



PERMANENT DOCUMENT

**ENEC 303
Annex AF**

**Annex AF
to Routine Test Requirements for manufacturers
(as per Article 9 of the Agreement)**

**Hand-held motor-operated electrical tools
covered by the EN 60745 series**

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Annex AF to PD ENEC 303

Hand-held motor-operated electrical tools covered by the EN 60745 series

1 ROUTINE TESTS (100 %)

1.1 Operating check

The safe operation shall be checked, for example, by electrical measurements, by verifying the functional devices, such as switches and manually-operated controls, and by verifying the direction of rotation of motors.

1.2 Electric strength test

The insulation of the tools shall be checked by the following test:

A voltage of substantially sinus-wave form having a frequency of 50 Hz or 60 Hz and the value shown in the following table is immediately applied, for 3 seconds, between live parts and:

- a) accessible metal parts which may become live in the event of an insulation fault or as a result of incorrect assembly;
- b) inaccessible metal parts.

The tests of item a) are made on the tool; the tests of item b) are made on the tool either completely assembled, or in the production line.

The tests of item a) are made on all tools, the tests of item b) being only made on class II tools.

The high-voltage transformer used for the test must be so designed that, when the output terminals are short-circuited after the output has been adjusted to the appropriate test voltage, the output current is at least 200 mA.

The overcurrent relay shall trip when the output current exceeds 5 mA.

Care shall be taken that the r.m.s. value of the test voltage applied is measured within $\pm 3\%$ and that the voltage measuring device or other indicator responds to the output voltage of the transformer.

Attention is drawn to the fact that the test described cannot always be used if the tool incorporates DC components; in such cases, tests with DC may be necessary.

The inherent resistance of the DC source shall allow a short-circuit current of at least 200 mA.

No flashover or breakdown shall occur during the tests.

Application of test voltage	Test voltage V		
	Class III tools	Class II tools	Class I tools
Over basic insulation	400	1 000	1 000
Over double insulation or reinforced insulation	-	2 500	-

1.3 Earth continuity test

For class I tools, a current of at least 10 A, derived from an AC source having a no-load voltage not exceeding 12 V, is passed between the earthing terminal or the earthing contact and, in turn, each of the accessible metal parts which need to be earthed for safety reasons.

The voltage drop between the earthing contact of the plug or the external end of an earth continuity conductor or of the appliance inlet and the accessible metal part is measured, and the resistance calculated from the current and the voltage drop.

In no case shall the resistance exceed 0.3 Ω . This value is applicable to supply cable lengths up to 5 m. In case of supply cables having a length exceeding 5 m, it is increased by 0.12 Ω for any further length of 5 m.

Care shall be taken that the contact resistance between the tip of the measuring probe and the metal parts under test does not influence the test results.

2 PERIODIC TESTS

- 2.1 Endurance test (only in case of collector motors), Insulation test (clause 16)
- 2.2 Measurement of the input power (only in case of appliances provided with heating elements) (clause 10)
- 2.3 Check pin of plugs on rest voltage (clause 21.21)
- 2.4 Winding resistances at ambient temperature (compare with tested and certified appliance)
- 2.5 Leakage current measurement and voltage test under hot conditions (clause 12)
- 2.6 Moisture test (humidity cabinet), Insulation tests (clause 14,15)
- 2.7 Earthing continuity check (clause 26)
- 2.8 Check of control and protection devices

Extra tests for Battery powered tools

- 2.9 Short-circuiting the charged battery pack, if possible (Annex K)
- 2.10 Check the battery cells used, if possible (data in certificate).