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AMENDMENT 1
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Amendment 1

Hand-held motor-operated electric tools – Safety –

Part 1: General requirements

Amendement 1

Outils électroportatifs à moteur – Sécurité –

Partie 1: Règles générales

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FOREWORD

This amendment has been prepared by subcommittee 61F: Safety of hand-held motor-operated electric tools, of IEC technical committee 61: Safety of household and similar electrical appliances.

The text of this amendment is based on the following documents:

FDIS	Report on voting
61F/460/FDIS	61F/484/RVD

Full information on the voting for the approval of this amendment can be found in the report on voting indicated in the above table.

The committee has decided that the contents of the base publication and its amendments will remain unchanged until 2006. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

The contents of the corrigendum of January 2003 have been included in this copy.

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CONTENTS

Add, on page 3, to the list of annexes, the titles of new annexes K and L as follows:

Annex K (normative) Battery tools and battery packs

Annex L (normative) Battery tools and battery packs provided with mains connection or non-isolated sources

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FOREWORD

Replace the first sentence of the reference concerning the annexes as follows:

Annexes A, B, C, D, E, F, G, I, K and L form an integral part of this standard.

Add, after the reference concerning the annexes, the following note:

NOTE In annexes B, K and L, subclauses which are additional to those in the main body of the text are numbered starting from 101.

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1 Scope

Add, in the fifth paragraph, after the sentence beginning "Requirements for motors not isolated…", the following two new sentences:

Requirements for rechargeable battery-powered motor-operated or magnetically driven tools and the battery packs for such tools are given in Annex K. Those for such tools that are also operated and/or charged directly from the mains or a non-isolated source are given in Annex L.

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Add, after annex J, the following new annexes K and L:

Annex K
(normative)

Battery tools and battery packs

K.1 Scope

K.1.1 This annex applies to rechargeable battery-powered motor-operated or magnetically driven tools and the battery packs for such tools. This annex applies to tools incorporating detachable, integral and separable battery packs. The maximum rated voltage for tools and battery packs is 75 V d.c.

Battery tools covered by this annex are not considered to be class I, class II, or class III tools and therefore are not required to have basic, supplementary or reinforced insulation. Electric shock hazard is considered to exist only between parts of opposite polarity.

Battery packs for tools covered under this annex intended to be charged by a non-isolated charger shall be evaluated by this annex and standard. When evaluating a battery pack for protection against electric shock, creepage distances, clearances and distances through insulation, the battery pack shall be fitted to the intended charger.

All clauses of this standard apply unless otherwise specified in this annex. If a clause is stated in the annex, the requirements replace the requirements of the standard.

For the purpose of the tools covered by this annex, the term “mains switch” as it appears in the standard is understood to refer to the power switch of the battery-operated tool.

This annex is not intended to apply to tools using general purpose batteries installed by the user, and this annex alone will not be sufficient to ensure all hazards are considered for these products’ “battery packs” .

This annex does not apply to battery chargers which are covered by IEC 60335-2-29.

K.2 Normative references

This clause is applicable except as follows:

Additional normative reference:

IEC 61558-2-6:1997, *Safety of power transformers, power supply units and similar – Part 2: Particular requirements for safety isolating transformers for general use*

K.3 Definitions

For the purpose of this annex, the following definitions apply.

K.3.101
battery pack
assembly of one or more cells intended to provide electrical current to the tool

K.3.101.1
detachable battery pack
battery pack which is contained in a separate enclosure from the battery tool and is intended to be removed from the tool for charging purposes

K.3.101.2
integral battery pack
battery pack which is contained within the battery tool and is not removed from the battery tool for charging purposes. A battery pack that is to be removed from the battery tool for disposal or recycling purposes only is considered to be an integral battery pack

K.3.101.3
separable battery pack
battery pack which is contained in a separate enclosure from the battery tool and is connected to the battery tool by a cord

K.3.102
fully charged battery pack
battery pack which has been through at least two discharge and charge cycles with an interval of at least two hours after each cycle in accordance with the manufacturer's instructions

K.3.103
non-isolated source
voltage source in which the output is not isolated from the mains supply by means of a safety isolating transformer as specified in IEC 61558-1 and IEC 61558-2-6

K.3.104
hazardous voltage
voltage between parts having an average value exceeding 60 V d.c. or 42,4 V peak when the peak-to-peak ripple exceeds 10 % of the average value

K.3.105
power switch
switch that controls the primary operating means of the tool

K.5 General conditions for the tests

K.5.7.1 This subclause is not applicable.

K.5.7.2 Tools having more than one rated voltage are tested on the basis of the most unfavourable voltage.

K.5.7.3 This subclause is not applicable.

K.5.10 This subclause is not applicable.

K.5.11 This subclause is not applicable.

K.5.14 This subclause is not applicable.

K.5.15 This subclause is not applicable.

K.5.16 This subclause is not applicable.

K.5.101 *Unless otherwise specified, a fully charged battery pack shall be used for each test.*

K.5.102 *When measuring voltage, the peak value of any superimposed ripple exceeding 10 % of the average value shall be included. Transient voltages are ignored, such as a temporary increase above rated voltage, for example after the battery pack is removed from the charger.*

K.7 Classification

This clause is not applicable.

K.8 Marking and instructions

K.8.1 Battery tools and detachable or separable battery packs shall be marked with:

- rated voltage(s) or rated voltage range(s), in volts;
- symbol for nature of supply;
- name or trade mark or identification mark of the manufacturer or responsible vendor;
- model or type reference;
- manufacturer's address or country of origin;
- any mandatory mark showing compliance with legislation by reference to this standard.

Additional markings shall not give rise to misunderstanding.

Compliance is checked by inspection.

K.8.2 This subclause is not applicable.

K.8.5 This subclause is not applicable.

K.8.7 This subclause is not applicable.

K.8.8 This subclause is not applicable.

K.8.12.1 This subclause is applicable except as follows:

Item 5) Service, is replaced by the following:

Replacement:

5) **Battery tool use and care**

a) **Ensure the switch is in the off position before inserting battery pack.** *Inserting the battery pack into power tools that have the switch on invites accidents.*

b) **Recharge only with the charger specified by the manufacturer**. *A charger that is suitable for one type of battery pack may create a risk of fire when used with another battery pack.*

c) **Use power tools only with specifically designated battery packs.** *Use of any other battery packs may create a risk of injury and fire.*

d) **When battery pack is not in use, keep it away from other metal objects like paper clips, coins, keys, nails, screws, or other small metal objects that can make a connection from one terminal to another**. *Shorting the battery terminals together may cause burns or a fire.*

e) **Under abusive conditions, liquid may be ejected from the battery; avoid contact. If contact accidentally occurs, flush with water. If liquid contacts eyes, additionally seek medical help**. *Liquid ejected from the battery may cause irritation or burns.*

6) **Service**

a) **Have your power tool serviced by a qualified repair person using only identical replacement parts.** *This will ensure that the safety of the power tool is maintained.*

K.9 Protection against electric shock

NOTE The title of this clause differs from that of the main standard.

Battery tools and battery packs shall be so constructed and enclosed that there is adequate protection against electric shock.

K.9.1 This subclause is not applicable.

K.9.2 It shall not be possible to have two conductive, simultaneously accessible parts where the voltage between them is hazardous unless they are provided with protective impedance.

In the case of protective impedance the short circuit current between the parts shall not exceed 2 mA for d.c. or 0,7 mA peak for a.c. and there shall not be more than 0,1 µF capacitance directly between the parts.

Compliance for accessibility is checked by applying the test finger of Figure 1 to each conductive part.

The test finger of Figure 1 is applied without any appreciable force through openings to any depth that the finger will permit, and it is rotated or angled before, during and after insertion to any position.

If the opening does not allow entry of the finger, the force on the finger in the straight position is increased to 20 N and the test with the finger bent repeated.

Contact with the test finger is determined with all detachable parts removed and the battery tool operated in any possible position of normal use.

Lamps located behind detachable covers are not removed, providing the lamp may be de-energized by means of a user operable plug, battery pack disconnection or a switch.

K.9.3 This subclause is not applicable.

K.9.4 This subclause is not applicable.

K.10 Starting

This clause is not applicable.

K.11 Input and current

This clause is not applicable.

K.12 Heating

K.12.1 Battery tools and battery packs shall not attain excessive temperatures.

Compliance is checked by determining the temperature rise of the various parts under the following conditions:

The tool is operated at no load until maximum temperature is reached or the tool no longer operates due to the battery pack being discharged.

During the test, thermal cut-outs and overload releases shall not operate. The temperature rises shall not exceed the values shown in Table K.1.

Table K.1 – Maximum normal temperature rises for battery tools

Parts	Temperature rise K
External enclosure, except handles held in normal use	60
Handles, knobs, grips, and the like which, in normal use, are continuously held:	
– of metal	30
– of porcelain or vitreous material	40
– of molded material, rubber or wood	50
Handles, knobs, grips, and the like which, in normal use, are held for short periods only (e.g. switches):	
– of metal	35
– of porcelain or vitreous material	45
– of molded material, rubber or wood	60
Parts in contact with oil having a flash point of t °C	t-50

K.12.2 to K.12.6 These subclauses are not applicable.

K.13 Leakage current

This clause is not applicable.

K.14 Moisture resistance

This clause is not applicable.

K.15 Electric strength

K.15.1 Materials providing insulation from electric shock shall be adequate.

Compliance is checked by subjecting the insulating material for 1 min to 750 V with a substantially sinusoidal wave from having a frequency of 50 Hz or 60 Hz. This provision does not exclude the testing of the material as situated within the tool, providing care is taken to ensure that materials not under consideration are not subjected to the test voltage.

This test applies only to materials which, if they were to fail to insulate, would subject the user to a shock hazard from a hazardous voltage. This test does not apply to materials that provide only a physical barrier to contact. As such, an uninsulated energized part shall be within 1,0 mm of the material surface to be considered for this requirement

K.15.2 This subclause is not applicable.

K.16 Overload protection of transformers and associated circuits

This clause is not applicable.

K.17 Endurance

This clause is not applicable.

K.18 Abnormal operation

K.18.1 All tools when operating under battery power and their battery packs shall be so designed that the risk of fire or electric shock as a result of abnormal operation is obviated as far as is practical.

Compliance is checked by the following tests.

The battery tool and battery pack, as is appropriate, are to be placed on a soft wood surface covered by two layers of tissue paper; the battery tool and battery pack are to be covered by one layer of untreated 100 % cotton medical gauze. The test is to be conducted until failure or until the test sample returns to room temperature. A new sample can be used for each fault listed below. There shall be adequate protection against electric shock as defined in clause K.9 and no charring or burning of the gauze or tissue paper shall result when a battery tool and battery pack are subjected to any one of the following fault conditions shown below in tests a to f.

Charring is defined as a blackening of the gauze caused by combustion. Discolouration of the gauze caused by smoke is acceptable.

Thermal cut-outs and thermal overloads may operate during the above tests. In this case, the same test is to be repeated three more times, using three additional samples. The resistance for the short in items a), b), d), e) and f) shall not exceed 10 mΩ.

a) *The terminals of a detachable battery pack with exposed terminals are shorted. Battery pack terminals that can be contacted using either Figure 1 or Figure 2 probes are considered exposed. The means of shorting shall not attain excessive temperatures so as to char or ignite the tissue paper or gauze.*

b) *The motor terminals are shorted.*

c) *The motor rotor is locked.*

d) *A cord provided between the separable battery pack and the battery tool shall be shorted at the point likely to produce the most adverse effects.*

e) *A cord provided between the tool and the charger shall be shorted at the point likely to produce the most adverse effects.*

f) *For battery tools a short is introduced between any two uninsulated parts of opposite polarity not in accordance with the spacings given in clause K.28.*

K.18.2 to K.18.9 These subclauses are not applicable.

K.18.12 This subclause is not applicable.

K.19 Mechanical hazards

K.19.101 If a tool is marked with a direction of movement, it shall not be possible to connect a battery pack such that the marking is not correct.

K.20 Mechanical strength

K.20.1 Battery tools and battery packs shall have adequate mechanical strength, and shall be so constructed that they withstand such rough handling as may be expected in normal use.

Compliance is checked by the tests of 20.2 and K.20.3.

Following the test, the battery tool and battery pack shall meet the requirements of clauses K.9, K.19 and either K.18.1 (f) or K.28.1.

K.20.3 *A battery tool with its battery pack attached, shall withstand being dropped three times on a concrete surface from a height of 1 m. The sample shall be positioned to vary the point of impact.*

For battery tools with detachable or separable battery packs, the test is repeated three more times without the battery pack attached to the tool.

In addition for detachable or separable battery packs the test is repeated three more times on the battery packs separately.

New samples may be used for each series of three drops.

K.20.4 This subclause is not applicable.

K.21 Construction

K.21.5 This subclause is not applicable.

K.21.6 This subclause is not applicable.

K.21.8 to K.21.16 These subclauses are not applicable.

K.21.21 This subclause is not applicable.

K.21.25 to K.21.34 These subclauses are not applicable.

K.21.101 Tools shall not readily accept general purpose batteries (either primary or rechargeable).

NOTE Examples of general purpose batteries are AA, C, D, etc.