scorched, Yes/No	Other remarks
Enclosure	PA6-GF30	No	No	No	---
Brush holder	Bakelite	No	No	No	---
Supplementary information: None.					

PART One: EN 60745-1:2009+A11:2010			
Clause	Requirement + Test	Result - Remark	Verdict

29.3A	**Table: Proof Tracking Test, Annex G**			P
Test Conditions	Test according to IEC 60112			—
Test solution	0,1% ammonium chloride solution			—
Test Voltage (V)	175			—
Specimen under test	Material type	Tracking occurred Yes / No	Rate of Tracking	Other remarks
Enclosure	PA6-GF30	No	---	---
Supplementary information: None.				

PART Two: EN 60745-2-23:2013			
Clause	Requirement + Test	Result - Remark	Verdict
6	**ENVIRONMENTAL REQUIREMENTS**		
6.1	**Noise**		
6.1.2.4	Die grinders and small rotary tools are suspended, the motor axis being horizontal.		P
6.1.2.5	Die grinders and small rotary tools are tested at no-load.		P
6.2	**Vibration measurement**		
6.2.4.2	Figures Z102 to Z103 show the positions for different types of tools		P
6.2.6.3	Operation conditions		
	The tool shall be tested under no-load equipped with an artificial wheel under the conditions described below in Table Z101.		P
6.2.7.2	The vibration total value a_h of the handle with the highest emission and the uncertainty K shall be declared	.	P

8	**MARKING AND INSTRUCTIONS**		
8.1	Tools shall also be marked with:		
	Rated speed (min^{-1}).....:	See copy of marking plate	P
	Rated capacity (mm) .....:	See copy of marking plate	P
	Tools provided with a threaded spindle shall be marked with spindle thread size .....:	No threaded spindle used	N/A
	"WARNING Always wear eye protection" or sign M004 of ISO7010 or the following safety sign  :.....:	See copy of marking plate	P
	Indication of direction of rotation of the spindle	On enclosure	P
8.6	n: rated speed		P
8.12.1	Additional safety instructions		P
8.12.2	Additional information		P
8.101	Tool shall also be marked with an indication of direction of rotation of the spindle.		P

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Clause	Requirement + Test	Result - Remark	Verdict
8.102	Tools designed for operation at more than one speed shall be marked with clearly identifiable symbols for each of the speed settings in such a way that in conjunction with the instruction manual it is clear which speed corresponds with each of the settings.		P
12	**HEATING**		
12.4	The tool operated at rated input or rated current for 30 min. The temperature rises are measured at the end of the 30 min.		P
18	**ABNORMAL OPERATION**		
18.10.4	During these tests, the speed of the spindle shall not exceed 120 % of the rated speed. The accessory in accordance with 8.12.2 a) 101) that results in the maximum speed shall be installed.		P
19	**MECHANICAL HAZARDS**		
19.6	The tool shall be designed so as to prevent excessive speed under normal use. The speed of the tool shall not exceed the rated speed under any operating condition.	34988/min (Max.) < 35000/min	P
	Compliance is checked by inspection and by measuring the speed after the tool is operated for a period of 5 min. The recommended accessory that produces the maximum speed shall be installed.		P
	If the tool is provided with a load sensitive speed control, then an accessory need not be installed to load the tool to find maximum speed.	No such device	N/A
19.101	The tool shall be designed so as to prevent the accessory from coming loose under normal use.		P
	The collets and chuck shall be designed to allow insertion of the mandrel to the full depth of the gripping jaws of the collet or chuck and at least 50 % of the maximum mandrel length specified by the manufacturer in accordance with 8.12.2 b) 2) to limit the amount of the wheel overhang as illustrated in Figure 101.	20mm>0,5X30mm	P

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Clause	Requirement + Test	Result - Remark	Verdict
19.102	Spindles shall be designed so that they provide for or aid in securing and driving the accessories designed for the tool.		P
	The direction of spindle threads or the design of an equivalent securing means shall be such that any clamping device, collet, chuck or wheel with threaded hole tends to tighten during operation.		P
	Threaded spindles intended for direct mounting of wheels with threaded holes shall be designed with unrelieved flange shoulders to prevent the spindle from bottoming out in the threaded hole of the wheel.		N/A
19.103	The unbalance of any rotating accessory shall be limited.		P
	For tools with spindles intended for direct mounting of accessories, the eccentricity of the spindle shall be less than 0,1 mm.		N/A
	For tools that use collets or chucks with a maximum capacity of 5 mm or more for mounting accessories, the eccentricity shall be less than: - 0,15 mm for rated speeds less than 25 000 min^{-1}; - 0,10 mm for rated speeds 25 000 min^{-1} and higher.		N/A
	For tools that use collets or chucks with a maximum capacity of less than 5 mm for mounting accessories, the eccentricity shall be less than: - 0,45 mm for rated speeds less than 25 000 min^{-1}; - 0,30 mm for rated speeds 25 000 min^{-1} and higher.	0,06mm	P
	Compliance is checked by measurement. A true concentric steel pin is mounted in accordance with 8.12.2 b) 102), fully inserted in the collet or chuck. The pin's eccentricity is measured as the difference between the maximum and minimum reading of the indicator at 10 mm and at 20 mm from the end of the collet or chuck.		P
21	**CONSTRUCTION**		

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Clause	Requirement + Test	Result - Remark	Verdict
21.18.2	The switches shall be so located or designed that inadvertent operation is unlikely to occur during lifting, carrying or placing the tool on a horizontal flat surface.		P
	It shall either not be possible to start the tool when a rigid sphere with a diameter of (100±1) mm is applied to the switch perpendicularly to the tool's surface where the switch is mounted; and the grasping surface immediately in front of or behind the switch shall be a minimum of 70 mm in length;		P
	or the switch shall have two separate and dissimilar actions before the motor is switched on (e.g. a switch which has to be pushed in before it can be moved laterally to close the contacts to start the motor).		N/A
21.101	The total mass of a rotary tool designed for single hand operation shall be, without any accessory fitted, less than 1 kg.	<1kg	P
29	**RESISTANCE TO HEAT, FIRE AND TRACKING**		
29.3	Die grinders are considered to be subjected to severe duty conditions.		P
ANNEX K	**BATTERY TOOLS AND BATTERY PACKS**		
K.8.12.1.101	Replacement of item k): k) **Hold power tool by insulated gripping surfaces only, when performing an operation where the cutting accessory may contact hidden wiring.** *Cutting accessory contacting a "live" wire may make exposed metal parts of the power tool "live" and could give the operator an electric shock.* NOTE The above warning is omitted if polishing is the only recommended operation.		N/A
	Item n) is not applicable.		N/A
K.12.4	This subclause of this part 2 is not applicable.		N/A
K.29.3	This subclause of this part 2 is not applicable.		N/A