

JIS

JAPANESE INDUSTRIAL STANDARD

Portable Electric Drills

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1. Scope

This Japanese Industrial Standard specifies metal portable electric drills and wood portable electric drills of rated frequency 50 Hz only, 60 Hz only or 50/60 Hz in common, hereinafter referred to as the "electric drills".

Remark: The units and numerical values shown in { } in this Standard are based on the traditional unit system, and are appended for informative reference.

2. Classification on Output

The electric drills are classified according to the maximum value of usable drill diameter, and the outputs, corresponding to the classes, shall be as given in Table 1 for metal drills and as given in Table 2 for wood drills. The time rating of motor shall be 30 min.

Table 1. Classification and Output of Metal Electric Drill

Class	5 mm	6.5 mm	10 mm	13 mm	16 mm	20 mm	25 mm	32 mm
Nominal size of maximum diameter of drill mm	5	6.5	10	13	16	20	25	32
Output W	55 min.	75 min.	150 min.	225 min.	260 min.	370 min.	600 min.	1000 min.

Table 2. Classification and Output of Wood Electric Drill

Class	21 mm	24 mm	30 mm	36 mm
Nominal size of maximum diameter of drill mm	21	24	30	36
Output W	135 min.	160 min.	190 min.	220 min.

3. Rated Voltage and Driving Motor

The classification and the rated voltages of electric drill driving motors shall be as given in Table 3.

Applicable Standards: See page 23.

Table 3. Classification and Rated Voltage of Driving Motor

Unit: V	
Classification of driving motors	Rated voltage
Series commutator motor or single-phase induction motor	100 or 200
Three-phase squirrel-cage induction motor	200

4. Fluctuation of Operating Voltage

The electric drill shall be capable of being used without practical trouble even if the supply voltage at its terminals changes above and below its rated voltage by 10 %.

5. Performances

5.1 Starting The drill shall start irrespective of its motor rotor position when the test of 8.2 is carried out.

5.2 Run Out of Drill Bit Tip The run out of drill bit tip, tested as specified in 8.3, shall not exceed the relevant value of Table 4 every time.

Table 4. Run Out of Drill Bit Tip

Unit: mm	
Mounting of drill chack	Run out of drill bit tip
Taper type	0.3
Screw type	0.6

5.3 Temperature The temperatures of various parts tested as specified in 8.4 shall not exceed the relevant values of Table 5.

Table 5. Temperature Limit

Unit: °C

Measurement position		Temperature
Motor winding	Of class A insulation	105
	Of class E insulation	120
	Of class B insulation	125
	Of class F insulation	140
	Of class H insulation	165
Knob of switch, push button	Of metal, ceramics or glass	60
	Of others	75
Accessible enclosure (including gear case and bearing part)	Of metal, ceramics or glass	65
	Of others	80
Handle operated by a man during service	Of metal, ceramics or glass	55
	Of others	70

Remark: The ambient temperature is 30°C.

5.4 Insulation The insulation shall comply with the following requirements:

- (1) Insulation Resistance The insulation resistance tested as specified in 8.5 (1) shall be not less than 2 MΩ for drills of other construction than class II insulation specified in 6.7, and 7 MΩ for ones of class II insulation.

If the measurement is carried out on each kind of insulation for drills of class II insulation, the insulation resistances shall have at least the relevant values given in Table 6.

Table 6. Insulation Resistance

Unit: MΩ

Kind of insulation	Insulation resistance
Basic insulation	2
Supplementary insulation	5
Reinforced insulation	7

- (2) Dielectric Withstand Voltage The drills shall withstand the test voltage when the test of 8.5 (2) is carried out.

5.5 Output The output shall comply with the following requirements:

- (1) The outputs shall be as given in Table 1 or Table 2, when the test of 8.6 (1) is carried out.
- (2) The current shall not exceed 110 % of the full load current (current entered in the nameplate), when the test of 8.6 (2) is carried out.

5.6 Switch The switches shall comply with the following requirements:

- (1) No trouble shall be caused at any part when a switch is subjected to the test of 8.7 (1).
- (2) The temperature of contact shall not exceed the relevant value given in Table 7 when a switch is subjected to the test of 8.7 (2).

Table 7. Temperature Limit of Contact

Unit: °C

Kind of contact	Temperature
Copper or copper alloys	70
Silver or silver alloys	95

Remark: The ambient temperature is 30°C

5.7 Flexure of Cord

5.7.1 Flexure of Joint between Body and Cord The joint between appliance body and cord shall not cause short circuit of the cord when subjected to the test of 8.8.1.

Further, the rate of broken component wires shall not exceed 10 %.

5.7.2 Flexure of Joint of Cord in Non-renewable Connector with Cord
The joint of cord in a non-renewable connector with cord shall not cause short circuit of the cord when subjected to the test of 8.8.2.

Further the rate of broken component wires shall not exceed 20 %.

5.8 Resistance to Shock The resistance to shock tested as specified in 8.9 shall comply with the following requirements:

- (1) No live parts shall be exposed. However, exposure of live part in such a degree that the live part is not touched by the test finger when tested by the test finger shown in Attached Figure, is an exception.
- (2) No short circuit shall occur when the electric drill is connected to the power supply.

- (3) The insulation resistance between the live parts and the dead metal parts liable to be earthed, measured by a d.c. 500 V insulation tester, shall be not less than 2 MΩ.
- (4) No flaws, cracks or other abnormalities which may result in risks of electric shock, fire, etc. shall appear when the polyamide sphere is dropped.

5.9 Endurance No practical trouble such as loosening of any part shall appear when the test of 8.10 is carried out.

5.10 Noise

5.10.1 Noise under No-loading When the noise under no-load is tested as specified in 8.11.1, the average of measured values at 6 positions shall not exceed 85 dB.

5.10.2 Noise under Loading When the noise under loading is tested as specified in 8.11.2, the average of the measured values at 4 positions shall not exceed 82 dB.

5.11 Locking When the test of 8.12 is carried out, no smoke shall appear at the time of locking, and, after the locking, the drill shall operate at the rated voltage without practical trouble.

Remark: Without practical trouble means that there are no remarkable abnormal sound, vibration, etc.

5.12 Overload When a substantially sinusoidal voltage at 50 Hz or 60 Hz of 1200 V is applied, after the test of 8.13 has been carried out, to the following positions of the electric drill with rated voltage 100 V or 1400 V to that with rated voltage 200 V, for 1 min. the drill shall withstand this voltage application.

- (1) Between the live parts and the accessible dead metal parts
- (2) Between the non-accessible dead metal parts and the accessible dead metal parts

6. Construction

6.1 Construction in General The construction of drill shall comply with the following requirements:

- (1) The drill shall cause no hazard under its normal service conditions, be assembled into correct shape, be finished well at any part, and operate smoothly.
- (2) The drill shall operate safely without remarkable vibration and abnormal sound during its service.
- (3) Every part shall not easily cause mechanical or electrical trouble, or any danger.
- (4) The switch shall be mounted on a position where its operation is easy, and shall not start the drill unexpectedly due to touch, vibration etc.

- (5) The motor having a commutator shall generate less commutation spark, and shall allow replacement of its brushes.
- (6) No live parts shall be exposed.
- (7) The part which receives a thrust shall withstand the thrust
- (8) Screws which clamp current carrying parts shall be equipped with locking means.
- (9) The electric drill shall be capable of securely clamping a drill bit by means of a chuck or socket, and a chuck handle shall be provided for ones employing a chuck.
- (10) The electric drill shall be capable of cutting a hole efficiently under its normal service conditions.

6.2 Insulation Distance The insulation distance shall comply with the following requirements:

- (1) The insulation distances (clearance and creepage distance) between the live parts of different polarity, between the live parts and dead metal parts, and between the live parts and accessible surfaces of non-metallic parts shall have at least the relevant values given in Table 8.