

# norm

NEN-EN-IEC 60745-2-1 (en)

Hand-held motor-operated electric tools -  
Safety - Part 2-1: Particular requirements  
for drills (IEC 60745-2-1:2003,MOD)

september 2003

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Vervangt NEN-EN 50144-2-1:1999; NEN-EN 50260-2-1:2002

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- IEC 60745-2-1:2003, MOD

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EUROPEAN STANDARD

**EN 60745-2-1**

NORME EUROPÉENNE

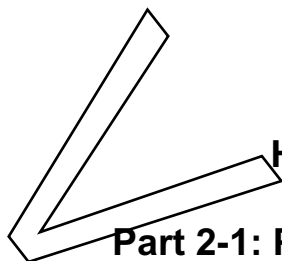
EUROPÄISCHE NORM

July 2003

ICS 25.140.20; 25.140.30

Supersedes EN 50144-2-1:1999 & EN 50260-2-1:2002

English version



**Hand-held motor-operated electric tools -  
Safety**

**Part 2-1: Particular requirements for drills and impact drills  
(IEC 60745-2-1:2003, modified)**

Outils électroportatifs à moteurs -  
Sécurité  
Partie 2-1: Règles particulières  
pour les perceuses  
(CEI 60745-2-1:2003, modifiée)

Handgeführte motorbetriebene  
Elektrowerkzeuge -  
Sicherheit  
Teil 2-1: Besondere Anforderungen  
für Bohrmaschinen und  
Schlagbohrmaschinen  
(IEC 60745-2-1:2003, modifiziert)

This European Standard was approved by CENELEC on 2002-12-01. 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, Lithuania, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

**CENELEC**

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

**Central Secretariat: rue de Stassart 35, B - 1050 Brussels**

## Foreword

The text of the International Standard IEC 60745-2-1:2003, 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 and was approved by CENELEC as EN 60745-2-1 on 2002-12-01.

This European Standard supersedes EN 50144-2-1:1999 and EN 50260-2-1:2002.

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) 2004-03-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2005-12-01

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 this Part 2 provides one means of conforming with the essential health and safety requirements of the Directive concerned.

CEN/TC 255 is producing standards for non-electric drills and tappers (EN 792-3) and for non-electric rotary percussive tools (EN 792-5).

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

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

This Part 2-1 is to be used in conjunction with EN 60745-1:2003. When this standard states "addition", "modification" or "replacement", the relevant text in Part 1 is to be adapted accordingly.

Subclauses and figures which are additional to those in Part 1 are numbered starting from 101.

Subclauses, tables and figures which are additional to those in IEC 60745-2-1 are prefixed "Z".

NOTE In this standard, the following print types are used:

- requirements: in roman type;
- *test specifications: in italic type;*
- notes: in smaller roman type.

## Contents

1	Scope.....	4
2	Normative references.....	4
3	Definitions.....	4
4	General requirements.....	4
5	General conditions for the tests.....	4
6	Environmental requirements.....	5
7	Classification.....	6
8	Marking and instructions.....	6
9	Protection against access to live parts.....	6
10	Starting.....	6
11	Input and current.....	6
12	Heating.....	6
13	Leakage current.....	7
14	Moisture resistance.....	7
15	Electric strength.....	7
16	Overload protection of transformers and associated circuits.....	7
17	Endurance.....	7
18	Abnormal operation.....	8
19	Mechanical hazards.....	8
20	Mechanical strength.....	8
21	Construction.....	8
22	Internal wiring.....	9
23	Components.....	9
24	Supply connection and external flexible cords.....	9
25	Terminals for external connectors.....	9
26	Provision for earthing.....	9
27	Screws and connections.....	9
28	Creepage distances, clearances and distances through insulation.....	9
29	Resistance to heat, fire and tracking.....	9
30	Resistance to rusting.....	10
31	Radiation, toxicity and similar hazards.....	10
	Annex K (normative) Battery tools and battery packs.....	16
	Annex L (normative) Battery tools and battery packs provided with mains connection or non-isolated sources.....	16
	Bibliography.....	16
	Figure 101 - Testing apparatus.....	11
	Figure 102 - Reaction torque of single-hand support.....	13
	Figure 103 - Reaction torque of double-hand support.....	14
	Figure Z101 - Application of load.....	15
	Table Z101 - Concrete formulation (per cubic metre).....	5
	Table Z102 - Test conditions for impact drills.....	5

## 1 Scope

This clause of Part 1 is applicable, except as follows:

### 1.1 Addition:

This standard applies to drills and impact drills.

## 2 Normative references

This clause of Part 1 is applicable.

## 3 Definitions

This clause of Part 1 is applicable, except as follows:

*Additional definitions:*

### 3.101

#### **drill**

tool specifically designed to bore holes in various materials such as metal, plastics, wood, etc.

### 3.102

#### **impact drill**

drill specifically designed to bore holes in concrete, stone and other materials. It is similar, in appearance and construction, to a drill, but has a built-in percussion system which gives an axial percussion movement to rotating output spindle.

It may have a device for rendering the percussion system inoperative, so that it may be used as a conventional drill

## 4 General requirements

This clause of Part 1 is applicable.

## 5 General conditions for the tests

This clause of Part 1 is applicable, except as follows:

### 5.5 Addition:

*For drills which have both a mechanical means of setting different ranges of speed and an electronic means of setting the speed within a given range, the mechanical device is adjusted to the lowest range possible and the electronic device is adjusted to the highest setting within the given range.*

## 6 Environmental requirements

This clause of Part 1 is applicable except as follows:

### 6.1.2.4 Modification:

Drills without an impact mechanism are suspended.

Impact drills are held by the operator for drilling vertically down in accordance with 6.1.2.5.

### 6.1.2.5 Modification:

Drills without impact mechanism are tested at no-load, all speed setting devices adjusted to the highest value.

For impact drills the speed setting shall be that recommended by the manufacturer for an 8 mm bit for drilling into concrete.

Impact drills are tested under load as shown in Figure Z101 and in accordance with the conditions shown in Tables Z101 and Z102.

**Table Z101 — Concrete formulation (per cubic metre)**

Cement	Water	Aggregate	
450 kg	220 kg	1 450 kg	
		Particle size	Fraction (%)
		0 to 0,25 mm	12 ± 3
		0 to 0,50 mm	50 ± 5
		0 to 1,00 mm	80 ± 5
		0 to 4,00 mm	100
Compressive strength after 28 days to be 40 N/mm <sup>2</sup> .			

**Table Z102 — Test conditions for impact drills**

Orientation	Drilling vertically down into a concrete block having the formulation specified in Table Z101 and having the minimum dimensions 500 mm x 500 mm and 200 mm in height and supported on resilient material. The concrete block, its support and the tool shall be so oriented that the geometric centre of the tool is 1 m above the reflecting plane. The centre of the concrete block shall be located under the top microphone.
Tool bit	8 mm drill bit for drilling in concrete with a usable length of approximately 100 mm
Feed force	150 N ± 30 N
Test cycle	Measurement starts when the drill bit has reached a depth of approximately 10 mm and stops when the depth has reached approximately 80 mm

#### 6.2.2.4 Modification:

Drills and impact drills are tested under the conditions specified in 6.1.2.5.

### 7 Classification

This clause of Part 1 is applicable.

### 8 Marking and instructions

This clause of Part 1 is applicable, except as follows:

#### 8.1 Addition:

Drills and impact drills shall be marked with the following:

- rated no-load speed in revolutions per minute.
- maximum capacity, in millimetres, of the chuck.

#### 8.12.1 Addition:

The following additional warnings are given; if in English they shall be verbatim and if in any other official language they shall be equivalent.

- **Wear ear protectors with impact drills.** *Exposure to noise can cause hearing loss.*
- **Use auxiliary handles supplied with the tool.** *Loss of control can cause personal injury.*

### 9 Protection against access to live parts

This clause of Part 1 is applicable.

### 10 Starting

This clause of Part 1 is applicable.

### 11 Input and current

This clause of Part 1 is applicable.

### 12 Heating

This clause of Part 1 is applicable, except as follows:

#### 12.2 Addition:

*Tools are operated continuously with the impact mechanism, if any, disengaged, while the torque applied to the spindle is 80 % of the torque necessary to attain rated input or rated current.*



**12.3 Addition:**

*The temperature-rise limit for the external enclosure does not apply to the enclosure of the hammer mechanism.*

**13 Leakage current**

This clause of Part 1 is applicable.

**14 Moisture resistance**

This clause of Part 1 is applicable.

**15 Electric strength**

This clause of Part 1 is applicable.

**16 Overload protection of transformers and associated circuits**

This clause of Part 1 is applicable.

**17 Endurance**

This clause of Part 1 is applicable, except as follows:

**17.2 Replacement for impact drills:**

*Impact drills are operated intermittently with no load and, if the impact mechanism can be engaged and disengaged at will, the impact mechanism shall remain disengaged for 12 h at supply voltage equal to 1,1 times rated voltage and then for 12 h at a supply voltage equal to 0,9 times rated voltage. The speed is adjusted to the highest value of the highest range.*

*Each cycle of operation comprises an "on" period of 100 s and an "off" period of 20 s, the off periods being included in the specified operating time.*

*During the test, the tool is placed in three different positions, the operating time, at each voltage, being approximately 4 h for each position.*

*The tool may be switched on and off by means of a switch other than that incorporated in the tool.*

*During this test, replacement of the carbon brushes is allowed, and the tool is oiled and greased as in normal use.*

*The impact drills are then mounted vertically in a test apparatus as shown in Figure 101 and are operated at rated voltage or at the mean value of the rated voltage range, for four periods of 6 h each, the interval between these periods being at least 30 min; if the impact mechanism can be engaged and disengaged at will, the impact mechanism shall remain engaged.*

*During these tests, the impact drills are operated intermittently, each cycle comprising a period of operation of 30 s and a rest period of 90 s during which the tool remains switched off.*

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