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JAPANESE INDUSTRIAL STANDARD

Portable Electric Grinders

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JAPANESE INDUSTRIAL STANDARD

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Portable Electric Grinders

C 9610-1976
(Reaffirmed: 1984)1. Scope

This Japanese Industrial Standard specifies portable electric grinders, hereinafter referred to as the "grinders", which are used under a rated frequency of 50 Hz or 60 Hz or rated frequencies of 50 and 60 Hz, together with the grinding wheels specified in JIS R 6210 or JIS R 6212.

Remark: The units and the numerical values given in { } in this standard are in accordance with the International System of Units (SI), and are appended for reference.

2. Class, Output and Maximum Speed of Revolution of Grinding Wheel

Grinders are classified according to the outside diameters of grinding wheel to be used, and the classes, the outputs and the maximum speeds of revolution of grinding which shall be as given in Table 1. The time rating of the motors shall be 30 min.

Table 1

Class (nominal outside diameter of grinding wheel) mm		100	125	150	180	205	255
Output W		150 min.	200 min.	300 min.	375 min.	500 min.	750 min.
Maximum speed of revolution r.p.m {min ⁻¹ }	For vitrified grinding wheel	6300	5000	4200	3500	3100	2400
	For resinoid grinding wheel	9500	7600	6300	5300	4600	3700

3. Kind and Rated Voltage of Driving Motor

The kinds and rated voltages of driving motor shall be as given in Table 2.

Table 2

Kind of driving motor	Rated voltage V
Single-phase series commutator motor or single-phase induction motor	100, 200
Three-phase squirrel-cage induction motor	200

4. Fluctuation of Supply Voltage

Grinders shall be capable of serving without any practical trouble even if the supply voltage at the terminals fluctuates by 10 % above and below the rated voltage.

5. Performances

5.1 Starting The grinder shall start irrespective of the position of the motor rotor when subjected to the test of 8.2.

5.2 Deflection of Grinder Wheel Mounting Shaft The deflection of grinder wheel mounting shaft shall not exceed 0.03 mm every time, when tested in accordance with 8.3.

5.3 Temperature Rise The temperature rise shall not exceed the appropriate value given in Table 3, when tested in accordance with 8.4.

Table 3

Measurement point		Temperature rise °C {K}
Motor winding	Of Class A insulation	75
	Of Class E insulation	90
	Of Class B insulation	95
	Of Class F insulation	110
	Of Class H insulation	135
Knob of switch or the like, and push button	Made of metals, ceramics or glass	30
	Made of others	45
Easily accessible enclosure, (including gear case and bearing part)	Made of metals, ceramics or glass	35
	Made of others	50
Handle operated by man in service	Made of metals, ceramics or glass	25
	Made of others	40

Remark: The limit of reference ambient temperature shall be 30°C.

5.4 Insulation The insulation shall comply with the following requirements:

- (1) Insulation Resistance The insulation resistance shall be not less than $2\text{ M}\Omega$ when tested in accordance with 8.5 (1).
- (2) Dielectric Withstand Voltage The grinder shall withstand the test voltage when subjected to the test of 8.5 (2).

5.5 Output The output characteristic shall comply with the following requirements:

- (1) The motor output shall be as specified in Table 1, when tested in accordance with 8.6 (1).
- (2) The motor current shall not exceed 110 % of the full load current (described on the nameplate) when tested in accordance with 8.6 (2).

5.6 Switch The switch shall comply with the following requirements:

- (1) No trouble shall appear in each part when the test of 8.7 (1) is carried out.
- (2) The temperature rise of contact shall not exceed the appropriate value given in Table 4, when the test of 8.7 (2) is carried out.

Table 4

Unit: $^{\circ}\text{C}\{\text{K}\}$

Type of contact	Temperature rise
Copper or copper alloys	40
Silver or silver alloys	65

Remark: The limit of reference ambient temperature shall be 30°C .

5.7 Bending of Cord

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

The relative breakage of component wires of the cord shall not exceed 10 %.

5.7.2 Bending of Joint between Non-renewable Connector and Cord The joint between non-renewable connector and cord shall not cause short circuit of the cord when subjected to the test of 8.8.2.

The relative breakage of component wires of the core shall not exceed 20 %.

5.8 Resistance to Mechanical Shock The resistance to mechanical shock, when tested in accordance with 8.9, shall comply with the following requirements:

- (1) No live part shall be exposed. However, such exposure of live part that can not be touched by the test finger shown in Attached Figure is excluded.
- (2) No short circuit shall occur when the grinder is connected to the power supply.
- (3) The insulation resistance between live part and dead metal part liable to be earthed measured with a d.c. 500 V insulation resistance tester shall be not less than 2 MΩ.
- (4) When polyamide ball is dropped, no cracks, splits or other abnormalities which will result in risk of electric shock, fire, etc. shall be caused.

5.9 Durability 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-load Conditions When the noise under no-load conditions is tested in accordance with 8.11.1, the average of the measured values at 5 positions shall not exceed 82 phones {82 dB} (A).

5.10.2 Noise under Loaded Conditions When the noise under loaded conditions is tested in accordance with 8.11.2, the average of the measured values at 4 positions shall not exceed 85 phones {85 dB} (A).

5.11 Overload The grinder which has been subjected to the overload test of 8.12 shall withstand such voltage application that a substantially sinusoidal voltage of 50 or 60 Hz, of 1200 V for a grinder with rated voltage 100 V or of 1400 V for a grinder with rated voltage 200 V, is applied between live parts and dead metal parts liable to be touched by a man (accessible dead metal parts), and between non-accessible dead metal parts and accessible dead metal parts for 1 min each.

6. Construction

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

- (1) Grinders shall have no possibility of causing danger during normal use, shall be assembled to have correct style, shall be good in finishing of each part and smooth in operation.
- (2) Grinders shall operate safely without remarkable vibration and/or abnormal sound during service.
- (3) Each part shall not easily cause mechanical and/or electrical failure and also danger.

- (4) The switch shall be mounted on a position where it is easily operated and shall have no possibility of unexpected starting of the grinder due to contact, vibration, etc.
- (5) The motor having a commutator shall not cause much spark and its bushes shall be easily replaced.
- (6) The live parts shall not be exposed.
- (7) The screws which clamp the conductive parts shall be equipped with any means to prevent loosening.
- (8) Good finished surface shall be obtained when a material is ground by a grinder in normal service conditions.

6.2 Insulation Distance The insulation distance shall be as follows:

- (1) The insulation distances (clearance and creepage distance) between live parts of different polarity, between live part and dead metal part and between live part and accessible dead metal part shall have the values not less than the appropriate values given in Table 5.

Table 5

Insulation distance			Line voltage or voltage to earth V		
			Up to and including 50	Over 50 upto and including 150	Over 150 up to and including 300
Mount of power supply wire	Between terminals connected by manufacturer		—	3	4
	Between terminals connected by manufacturer and dead metal part liable to be earthed or accessible surface of non-metallic part		—	2.5	3
Other parts	Between live parts of different polarity (including wire mounting terminals of components having switching mechanism)	Fixed parts where ingress of dust and deposition of metal powder are not anticipated	1.2	1.5	2
		Other places	1.5	2.5	3
	Between live part and dead metal part liable to be earthed or accessible surface of non-metallic part	Fixed parts where ingress of dust and deposition of metal powder are not anticipated	1.2	1.5	2
		Other places	1.2	2	2.5
			Commutator		1.6

- (2) The parts of semiconductors, resistors, capacitors, tube sockets, printed circuit, etc. used in electronic circuits where decrease of insulation distance is unavoidable due to their construction, may not comply with (1), if such parts pass the tests to prove the following requirements:

- (a) When the live parts of different polarity are short circuited, the components connected to the shorted circuits will not burn. However, burning of one component connected to the circuit in question is exempted if the burning does not result in burning of other components.
- (b) The insulation resistance between live parts and accessible dead metal parts measured after the test (a) with a 500 V insulation resistance tester shall be not less than 0.1 MΩ.

6.3 Noise Strength The strength of noise generated from a grinder having a rated power consumption not exceeding 500 W and employing a commutator motor, shall comply with the following requirements:

- (1) The noise field strength shall comply with either of the requirements given below, over the frequency range of 150 kHz (incl.) to 200 MHz (incl.). Here, dB means the value calculated on the basis of 1 μV/m is 0 dB.
 - (a) The noise field strength measured by the antenna located at a point 10 m, in horizontal distance, apart from the grinder, shall be not more than 40 dB.
 - (b) The noise field strength measured by the antenna located at a point 3 m, in horizontal distance, apart from the grinder, shall have not more than the appropriate values given in Table 6.

Table 6

	Noise field strength dB
150 kHz (incl.) to 1605 kHz (incl.)	60
1605 kHz (not incl.) to 27 MHz (incl.)	55
27 MHz (not incl.) to 200 MHz (incl.)	50

- (2) The noise terminal voltage measured between one line and the earth, over the frequency range of 525 kHz (incl.) to 1605 kHz (incl.) shall be not more than 65 dB. Here, dB means the value calculated on the basis of 1 μV/m is 0 dB.