SLOVENSKI STANDARD
SIST EN 60745-2-1:2010

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Nadomešča:
SIST EN 60745-2-1:2003
SIST EN 60745-2-1:2003/A1:2009
SIST EN 60745-2-1:2003/A11:2007
SIST EN 60745-2-1:2003/A12:2010

Električna ročna orodja - Varnost - 2-1. del: Posebne zahteve za vrtalnike in udarne (vibracijske) vrtalnike (IEC 60745-2-1:2003, spremenjen + A1:2008)

Hand-held motor-operated electric tools - Safety - Part 2-1: Particular requirements for drills and impact drills (IEC 60745-2-1:2003, modified + A1:2008)

Handgeführte motorbetriebene Elektrowerkzeuge - Sicherheit - Teil 2-1: Besondere Anforderungen für Bohrmaschinen und Schlagbohrmaschinen (IEC 60745-2-1:2003, modifiziert + A1:2008)

Outils électroportatifs à moteurs - Sécurité - Partie 2-1: Règles particulières pour les perceuses (CEI 60745-2-1:2003, modifiée + A1:2008)

Ta slovenski standard je istoveten z: **EN 60745-2-1:2010**

ICS:

25.080.40	Vrtalniki	Drilling machines
25.140.20	Električna orodja	Electric tools

SIST EN 60745-2-1:2010 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60745-2-1

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ICS 25.140.20; 25.140.30

Supersedes EN 60745-2-1:2003 + A1:2009 + A11:2007 + A12:2009

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 + A1:2008)

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This European Standard was approved by CENELEC on 2010-02-01. 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, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

CENELEC

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

Central Secretariat: Avenue Marnix 17, B - 1000 Brussels

Foreword

The text of the International Standard IEC 60745-2-1:2003, prepared by SC 61F (transformed into IEC TC 116, Safety of hand-held motor-operated electric tools), together with the common modifications prepared by the Technical Committee CENELEC TC 61F (transformed into TC 116) was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 60745-2-1 on 2002-12-01.

A number of amendments to EN 60745-2-1 have since been voted on and published as amendments A11, A1 and A12.

A further draft amendment (FprAE) including improvements to the vibration test code and some editorial corrections, was submitted to the Unique Acceptance Procedure.

The combined texts were approved by CENELEC as a new edition of EN 60745-2-1 on 2010-02-01.

This European Standard supersedes EN 60745-2-1:2003 + A11:2007 + A1:2009 + A12:2009.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN and CENELEC shall not be held responsible for identifying any or all such patent rights.

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)	2011-02-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2013-02-01

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 2006/42/EC. See Annex ZZ.

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 ISO 12100-1 and EN ISO 12100-2.

This Part 2-1 is to be used in conjunction with EN 60745-1:2009. 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.

Annexes, 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.

Endorsement notice

The text of the International Standard IEC 60745-2-1:2003 + A1:2008 was approved by CENELEC as a European Standard with agreed common modifications as given below.

COMMON MODIFICATIONS

3 Terms and definitions

Add *the following new definition:*

3.Z101
diamond core drill
drill designed to be equipped with a diamond core drill bit with or without water supply to drill with or without percussion into materials such as concrete or brick

6 Void

Replace by:

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 for impact drills (per cubic metre)

Cement	Water	Aggregate [b]	
		1 450 kg	
		Particle size	Fraction %
450 kg [a]	220 l [a]	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^2.

[a] The water/cement mass ratio shall be 0,49 ± 0,02 (the mass tolerance of cement and water is + 10 % to enable the concrete manufacturer to ensure compressive strength with local cement).

[b] Very hard aggregates such as flint or granite and very soft aggregates such as limestone shall not be used.

Table Z102 — Noise 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	New 8 mm drill bit for drilling in concrete with a usable length of approximately 100 mm
Feed force	150 N ± 30 N in addition to the weight of the drill
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

6.2.4.2 Location of measurement

Addition:

Figures Z102 and Z103 show the position for different types of tools.

6.2.6.3 Operating conditions

Addition:

Drills with an impact mechanism that can be switched off to have a rotary function only are tested as described under 6.2.6.3.101 and 6.2.6.3.102.

Diamond core drills are tested as described under 6.2.6.3.103.

6.2.6.3.101 Drills

Drills without impact action shall be equipped with a new 6 mm bit to drill through 8 mm thick mild steel. Drills shall be set at the correct speed for the drill bit and material as selected above.

Measurements are conducted drilling into mild steel downwards with a feed force of 200 N ± 30 N in addition to the weight of the machine. The workpiece shall be clamped or adequately fixed on a wooden board.

The measurement starts, when the drill bit has contact to the steel plate and stops when the hole is completed.

NOTE This test is also representative for drilling into other materials without impact.

6.2.6.3.102 Impact drills

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 drilling into a concrete block in accordance with Table Z101 and with the conditions shown in Table Z103.

Table Z103 — Vibration test conditions for impact drills

Orientation	Drilling vertically down into a concrete block having the minimum dimensions 500 mm x 500 mm and 200 mm in height and supported on resilient material
Tool bit	New 8 mm drill bit for drilling in concrete with a usable length of approximately 100 mm
Feed force	150 N ± 30 N in addition to the weight of the drill
Test cycle	Measurement starts when the drill bit has contact to the concrete block and stops at a drilling depth of 80 mm before the drill bit is removed from the hole

6.2.6.3.103 Diamond core drills

Diamond core drills provided with an impact function shall also be tested as an impact drill.

Diamond core drills are tested under load as described in Table Z104.

The machine settings (speed, water supply, impact, etc.) shall be correctly adjusted for drilling into the material specified for the test and for the type and diameter of the drill bit specified in Table Z104.

If the tool is suitable to drill into concrete with water supply, the water collection device, if any, shall be in place during the operation of the tool.

Table Z104 — Vibration test conditions for diamond core drills

Orientation	If the tool is suitable to drill into concrete with water supply: Drilling vertically down into a concrete block having the formulation specified in Table Z105 and having the dimensions 500 mm x 500 mm and 200 mm in height, supported on resilient material. If the tool is designed to drill without water only: The test is conducted drilling horizontally into a sand-lime-stone or brick wall with a minimum thickness of 200 mm. The dust is to be collected.
Tool bit	New or sharpened diamond core bit which is in the middle of the rated capacity range.
Feed force	The feed force applied to the tool shall be determined as follows: Drill with the tool increasing the feed force until either the speed is significantly reduced by the load or a torque limiting device operates. Reduce the feed force slightly until a feed force is reached enabling stable operation. Use this feed force for the test or 250 N, whichever is less.
Test cycle	The measurement starts when the drill bit has contact with the concrete block or brick wall and stops after 2 min or, when the hole is completed, or when the maximum drilling depth of the core bit is reached.

Table Z105 — Concrete formulation for diamond core drills (per cubic metre)

Cement	Water	Aggregate [b]	
		1 844 kg	
		Particle size	Fraction %
330 kg [a]	183 l [a]	0 to 2 mm	38 ± 3
		0 to 8 mm	50 ± 5
		0 to 16 mm	80 ± 5
		0 to 32 mm	100

Compressive strength after 28 days to be 40 N/mm^2.

[a] The water/cement mass ratio shall be 0,55 ± 0,02 (the mass tolerance of cement and water is + 10 % to enable the concrete manufacturer to ensure compressive strength with local cement).

[b] Very hard aggregates such as flint or granite and very soft aggregates such as limestone shall not be used.

6.2.7.1 Reported vibration value

Addition:

If more than one operating mode was measured, the result a_h for each operating mode applicable shall be reported.

$a_{h,ID}$ = mean vibration “impact drilling” in accordance with 6.2.6.3.102

$a_{h,D}$ = mean vibration “drilling” in accordance with 6.2.6.3.101 (representative for steel and other materials)

$a_{h,DD}$ = mean vibration “diamond drilling” in accordance with 6.2.6.3.103

6.2.7.2 Declaration of the vibration total value

Addition:

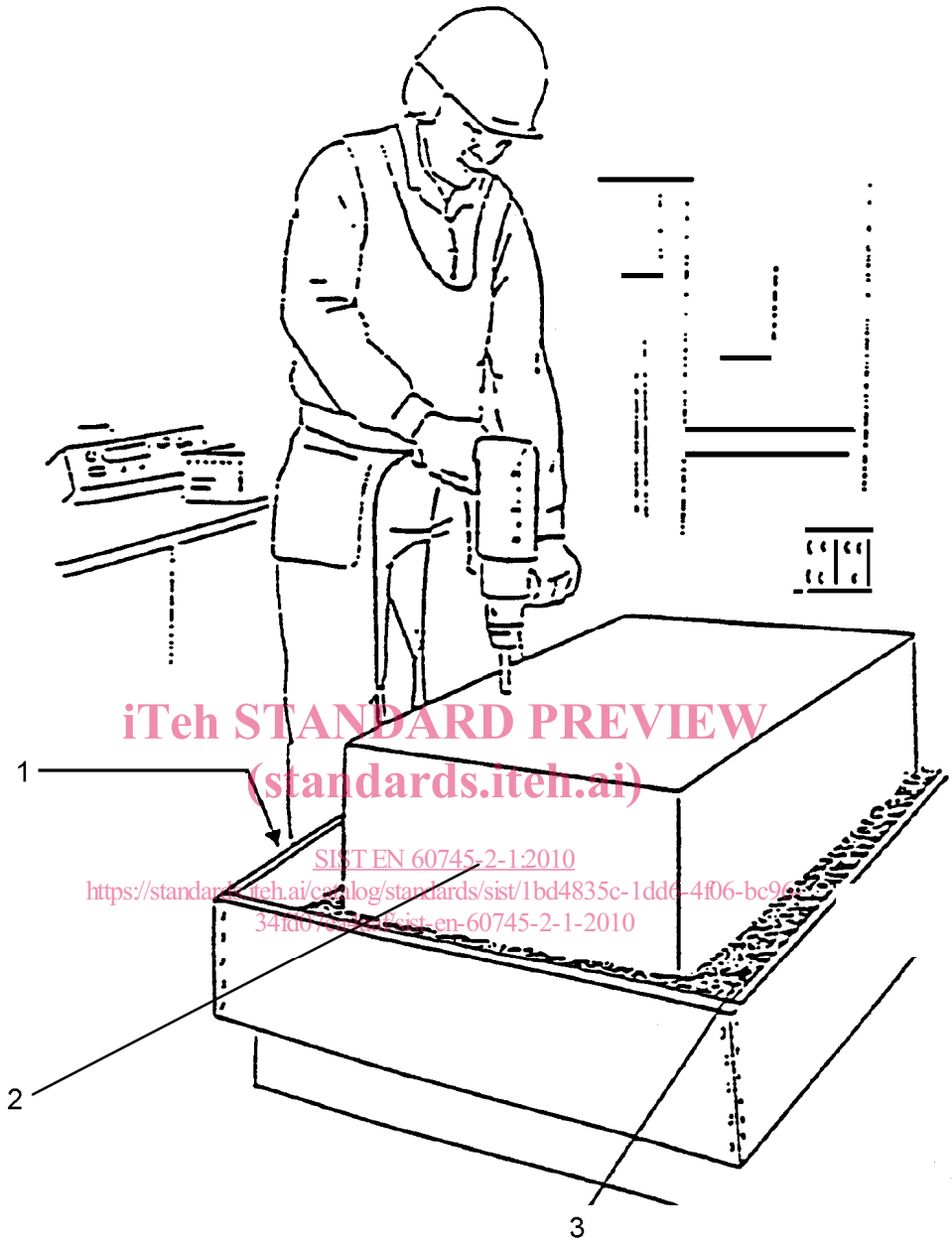
The vibration total value of the handle with the highest emission and the uncertainty *K* shall be declared:

- for drills without impact mechanism
  the value of $a_{h,D}$, with the work mode description “drilling into metal”;
- for impact drills with drill only function
  the value of $a_{h,ID}$, with the work mode description “impact drilling into concrete” and
  the value of $a_{h,D}$, with the work mode description “drilling into metal”;
- for impact drills without drill only function
  the value of $a_{h,ID}$, with the work mode description “impact drilling into concrete”;
- for diamond core drills without impact mechanism
  the value of $a_{h,DD}$; with the work mode description “drilling into concrete”;
- for diamond core drills with impact mechanism
  the value of $a_{h,ID}$, with the work mode description “impact drilling into concrete” and
  the value of $a_{h,DD}$; with the work mode description “drilling into concrete”.

21 Construction

Add:

21.Z1 This subclause of Part 1 is not applicable.



Key

1 Operator standing on a device for measuring the force applied to the tool

2 Concrete block

3 Resilient material

Figure Z101 — Application of load

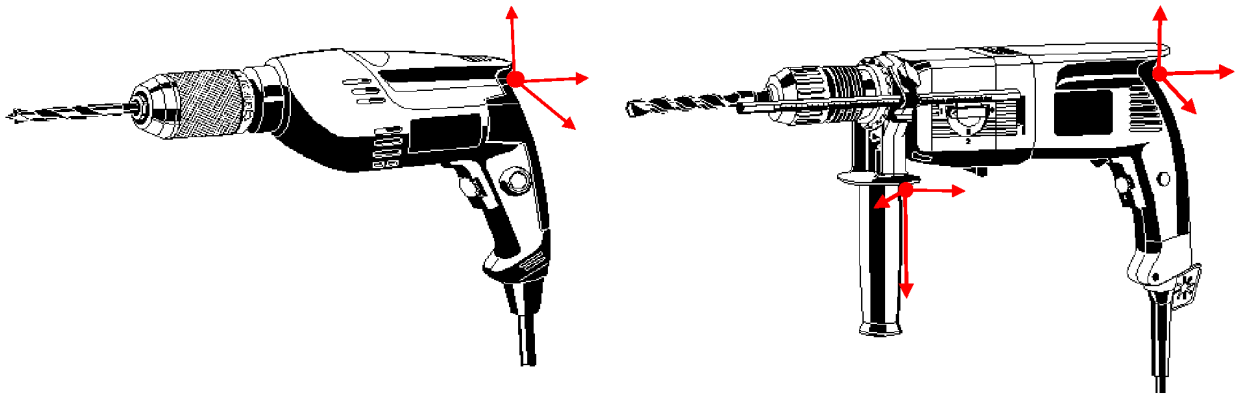


Figure Z102 - Positions of transducers for drills and impact drills

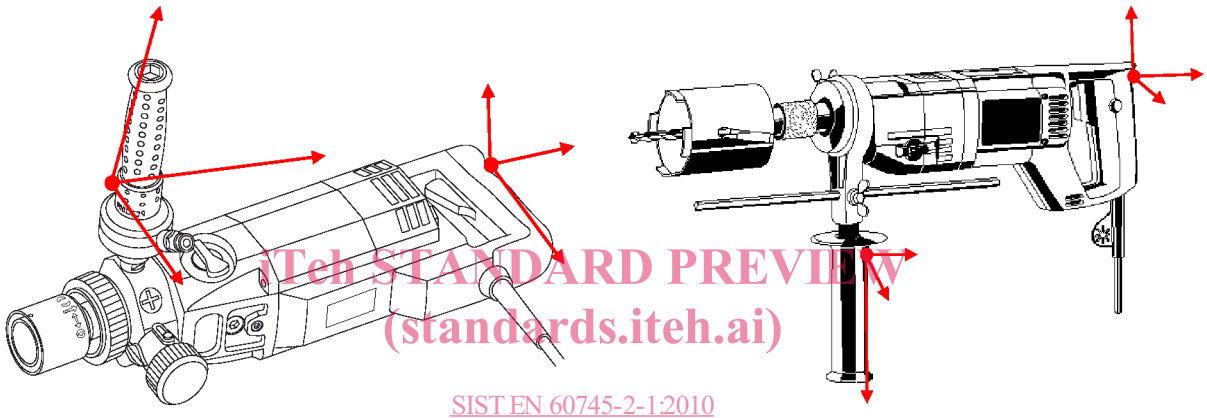


Figure Z103 - Positions of transducers for diamond core drills

Annex ZZ
(informative)

Coverage of Essential Requirements of Directive 2006/42/EC

This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and within its scope the standard covers all relevant Essential Requirements as given in EC Directive 2006/42/EC (Machinery Directive).

Compliance with this standard provides one means of conformity with the specified essential requirements of the Directive concerned.

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