

SLOVENSKI STANDARD
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Safety of hand-held electric motor operated tools -- Part 2-3: Particular requirements for grinders, disk type sanders and polishers

Sicherheit handgeführter motorbetriebener Elektrowerkzeuge -- Teil 2-3: Besondere Anforderungen für Schleifer, Polierer und Schleifer mit Schleifblatt
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Sécurité des outils électroportatifs à moteur -- Partie 2-3: Règles particulières pour les meuleuses, ponceuses du type à disque et lustreuses
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Ta slovenski standard je istoveten z: EN 50144-2-3:2002

ICS:

25.080.50	Brusilni in polirni stroji	Grinding and polishing machines
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EUROPEAN STANDARD

EN 50144-2-3

NORME EUROPÉENNE

EUROPÄISCHE NORM

July 2002

ICS 25.080.50; 25.140.20

Supersedes HD 400.2C S1:1980 + A1:1991

English version

**Safety of hand-held electric motor operated tools
Part 2-3: Particular requirements for grinders,
disk type sanders and polishers**

Sécurité des outils électroportatifs
à moteur
Partie 2-3: Règles particulières
pour les meuleuses, ponceuses
du type à disque et lustreuses

Sicherheit handgeführter
motorbetriebener Elektrowerkzeuge
Teil 2-3: Besondere Anforderungen an
Schleifer, Polierer und Schleifer mit
Schleifblatt

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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.

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

This European Standard has been prepared by Technical Committee CENELEC TC 61F, Safety of hand-held and transportable motor-operated electric tools.

The text of the draft was submitted to the formal vote in August 2001 and was approved by CENELEC as EN 50144-2-3 on 2001-03-05.

This European Standard supersedes HD 400.2C S1:1980 + A1:1991.

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) 2003-03-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2005-03-01

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).

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/CENELEC by 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 specified essential health and safety requirements of the Directive.

For noise and vibration, this standard covers the requirements for their measurement, the provisions of information arising from these measurements and the provisions of information about the personal protective equipment required.

Specific requirements for the reduction of the risks arising from noise and vibration through the design of the tool are not given as this reflects the current state of the art.

As with any standards technical progress will be kept under review so that any developments can be taken into account.

CEN TC/255 has produced standards for non electrically driven grinders (EN 792-7 and EN 792-8).

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.

Subclauses, tables and figures which are additional to those in Part 1 are numbered starting from 101. Additional annexes are labelled AA, BB, etc.

NOTE In this standard the following print types are used:

- Requirements proper;
- *Test specifications*;
- Explanatory matter.

Contents

1	Scope	5
2	Definitions	5
3	General requirements	6
4	General conditions for the tests	6
5	Rating	6
6	Classification	7
7	Marking and information for use	7
8	Protection against electric shock	8
9	Starting	8
10	Input and current	8
11	Heating	8
12	Leakage current	9
13	Environmental requirements	9
14	Moisture resistance	13
15	Insulation resistance and electric strength	13
16	Endurance	13
17	Abnormal operation	13
18	Mechanical hazards	13
19	Mechanical strength	16
20	Construction	17
21	Components	17
22	Internal wiring	17
23	Supply connection and external flexible cables and cords	18
24	Terminals for external conductors	18
25	Provision for earthing	18
26	Screws and connections	18
27	Creepage distances, clearances and distances through insulation	18
28	Resistance to heat, fire and tracking	18
29	Resistance to rusting	18
30	Radiation	18
Annex AA (normative) – Design and construction of guards		22
Annex BB (normative) – Flanges dimensional requirements		26
Figure 101 – Test fixture for grinders		19
Figure 102 – Artificial grinding wheel		20
Figure AA.1 – Guard for plain grinding wheel with front curtain		23
Figure AA.2 – Guard for reinforced plain grinding wheel without front curtain		23
Figure AA.3 – Adjustable guard for straight cup wheels		24
Figure AA.4 – Guard with front lip		24
Figure AA.5 – Guard with curtain segment for reinforced depressed-centre and cutting-off wheels		25
Figure BB.1 – Flanges for plain grinding wheels (type 1)		29
Figure BB.2 – Flanges for two-sided tapered wheels (type 4)		29
Figure BB.3 – Flange for cup wheels without threaded insert (type 6 and 11)		30
Figure BB.4 – Unrecessed flange for cup wheels with threaded inserts (type 6 and 11)		30
Figure BB.5 – Unrecessed flange for cones and plugs with threaded inserts (type 16, 18, 18R and 19)		31
Figure BB.5 – Flanges for reinforced depressed-centre wheels (type 27, 28 and 42)		31
Table 101 – Test conditions for straight grinders		11
Table 102 – Artificial wheel dimensions for straight grinders		12
Table 103 – Test conditions for angle grinders		12
Table 104 – Artificial wheel dimensions for angle grinders		12
Table 105 – Test conditions for polishers		12
Table 106 – Test conditions for disc-type sanders		13
Table 107 – Torques for testing of flanges		16

Table BB.1 – Dimensions of flanges for plain grinding wheels type 1.....	26
Table BB.2 – Dimensions of flanges for grinding wheels type 4.....	26
Table BB.3 – Dimensions of flanges for cup wheels type 6 and 11	27
Table BB.4 – Dimensions of flanges for cup wheels type 6 and 11 with threaded inserts.....	27
Table BB.5 – Dimensions of flanges for plugs and cones type 16, 18, 18R and 19	27
Table BB.6 – Dimensions of flanges for type 27, 28 and 42 grinding wheels.....	28

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[SIST EN 50144-2-3:2002](#)

<https://standards.iteh.ai/catalog/standards/sist/0bfd7aaa-d0dc-484c-9152-cdc60f778630/sist-en-50144-2-3-2002>

1 Scope

This clause of Part 1 is applicable except as follows:

Addition:

This standard applies to grinders, with maximum rated rotational speed corresponding to a peripheral speed of 80 m/s, polishers and disc-type sanders.

This standard does not give requirements for the reduction of the risks arising from noise and vibration.

NOTE Random orbit sanders are covered by EN 50144-2-4.

2 Definitions

This clause of Part 1 is applicable except as follows:

2.2.18 *Replacement:*

2.2.18

normal load

load obtained when the tool is operated continuously for a period of 30 min, the torque applied to the spindle being:

$1,5 D^{1,5} L \times 10^{-5}$ Nm for straight grinders and straight polishers with a wheel diameter not exceeding 55 mm in the new condition,

$2,5 D^{1,5} L \times 10^{-5}$ Nm for other straight grinders and straight polishers,

$1,3 D^3 \times 10^{-7}$ Nm for angle grinders, angle polishers, disc-type sanders and vertical grinders,

$1,5 D^{1,5} \times 10^{-4}$ Nm for valve-seat grinders,

where D is the diameter, in millimeters, of the grinding wheel or disc, and L the width, in millimeters, of the grinding or polishing wheel in the new condition.

The normal load is based on the rated voltage or on the upper limit of the rated voltage range.

Additional subclauses:

2.2.101

grinder

abrading tool driving a rotating spindle on which a bonded abrasive product is mounted

NOTE A grinder equipped with a cutting-off wheel is often called a cutting-off machine.

2.2.102

straight grinder

tool, with the driving spindle in the direction of the motor shaft, usually equipped with a rotating abrasive wheel, which is intended for peripheral grinding. A straight grinder with collet or chuck is intended for use with mounted wheels, points or burrs

2.2.103

vertical grinder

tool with the driving spindle in the direction of motor-shaft, equipped with a rotating abrasive wheel or disc, which is intended for peripheral (cut-off) and lateral grinding

2.2.104**angle grinder**

tool, with the driving spindle at a right angle to the motor shaft, equipped with a rotating abrasive wheel or disc, which is intended for peripheral (cut-off) and lateral grinding

2.2.105**disc-type sander**

tool, constructed like an angle or vertical grinder, intended for lateral sanding operations

2.2.106**polisher**

tool equipped with a rotating disc or pad of material intended for polishing

2.2.107**rated capacity**

maximum diameter of the abrasive product which can be fitted on the tool

2.2.108**flange set**

means provided to clamp an unthreaded abrasive product between them, on the machine spindle

2.2.109**flange (backing)**

flange fixed to the machine spindle having an unrecessed flat surface against which a threaded hole abrasive product is screwed, e.g. a cup wheel, a cone or a plug. Backing flange is also used for this term

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2.2.110**flange outside diameter**

outside diameter of the contact surface of a flange

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2.2.111**wheel guard**

device which partly encloses the abrasive product

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2.2.112**blotter**

thin piece of an easily compressible material, between the abrasive product and the flange

2.2.113**rated speed**

the speed at rated input and at rated voltage or at the upper limit of the rated voltage range for operation of the grinding wheel type designated by the manufacturer

3 General requirements

This clause of Part 1 is applicable.

4 General conditions for the tests

This clause of Part 1 is applicable.

5 Rating

This clause of Part 1 is applicable.

6 Classification

This clause of Part 1 is applicable.

7 Marking and information for use

This clause of Part 1 is applicable except as follows:

7.1 Addition:

Grinders, polishers and disc-type sanders shall be marked with:

- rated no load speed or rated speed, whichever is the higher, measured at the abrasive wheel spindle, in revolutions per minute;
- rated capacity in mm;
- indication of direction of rotation of the wheel or disc; this shall be clearly indicated by an arrow, raised or sunk, or by any other means no less visible and indelible;
- tools designed for operation at more than one speed shall be marked with the rated no-load speed for each of the speed settings in such a way that it is clear which speed corresponds with each of the settings;
- grinders provided with a threaded spindle shall be marked with spindle thread size;
- read the instructions or the relevant symbol;
- wear safety glasses or the relevant symbol.

7.6 Modification:

The symbol n shall be used for rated speed.
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7.13.1 Addition:

The instruction sheet shall include the following:

- in case of cup-wheels, cones or plugs with a threaded hole intended to be mounted on the machine spindle, critical dimensions and other data shall be given in order to prevent the spindle end from touching the bottom of the hole of the abrasive product;
- disc-type sanders exclusively intended for sanding wooden floors shall be accompanied by an instruction sheet stating how to connect the external dust collection equipment where applicable. Sufficient information shall be given to allow any dust collecting equipment, either required by this standard or otherwise supplied with the tool, to be fitted and used correctly;
- grinders, disc-type sanders and polishers with water supply, other than those of class III, shall be accompanied by an instruction sheet stating that the grinder must be supplied from an isolating transformer, complying with EN 60742, and indicating the type of transformer to be used.

7.13.2 Addition:

The safety instruction shall include the substance of the following text:

- check that speed marked on the wheel is equal to or greater than the rated speed of the grinder;
- ensure that the wheel dimensions are compatible with the grinder;
- abrasive wheels shall be stored and handled with care in accordance with manufacturer's instructions;

- inspect the grinding wheel before use, do not use chipped, cracked or otherwise defective products;
- ensure that mounted wheels and points are fitted in accordance with the manufacturer's instructions;
- ensure that blotters are used when they are provided with the bonded abrasive product and when they are required;
- ensure that the abrasive product is correctly mounted and tightened before use and run the tool at no-load for 30 s in a safe position, stop immediately if there is considerable vibration or if other defects are detected. If this condition occurs, check the machine to determine the cause;
- if a guard is supplied with the tool never use the tool without such a guard;
- do not use separate reducing bushings or adapters to adapt large hole abrasive wheels;
- for tools intended to be fitted with threaded hole wheel, ensure that the thread in the wheel is long enough to accept the spindle length;
- check that the work piece is properly supported;
- do not use cutting off wheel for side grinding;
- ensure that sparks resulting from use do not create a hazard e.g. do not hit persons, or ignite flammable substances;
- ensure that ventilation openings are kept clear when working in dusty conditions. If it should become necessary to clear dust, first disconnect the tool from the mains supply (use non metallic objects) and avoid damaging internal parts;
- always use eye and ear protection. Other personal protective equipment such as dust mask, gloves, helmet and apron should be worn;
- the wheel continues to rotate after the tool is switched off.

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8 Protection against electric shock

This clause of Part 1 is applicable.

9 Starting

This clause of Part 1 is applicable.

10 Input and current

This clause of Part 1 is applicable.

11 Heating

This clause of Part 1 is applicable except as follows:

11.2 Replacement:

The tool is operated for a period equal to the rated operating time or, in the absence of the relevant marking, for 30 min, the torque applied to the spindle being equal to that specified for normal load or to that corresponding with the load necessary to attain rated input, whichever is the higher.

12 Leakage current

This clause of Part 1 is applicable.

13 Environmental requirements

This clause of Part 1 is applicable except as follows:

13.1 Addition:

The following requirements apply only to disc-type sanders specifically designed for sanding wooden floors, straight grinders with a wheel diameter greater than 55 mm, angle grinders and cutting-off machines.

13.1.2 Replacement:

13.1.2.101 For disc-type sanders specifically designed for sanding wooden floors, the tests under working conditions, orientation within the cabin and material to be worked shall be in accordance with the following:

<i>Material</i>	<i>Oak 90 mm minimum thickness and 760 mm x 760 mm which may consist of several pieces clamped tightly together in a frame. Surface to be pre-sanded before test using abrasive paper of the same type as that to be used during the test</i>
<i>Feed speed</i>	<i>10 side to side movements per minute over 760 mm with no additional weight on the tool</i>
<i>Depth of cut</i>	<i>Not applicable</i>
<i>Width of cut-off</i>	<i>Not applicable</i>
<i>Tool bit/cutter/abrasive</i>	<i>Abrasive paper or aluminium oxide 80 grit (backing plate to be the least flexible as supplied by the manufacturer)</i>
<i>Integral collection (if any)</i>	<i>Emptied at the end of the test period</i>
<i>Orientation</i>	<i>Such that the airflow intake is behind the operator</i>
<i>Test cycle</i>	<i>10 min working with 2 min rest time (total 12 min)</i>
<i>Test period</i>	<i>5 complete test cycles (total 1 h)</i>

13.1.2.102 For hand-held grinders the tests under working conditions, orientation within the cabin and material to be worked shall be in accordance with the following:

<i>Material</i>	<i>Steel to ISO 630, 8 mm thick "T" section 70 mm x 70 mm x 500 mm</i>
<i>Feed-speed</i>	<i>Average load during grinding to obtain rated input $\pm 15\%$</i>
<i>Depth of cut</i>	<i>Not applicable</i>
<i>Width of cut-off</i>	<i>Not applicable</i>

<i>Tool bit/cutter/abrasive</i>	<i>Angle grinders - new wheel at start of each test cycle of type recommended by manufacturer Straight grinders - new wheel at start of test period and when wheel is reduced to 75 % of original diameter, thickness and diameter of new wheel to be maximum recommended by manufacturer</i>
<i>Integral collection (if any)</i>	<i>Emptied during 10 min rest time</i>
<i>Orientation</i>	<i>Dust to be directed to the side of the cabin not towards the tunnel, airflow direction to be from behind the operator</i>
<i>Test cycles</i>	<i>30 movements alternatively back and forth over 500 mm length per minute for 10 min then 10 min rest time.</i>
<i>Test period</i>	<i>3 complete test cycles (total 1 h)</i>

13.1.2.103 For cutting-off machines for metal (mounted in a stand), the tests under working conditions, orientation within the cabin and material to be worked shall be in accordance with the following:

<i>Material</i>	<i>20 mm diameter steel bar to ISO 630</i>
<i>Feed-speed</i>	<i>As necessary to achieve steady cutting</i>
<i>Depth of cut</i>	<i>Through 20 mm diameter material</i>
<i>Width of cut-off</i>	<i>10 mm</i>
<i>Tool bit/cutter/abrasive</i>	<i>New wheel at the start of each test period, change wheel if it is not possible to achieve depth of cut</i>
<i>Integral collection (if any)</i>	<i>Emptied at the end of the test period</i>
<i>Orientation</i>	<i>Across the cabin, sparks directed to the wall of the cabin, airflow from left to right of the tool</i>
<i>Test cycle</i>	<i>15 cuts, each cut at 2 min intervals with the machine mounted in the stand designed for the purpose</i>
<i>Test period</i>	<i>1 complete test cycle (30 min total)</i>

13.1.2.104 For cutting-off machines for paving slabs (mounted in a stand), the tests under working conditions, orientation within the cabin and material to be worked shall be in accordance with the following:

<i>Material</i>	<i>Concrete paving slabs 500 mm x 500 mm x 40 mm</i>
<i>Feed-speed</i>	<i>Not specified</i>
<i>Depth of cut</i>	<i>20 mm if manufacturer specifies that material should not be cut through, otherwise cut through 40 mm thickness</i>
<i>Width of cut-off</i>	<i>100 mm</i>
<i>Tool bit/cutter/abrasive</i>	<i>Diamond cutting-off wheel</i>
<i>Integral collection (if any)</i>	<i>Emptied at the end of the test period</i>