
Električna ročna orodja - Varnost - 1. del: Splošne zahteve (IEC 60745-1:2001; spremenjen)

Hand-held motor-operated electric tools - Safety - Part 1: General requirements

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Hand-held motor-operated electric tools - Safety
Part 1: General requirements
(IEC 60745-1:2001, modified)

Outils électroportatifs à moteur - Sécurité
Partie 1: Règles générales
(CEI 60745-1:2001, modifiée)

Handgeführte motorbetriebene
Elektrowerkzeuge - Sicherheit
Teil 1: Allgemeine Anforderungen
(IEC 60745-1:2001, modifiziert)

This European Standard was approved by CENELEC on 2002-07-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

The text of the International Standard IEC 60745-1:2001, prepared by SC 61F, Safety of hand-held motor-operated electric tools, of IEC/TC 61, Safety of household and similar electrical appliances, together with the common modifications prepared by the Technical Committee CENELEC TC 61F, Safety of hand-held and transportable motor-operated electric tools, was submitted to the Unique Acceptance Procedure (UAP) and was approved by CENELEC as EN 60745-1 on 2002-07-01.

This European Standard supersedes EN 50144-1:1995.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2003-11-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2005-07-01

In this standard the common modifications to the International Standard are indicated by a vertical line in the left margin of the text.

Other standards referred to in this European Standard are listed in Clause 2. Clause 2 lists the valid edition of those documents at the time of issue of this EN.

This standard is divided into two parts:

Part 1: General requirements which are common to most hand-held electric motor operated tools (for the purpose of this standard referred to simply as tools) which could come within the scope of this standard;

Part 2: Requirements for particular types of tools which either supplement or modify the requirements given in part 1 to account for the particular hazards and characteristics of these specific tools.

This European Standard has been prepared under a mandate given to CEN and CENELEC by the European Commission and the European Free Trade Association and supports the essential health and safety requirements of the Machinery Directive.

Compliance with the clauses of Part 1 together with a relevant part 2 of this standard provides one means of conforming with the essential health and safety requirements of the Directive concerned.

A relevant part 2 is one in which the type of the tool or an accessory which is to be used with the tool is within the scope of that part 2. (standards.iteh.ai)

When a relevant part 2 does not exist, Part 1 can help to establish the requirements for the tool, but will not by itself provide a means of conforming with the relevant essential health and safety requirements of the Machinery Directive.

Warning: Other requirements and other EC Directives can be applicable to the products falling within the scope of this standard.

CEN Technical Committees have produced a range of standards dealing with a similar range of non-electrically powered tools. Where necessary normative references are made to these standards in the relevant part 2.

This standard follows the overall requirements of EN 292-1 and EN 292-2.

Subclauses, tables and figures which are additional to those in IEC 60745-1 are prefixed "Z".

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

Annex J is for information only.

NOTE In this standard the following print types are used:

- Requirements proper; in roman type
- *Test specifications: in italic type;*
- Explanatory matter: in smaller roman type.

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1 Scope

1.1 This European Standard deals with the safety of hand-held motor-operated or magnetically driven electric tools, the rated voltage of the tools being not more than 250 V for single-phase a.c. or d.c. tools, and 440 V for three-phase a.c. tools.

So far as is practicable, this standard deals with the common hazards presented by hand-held tools which are encountered by all persons in the common use of the tools.

Tools with an electric heating element are within the scope of this standard. They should also comply with relevant parts of EN/IEC 60335.

This standard applies also to hand-held electric motor operated tools intended to be connected to a water supply.

Hand-held electric tools, hereinafter referred to as tools, which can be mounted on a support for use as fixed tools without any alteration of the tool itself, are within the scope of this standard. Unless the requirement for such support is given in a relevant part 2, this standard alone will not be sufficient to ensure that the combination of tool and support is adequate.

Requirements for motors not isolated from the supply, and having basic insulation not designed for the rated voltage of the tools, are given in Annex B.

This standard does not apply to:

- hand-held tools intended to be used in the presence of explosive atmosphere (dust, vapour or gas);
- hand-held tools used for preparing and processing food;
- hand-held tools for medical purpose (EN 60601);
- heating tools which are covered by EN 60335-2-45.

For hand-held tools intended to be used in vehicles or on board ships or aircraft, additional requirements may be necessary.

For hand-held tools intended to be used in tropical countries, special requirements may be necessary.

NOTE Attention is drawn to the fact that in many countries, additional requirements are specified by the national health authorities, the national authorities responsible for the protection of labour, the national water supply authorities, etc.

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2 Normative references

SIST EN 60745-1:2003

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

CR 1030-1:1995, *Hand-arm vibration – Guidelines for vibration hazards reduction – Part 1: Engineering methods by design of machinery*

EN 292-2:1991, *Safety of machinery – Basic concepts, general principles for design – Part 2: Technical principles and specifications*

EN 60061-1:1993, *Lamp caps and holders together with gauges for the control of interchangeability and safety – Part 1: Lamp caps*
(IEC 60061-1:1969 + IEC 60061-1A:1970 to N:1992, modified)
A1:1995 to A26:2001 (IEC 60061-1P:1994 to IEC 60061-1:1969/A26:2001)

EN 60065:1998 + corrigendum June 1999, *Audio, video and similar electronic apparatus - Safety requirements* (IEC 60065:1998, modified)

EN 60068-2-75:1997, *Environmental testing - Part 2-75: Tests - Test Eh: Hammer tests*
(IEC 60068-2-75:1997)

EN 60127 (all parts), *Miniature fuses* (IEC 60127 – all parts)

EN 60309 (all parts), *Plugs, socket-outlets and couplers for industrial purposes*
(IEC 60309 – all parts)

EN 60320 (all parts), *Appliance couplers for household and similar general purposes*
(IEC 60320 – all parts)

EN 60335-1:2001, *Household and similar electrical appliances - Safety – Part 1: General requirements* (IEC 60335-1:2002, modified)

EN 60529:1991 + corrigendum May 1993, *Degrees of protection provided by enclosures (IP Code)* (IEC 60529:1989)

EN 60695-2-2:1994, *Fire hazard testing – Part 2: Test methods – Section 2: Needle-flame test*
(IEC 60695-2-2:1991)

EN 60695-2-10:2001, *Fire hazard testing – Part 2-10: Glowing/hot-wire based test methods – Glow-wire apparatus and common test procedure* (IEC 60695-2-10:2000)

EN 60695-2-11:2001, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end-products* (IEC 60695-2-11:2000)

EN 60695-2-12:2001, *Fire hazard testing – Part 2-12: Glowing/hot-wire based test methods – Glow-wire flammability test method for materials* (IEC 60695-2-12:2000)

EN 60695-2-13:2001, *Fire hazard testing – Part 2-13: Glowing/hot-wire based test methods – Glow-wire ignitability test method for materials* (IEC 60695-2-13:2000)

EN 60707:1999, *Flammability of solid non-metallic materials when exposed to flame sources - List of test methods* (IEC 60707:1999)

EN 60730-1:2000, *Automatic electrical controls for household and similar use – Part 1: General requirements* (IEC 60730-1:1999, modified)

EN 60998-2-2:1993, *Connecting devices for low-voltage circuits for household and similar purposes – Part 2-2: Particular requirements for connecting devices as separate entities with screwless-type clamping units* (IEC 60998-2-2:1991)

EN 60999-1:2000, *Connecting devices – Electrical copper conductors – Safety requirements for screw-type and screwless-type clamping units – Part 1: General requirements and particular requirements for clamping units for conductors from 0,2 mm² up to 35 mm² (included)*
(IEC 60999-1:1999)

EN 61058-1:2002, *Switches for appliances – Part 1: General requirements* (IEC 61058-1:2000 + A1:2001, modified)

EN 61558-1:1997, *Safety of power transformers, power supply units and similar - Part 1: General requirements and tests* (IEC 61558-1:1997, modified)

EN ISO 3744:1995, *Acoustics - Determination of sound power levels of noise sources using sound pressure - Engineering method in an essentially free field over a reflecting plane* (ISO 3744:1994)

EN ISO 4871:1996, *Acoustics - Declaration and verification of noise emission values of machinery and equipment* (ISO 4871:1996)

EN ISO 5349 (all parts), *Mechanical vibration -- Measurement and evaluation of human exposure to hand-transmitted vibration*

EN ISO 11203:1995, *Acoustics - Noise emitted by machinery and equipment - Determination of emission sound pressure levels at a work station and at other specified positions from the sound power level* (ISO 11203:1995)

EN ISO 11688-1:1998, *Acoustics - Recommended practice for the design of low noise machinery and equipment - Part 1: Planning* (ISO/IR 11688-1:1995)

EN ISO 11690-3:1998, *Acoustics - Recommended practice for the design of low-noise workplaces containing machinery - Part 3: Sound propagation and noise prediction in workrooms* (ISO/TR 11690-3:1997)

HD 21 (all parts), *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V* (IEC 60227, related – all parts)

HD 22 (all parts), *Rubber insulated cables of rated voltages up to and including 450/750 V* (IEC 60245, related - all parts)

HD 214 S2:1980, *Method for determining the comparative and the proof tracking indices of solid insulating materials under moist conditions* (IEC 60112:1979)

HD 566 S1:1990, *Thermal evaluation and classification of electrical insulation* (IEC 60085:1984)

HD 639 S1:2002, *Electrical accessories – Portable residual current devices without integral overcurrent protection for household and similar use (PRCDs)* (IEC 61540:1997 + A1:1998, modified)

IEC 60384-14:1993, *Fixed capacitors for use in electronic equipment – Part 14: Sectional specification: Fixed capacitors for electromagnetic interference suppression and connection to the supply mains*

IEC 60884 (all parts), *Plugs and socket-outlets for household and similar purposes*

ISO 1463:1982, *Metallic and oxide coating – Measurement of coating thickness – Microscopical method*

ISO 2178:1982, *Non-magnetic coatings on magnetic substrates – Measurement of coating thickness – Magnetic method*

ISO 5348:1998, *Mechanical vibration and shock - Mechanical mounting of accelerometers*

ISO 7574-4:1985, *Acoustics - Statistical methods for determining and verifying stated noise emission values of machinery and equipment - Part 4: Methods for stated values for batches of machines*

3 Definitions

For the purpose of this European Standard, the following definitions apply.

3.1.1 Where the terms voltage and current are used, they imply the r.m.s. values, unless otherwise specified.

3.1.2 Where in this standard the expressions "with the aid of a tool", "without the aid of a tool" and "requires the use of a tool" occur, the word "tool" means a screwdriver or any other object, which may be used to operate a screw or other fixing means.

3.2.1

rated voltage

voltage assigned to the tool by the manufacturer. For three-phase supply, it is the voltage between phases

3.2.2

rated voltage range

voltage range assigned to the tools by the manufacturer, expressed by its lower and upper limits

3.2.3

working voltage

maximum voltage to which the part under consideration is subjected when the tool is supplied at its rated voltage and operating under normal load. When deducing the working voltage, the effect of transient voltages is ignored

3.2.4

rated input

input in watts assigned to the tool by the manufacturer

3.2.5

rated input range

input range in watts assigned to the tool by the manufacturer expressed by its lower and upper limits

3.2.6

rated current

current assigned to the tool by the manufacturer. If no current is assigned to the tool, the rated current for the purpose of this standard is the current measured when the tool is under normal load at rated voltage

3.2.7

rated frequency

frequency assigned to the tool by the manufacturer

3.2.8

rated frequency range

frequency range assigned to the tool by the manufacturer, expressed by its lower and upper limits

3.2.9**normal load**

load to be applied to a tool, to obtain rated input or rated current, any marking of short-time or intermittent operation being observed and, unless otherwise specified, heating elements, if any, being operated as in normal use. The normal load is based on the rated voltage or on the upper limit of the rated voltage range

3.2.9.1**no load input / current**

highest input or current obtained when a tool is operated at rated voltage and frequency with no external load (work) applied to the accessories packaged with the tool by the manufacturer and adjusted according to manufacturer's instructions, ready for use

3.2.10**rated no-load speed**

no-load speed at rated voltage or at the upper limit of the rated voltage range assigned to the tool by the manufacturer

3.3.1**detachable cord**

flexible cord, for supply, intended to be connected to the tool by means of a suitable appliance coupler

3.3.2**supply cord**

flexible cord, for supply purposes, which is fixed to the tool

3.3.3**type X attachment**

method of attachment of the supply cord so that it can easily be replaced without the aid of a special purpose tool provided by the manufacturer. The supply cord may be a specially prepared cord and only available from the manufacturer or its service agent. A specially prepared cord can also include a part of the tool

3.3.4**type Y attachment**

method of attachment of the supply cord such that any replacement is intended to be made by the manufacturer, its service agent or similar qualified person. Type Y attachment may be used either with an ordinary flexible cord or with a special cord

3.3.5**type Z attachment**

method of attachment of the supply cord so that it cannot be replaced without breaking or destroying the tool

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3.4.1**basic insulation**

insulation applied to live parts to provide basic protection against electric shock. Basic insulation does not necessarily include insulation used exclusively for functional purpose

3.4.2**supplementary insulation**

independent insulation applied in addition to the basic insulation, in order to provide protection against electric shock in the event of a failure of the basic insulation

3.4.3**double insulation**

insulation system comprising both basic insulation and supplementary insulation

3.4.4

reinforced insulation

single insulation system applied to live parts, which provides a degree of protection against electric shock equivalent to double insulation under the conditions specified in this standard. The term "single insulation system" does not imply that the insulation is one homogeneous piece. It may comprise several layers which cannot be tested singly as supplementary or basic insulation

3.4.5

class I tool

tool in which protection against electric shock does not rely on basic insulation only, but which includes an additional safety precaution in that conductive accessible parts are connected to the protective earthing conductor in the fixed wiring of the installation in such a way that conductive accessible parts cannot become live in the event of a failure of the basic insulation. For tools intended for use with a flexible cord, this provision includes a protective conductor as part of the flexible cord

3.4.6

class II tool

tool in which protection against electric shock does not rely on basic insulation only, but in which additional safety precautions, such as double insulation or reinforced insulation, are provided, there being no provision for protective earthing or reliance upon installation conditions.

Such a tool may be of one of the following types:

- a) a tool having a durable and substantially continuous enclosure of insulating material which envelops all metal parts, with the exception of small parts, such as nameplates, screws and rivets, which are isolated from live parts by insulation at least equivalent to reinforced insulation; such a tool is called an insulation-encased class II tool;
- b) a tool having a substantially continuous metal enclosure, in which double insulation is used throughout, except for those parts where reinforced insulation is used, because the application of double insulation is manifestly impracticable; such a tool is called a metal-encased class II tool;
- c) a tool which is a combination of the types a) and b).

The enclosure of an insulation-encased class II tool may form a part or the whole of the supplementary insulation or of the reinforced insulation.

If a tool with double insulation and/or reinforced insulation throughout has an earthing terminal or earthing contact, it is considered to be a class I tool.

3.4.7

class II construction

part of a tool for which protection against electric shock relies upon double insulation or reinforced insulation

3.4.8

class III tool

tool in which protection against electric shock relies on supply at safety extra-low voltage, and in which voltages higher than those of safety extra-low voltages are not generated. Tools intended to be operated at safety extra-low voltage, and having internal circuits which operate at a voltage other than safety extra-low voltage, are not included in the classification, and are subject to additional requirement

3.4.9

class III construction

part of a tool for which protection against electric shock relies upon safety extra-low voltage, and in which voltages higher than those of safety extra-low voltages are not generated

3.4.10**creepage distance**

shortest path between two conductive parts, or between a conductive part and the boundary surface of the tool, measured along the surface of the insulating material

3.4.11**clearance**

shortest distance between two conductive parts, or between a conductive part and the boundary surface of the tool, measured through air. The boundary surface of the tool is the outer surface of the enclosure, considered as though metal foil were pressed into contact with accessible surfaces of insulating material

3.4.12**normal duty conditions of insulating material**

where there is virtually no deposition of conductive material and a long period of electrical stress; or a light deposition of conductive material and a short period of electrical stress

3.4.13**severe duty conditions of insulating material**

where there is a light deposition of conductive material and a long period of electrical stress; or a heavy deposition of conductive material and a short period of electrical stress

3.4.14**extra-severe duty conditions of insulating material**

where there is heavy deposition of conductive material and a long period of electrical stress; or an extra heavy deposition of conductive material and a short period of electrical stress

3.5.1**extra-low voltage**

voltage supplied from a source within the tool and, which, when the tool is supplied at rated voltage, does not exceed 50 V between conductors and between conductors and earth

3.5.2**safety extra-low voltage**

nominal voltage not exceeding 42 V between conductors and between conductors and earth, the no-load voltage not exceeding 50 V. When safety extra-low voltage is obtained from the supply mains, it is to be through a safety isolating transformer or a convertor with separate windings, the insulation of which complies with double or reinforced insulation requirements

NOTE The voltage limits specified are based on the assumption that the safety isolating transformer is operated at its rated supply voltage.

3.5.3**safety isolating transformer**

transformer the input winding of which is electrically separated from the output winding by an insulation at least equivalent to double insulation or reinforced insulation, and which is intended to supply a distribution circuit, a tool or other equipment at safety extra-low voltage

3.6.1**hand-held tool (in this standard abbreviated to "tool")**

electric motor-operated or magnetically-driven machine intended to do mechanical work, and so designed that the motor and the machine form an assembly which can easily be brought to the place of operation, and which is held by hand or suspended during operation

NOTE Hand-held tools may be provided with a flexible shaft, the motor being either fixed or portable. Hand-held tools may also have provisions for mounting on a support. Hand-held tools include also hand-supported tools (such as paving breakers).

3.6.2

exchange type tool

tool which is intended not to be repaired at all, or to be repaired by the manufacturer's service organization only

3.7.1

non detachable part

part which can only be removed or opened with the aid of a tool, or a part which fulfils the test of 21.22

3.7.2

detachable part

part which can be removed or opened without the aid of a tool, or a part which is removed in accordance with the instruction for use, even if removal requires the use of a tool

3.8.1

thermostat

temperature-sensing device, the operating temperature of which may be either fixed or adjustable; and which, during normal operation, keeps the temperature of the controlled part between certain limits by automatically opening and closing a circuit

3.8.2

temperature limiter

temperature-sensing device, the operating temperature of which may be either fixed or adjustable; and which, during normal operation, operates by opening or closing a circuit when the temperature of the controlled part reaches a predetermined value. It does not make the reverse operation during the normal duty cycle of the tool. It may or may not require manual resetting

3.8.3

thermal cut-out

device which, during abnormal operation, limits the temperature of the controlled part by automatically opening the circuit, or by reducing the current; and which is so constructed that its setting cannot be altered by the user

3.8.4

self-resetting thermal cut-out

thermal cut-out which automatically restores the current after the relevant part of the tool has cooled down sufficiently

3.8.5

non-self-resetting thermal cut-out

thermal cut-out which requires a manual operation for resetting, or replacement of a part, in order to restore the current

3.8.6

protective device

device the operation of which prevents a hazardous situation under abnormal operation conditions

3.8.7

thermal link

thermal cut-out which operates only once, and then requires partial or complete replacement

3.9.1

all-pole disconnection

disconnection of all supply conductors except the protective earthing (grounding) conductor by a single initiating action