



SLOVENSKI STANDARD SIST EN 60745-2-3:2007

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SIST EN 50144-2-3:2002

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

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Handgeführte motorbetriebene Elektrowerkzeuge - Sicherheit -- Teil 2-3: Besondere
Anforderungen für Schleifer, Polierer und Schleifer mit Schleifblatt

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

Ta slovenski standard je istoveten z: EN 60745-2-3:2007

ICS:

| | | |
|-----------|----------------------------|---------------------------------|
| 25.080.50 | Brusilni in polirni stroji | Grinding and polishing machines |
| 25.140.20 | Ò\^ dā } æ ! [åæ | Electric tools |

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English version

**Hand-held motor-operated electric tools -
Safety -
Part 2-3: Particular requirements for grinders,
polishers and disk-type sanders
(IEC 60745-2-3:2006, modified)**

Outils électroportatifs à moteur -
Sécurité -
Partie 2-3: Règles particulières
pour les meuleuses, lustreuses
et ponceuses du type à disque
(CEI 60745-2-3:2006, modifiée)

Handgeführte motorbetriebene
Elektrowerkzeuge -
Sicherheit -
Teil 2-3: Besondere Anforderungen
für Schleifer, Polierer und Schleifer
mit Schleifblatt
(IEC 60745-2-3:2006, modifiziert)

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This European Standard was approved by CENELEC on 2006-12-01. 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, Bulgaria, 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: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of the International Standard IEC 60745-2-3:2006, 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 60745-2-3 on 2006-12-01.

This European Standard supersedes EN 50144-2-3:2002 + A1:2002 + A2:2003.

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) 2007-12-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2009-12-01

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 CENELEC by the European Commission and the European Free Trade Association and covers essential requirements of EC Directive 98/37/EC (Machinery Directive), amended by Directive 98/79/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 grinders (EN 792-7), polishers and sanders (EN 792-8) and die grinders (EN 792-9).

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 2-3 is to be used in conjunction with EN 60745-1:2006. When this standard states "addition", "modification" or "replacement", the relevant text in Part 1 is to be adapted accordingly.

Subclauses, tables 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 60745-2-3:2006 are prefixed "Z".

Annexes ZA and ZZ have been added by CENELEC.

- NOTE In this standard the following print types are used:
- Requirements proper;
 - *Test specifications*;
 - Explanatory matter.

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Endorsement notice

The text of the International Standard IEC 60745-2-3:2006 was approved by CENELEC as a European Standard with agreed common modifications as given below.

COMMON MODIFICATIONS

6 Void

Replace by:

6 Environmental requirements

This clause of Part 1 is applicable except as follows:

6.1.2.4 Modification:

Grinders, polishers and disk-type sanders are suspended. For angle and vertical tools, the wheel or pad shall be horizontal. For straight tools, the wheel or pad shall be vertical.

6.1.2.5 Modification:

Grinders, polishers and disk-type sanders are tested at no-load.

6.2.4.2 Location of measurement

Addition:

Figures Z104 to Z106 show the positions for different types of tools.

6.2.6.3 Operating conditions

Addition:

The weight of the tool is considered the weight of the complete tool as prepared for the test with all equipment needed for normal use and with the artificial wheel mounted, but without the cable.

6.2.6.3.101 Grinding

Tools for grinding applications shall be tested under load by using the artificial wheel under the conditions described below in Table Z101 for angle grinding and in Table Z104 for straight grinding.

Table Z101 – Test conditions for angle grinding

| | |
|-------------|---|
| Orientation | Tool to be held as in normal use for grinding a horizontal plate. |
| Tool bit | Artificial wheel as specified in Figure Z102 of a diameter equivalent to the rated capacity and dimensions in accordance with Table Z102. When using the artificial wheel, start with a diameter ($e - 1$ mm) and increase the size at the hole in stages of 1/10 mm until the required unbalance is obtained. |
| Feed force | Applied at a position as close as that in normal use. The feed force is specified in Table Z103 and obtained by applying an upward force equal to the sum of the intended feed force and the weight of the tool. The upward force is normally applied using the threaded holes for the support handle. For tools where the support handle can be mounted on either side, insert an extra bolt in the empty hole. Fix a short sling of cord from the extra bolt to the inner part of the support handle. Fix the cord used for applying the upward force in that sling. On tools with antivibration handles, the sling shall be attached between the tool body and the handle without blocking the antivibration function. The tool being suspended on a cord, the force can be applied using a weight (see Figure Z101) or, alternatively, a dynamometer can be attached to the cord. The application of force shall be achieved with minimum adaptation to the machine. NOTE Any weight added to the tool e.g. fixing devices for the upward force will alter the inertia of the tool and thereby reduce the vibration magnitude. |
| Test cycle | A test cycle is given by conducting a measurement for at least 10 s. After each test the wheel shall be loosened and repositioned $360^\circ / 5 = 72^\circ$ from its previous position on the shaft. Three series of five consecutive tests shall be carried out using a different operator for each series. |

Table Z102 – Dimensions of the artificial wheel of Figure Z102 for angle grinding

| $\varnothing a$ mm | $\varnothing b$ mm | c mm | $\varnothing d$ mm | $\varnothing e$ mm | Unbalance g mm |
|-----------------------|-----------------------|-----------|-----------------------|-----------------------|-------------------|
| 50 ± 0,2 | 10,0 | 6 ± 0,05 | 35 ± 0,02 | 8,1 | 14,5 |
| 100 ± 0,2 | 16,0 | 6 ± 0,05 | 70 ± 0,02 | 11,4 | 58 |
| 115 ± 0,2 | 22,23 | 6 ± 0,05 | 80 ± 0,02 | 12,2 | 76 |
| 125 ± 0,2 | 22,23 | 6 ± 0,05 | 90 ± 0,02 | 12,5 | 90 |
| 150 ± 0,2 | 22,23 | 6 ± 0,05 | 120 ± 0,02 | 13,0 | 130 |
| 180 ± 0,2 | 22,23 | 6 ± 0,05 | 150 ± 0,02 | 14,1 | 190 |
| 230 ± 0,2 | 22,23 | 6 ± 0,05 | 200 ± 0,02 | 15,5 | 305 |
| 300 ± 0,2 | 22,23 | 6 ± 0,05 | 270 ± 0,02 | 17,4 | 520 |

Table Z103 – Feed force

| | | | | | | | | | | |
|-------------------------------------|----|----|-----|-----|-----|-----|-----|-----|-----|-----|
| $\varnothing a$ mm | 50 | 80 | 100 | 115 | 125 | 150 | 180 | 200 | 230 | 300 |
| Feed force N (± 5 N) | 15 | 15 | 40 | 40 | 40 | 40 | 60 | 60 | 60 | 60 |

Table Z104 – Test conditions for straight grinding

| | |
|-------------|---|
| Orientation | <p>Tool to be held as in normal use for grinding a horizontal plate.</p> <p>For grinders with a rated capacity up to or equal 55 mm, the test shall be carried out under load by using the artificial wheel.</p> <p>For grinders with a rated capacity exceeding 55 mm diameter, the test shall be carried out under load by using the artificial wheel, but at the speed achieved at under normal load (for example by reducing the supply voltage).</p> |
| Tool bit | <p>Artificial wheel as specified in Figure Z103 of a diameter equivalent to the rated capacity and dimensions in accordance with Table Z105.</p> <p>When using the artificial wheel, start with a diameter ($e - 1$ mm) and increase the size at the hole in stages of 1/10 mm until the required unbalance is obtained.</p> |
| Feed force | <p>Applied at a position as close as that in normal use.</p> <p>For a rated capacity less than or equal to 55 mm, the feed force is 20 N, and for a rated capacity exceeding 55 mm, the feed force is 50 N.</p> <p>The feed force is obtained by applying an upward force equal to the sum of the intended feed force and the weight of the tool.</p> <p>The upward force is applied to the front part of the handle or gripping area closest to the wheel.</p> <p>On tools with antivibration handles, the upward force shall be applied without blocking the antivibration function.</p> <p>The force can be applied using a weight (see Figure Z101) or, alternatively, a dynamometer can be attached. The application of force shall be achieved with minimum adaptation to the machine.</p> <p>NOTE Any weight added to the tool e.g. fixing devices for the upward force will alter the inertia of the tool and thereby reduce the vibration magnitude.</p> |
| Test cycle | A test cycle is given by conducting a measurement for at least 10 s. |

Table Z105 – Dimensions of the artificial wheel of Figure Z103 for straight grinding

| $\varnothing a$ mm | $\varnothing b$ mm | c mm | $\varnothing d$ mm | $\varnothing e$ mm | Unbalance g mm |
|-----------------------|-----------------------|-----------|-----------------------|-----------------------|-------------------|
| 25 ± 0,2 | 4,0 | 10 ± 0,05 | 18 ± 0,02 | 4,3 | 3,6 |
| 50 ± 0,2 | 4,0 | 10 ± 0,05 | 35 ± 0,02 | 6,2 | 14,5 |
| 80 ± 0,2 | 4,0 | 10 ± 0,05 | 65 ± 0,02 | 7,1 | 37 |
| 100 ± 0,2 | 19,0 | 25 ± 0,05 | 70 ± 0,02 | 5,6 | 58 |
| 125 ± 0,2 | 19,0 | 25 ± 0,05 | 90 ± 0,02 | 6,1 | 90 |
| 150 ± 0,2 | 19,0 | 25 ± 0,05 | 120 ± 0,02 | 6,4 | 130 |
| 200 ± 0,2 | 19,0 | 25 ± 0,05 | 170 ± 0,02 | 7,1 | 230 |

6.2.6.3.102 Polishing

Tools for polishing applications are tested under load and under the conditions described below in Table Z106.

Table Z106 – Test conditions for polishing

| | |
|-------------|---|
| Orientation | Polishing a horizontal steel plate of min. 200 mm x 200 mm x 20 mm mounted on a bench |
| Tool bit | Polishing pad |
| Feed force | 50 N ± 5 N (in addition to the weight of the tool) or the force necessary to obtain rated input, whichever is the lower |
| Test cycle | A test cycle is given by conducting a measurement for at least 10 s |

6.2.6.3.103 Disc-type sanding

Tools for disc-type sanding applications are tested under load and under the conditions described below in Table Z107.

Table Z107 – Test conditions for disc-type sanding

| | |
|-----------------------|---|
| Orientation | Sanding a horizontal steel plate of min. 200 mm x 200 mm x 20 mm mounted on a bench |
| Tool bit | Recommended sanding disc for steel with a grain size of 180 |
| Feed force | 30 N ± 5 N (in addition to the weight of the tool) |
| Pre-test requirements | With a new sanding disc carry out 1 min sanding before starting measurements |
| Test cycle | A test cycle is given by conducting a measurement for at least 10 s |

6.2.6.4 Operator

Replacement:

The vibration of the machine is influenced by the operators. The operators shall therefore be skilled enough to be able to hold the tool in a manner similar to that used in real grinding. Also the angle of attack should equal to that used in real grinding on a horizontal surface (e.g. for angle grinders 20° ± 5°).

The forces and torques applied to the handles influence the vibration. It is therefore important that the force and torque distribution between the handles equals that in real use.

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.

$a_{h,SG}$ or $a_{h,AG}$ = mean vibration for straight grinding or angle grinding in accordance with 6.2.6.3.101

$a_{h,P}$ = mean vibration for polishing in accordance with 6.2.6.3.102

$a_{h,DS}$ = mean vibration for disc-type sanding in accordance with 6.2.6.3.103

Underestimation of the vibration for tools equipped with technical means to automatically reduce unbalances shall be taken into account by multiplying the vibration values of such tools with a correction factor of 1,3.

In cases, where the measurement was done at practical use with specific discs, information about the operating conditions (such as specification of the disk used, work piece material, feed force) shall be reported.

6.2.7.2 Declaration of the vibration emission value

Addition:

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For the following applications of the tool, if recommended in the instruction manual, the vibration emission values of the handle with the highest emission and the uncertainty K shall be declared:

- for grinding applications
the value of $a_{h,SG}$ or $a_{h,AG}$ with the work mode description "surface grinding";
- for polishing applications
the value of $a_{h,P}$ with the work mode description "polishing";
- for disc type sanding applications
the value of $a_{h,DS}$ with the work mode description "disc sanding".

In addition, the information shall be given in the instruction manual that other applications such as cutting-off or wire brushing, may have different vibration emission values.

21 Construction

21.Z1 *Addition:*

Disc-type sanders exclusively for sanding wooden floors are considered to be tools where a considerable amount of dust is produced.

Replace 21.18.1 by the following:

21.18.1 *Replacement:*

The switch shall be of momentary contact type.

For single phase angle grinders with a rated capacity greater than 155 mm and for single phase straight grinders with a rated capacity greater than 130 mm, either

- the mains switch shall automatically switch off the motor as soon as the actuating member of the switch is released and shall have no locking arrangement in the “on” position

or

- the tool shall not restart after an interruption of the mains supply without releasing and re-actuating the switch. In this case, a lock-on device is allowed provided that two dissimilar actions are necessary to lock the switch in the “on” position. In addition, only a single motion to the actuating member of the switch shall be required for the switch to automatically return to the “off” position.

For all other tools, a lock-on device is allowed provided that two dissimilar actions are necessary to lock the switch in the “on” position. In addition, only a single motion to the actuating member of the switch shall be required for the switch to automatically return to the “off” position.

Compliance is checked by inspection and manual test.

Bibliography

Add the following note under IEC 60745-2-4:

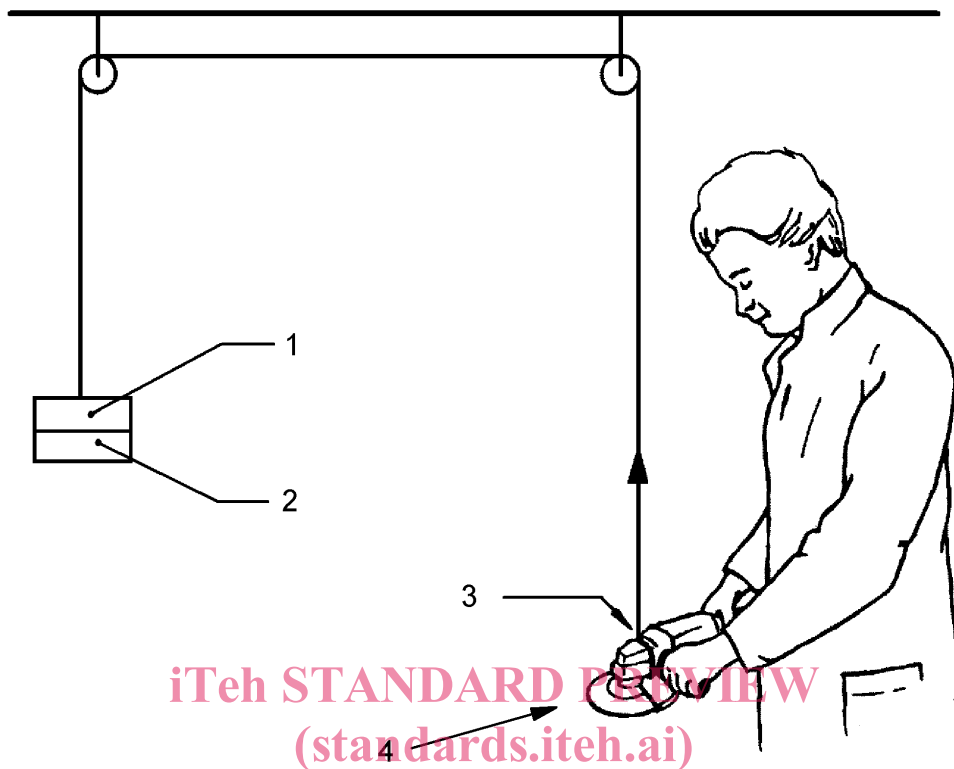
NOTE Harmonized as EN 60745-2-4:2003 (not modified).

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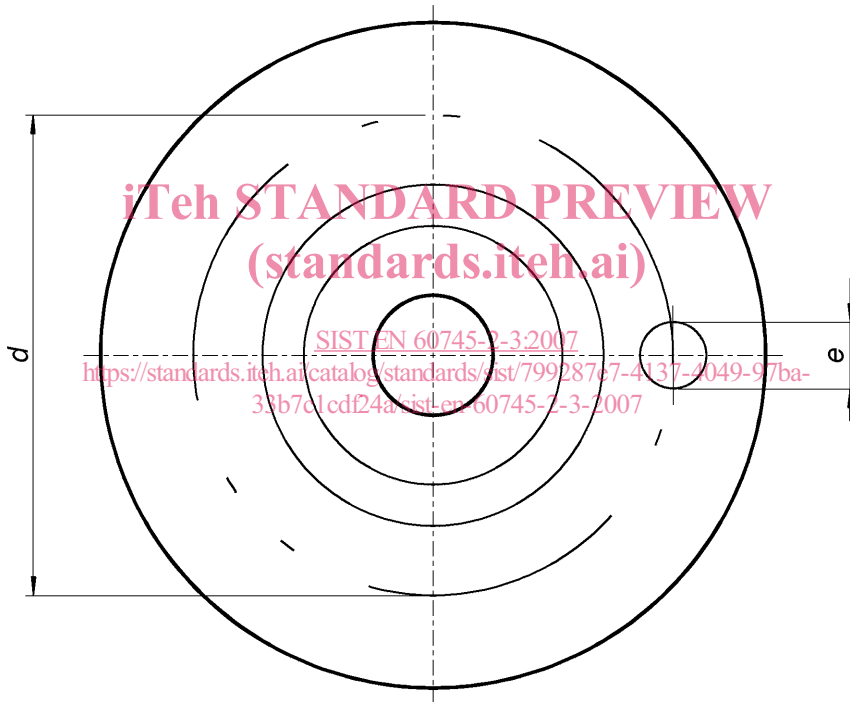
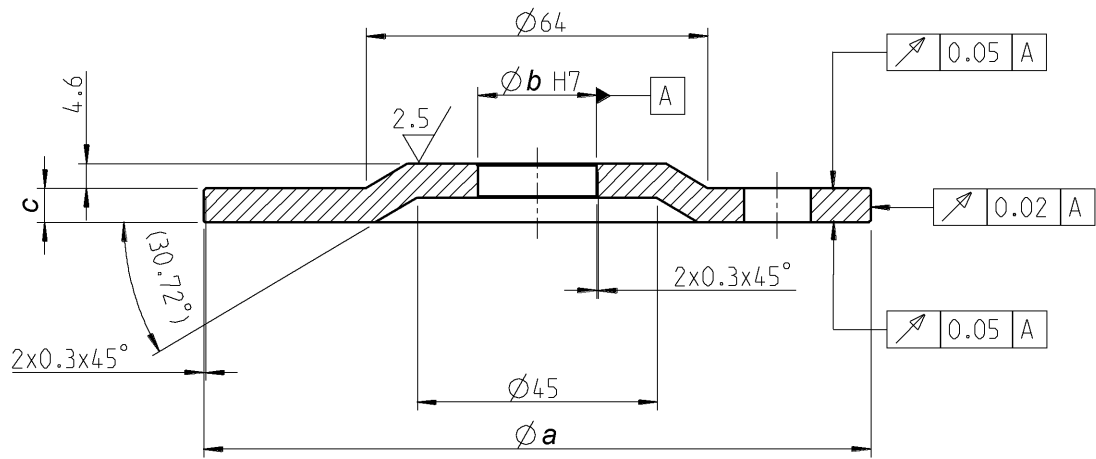
Add the following new figures:



Key

- 1 Weight of grinder
- 2 Feed force weight
- 3 Application of feed force using a sling of cord
- 4 Grinder is suspended at an angle of $20^\circ \pm 5^\circ$ to the horizontal

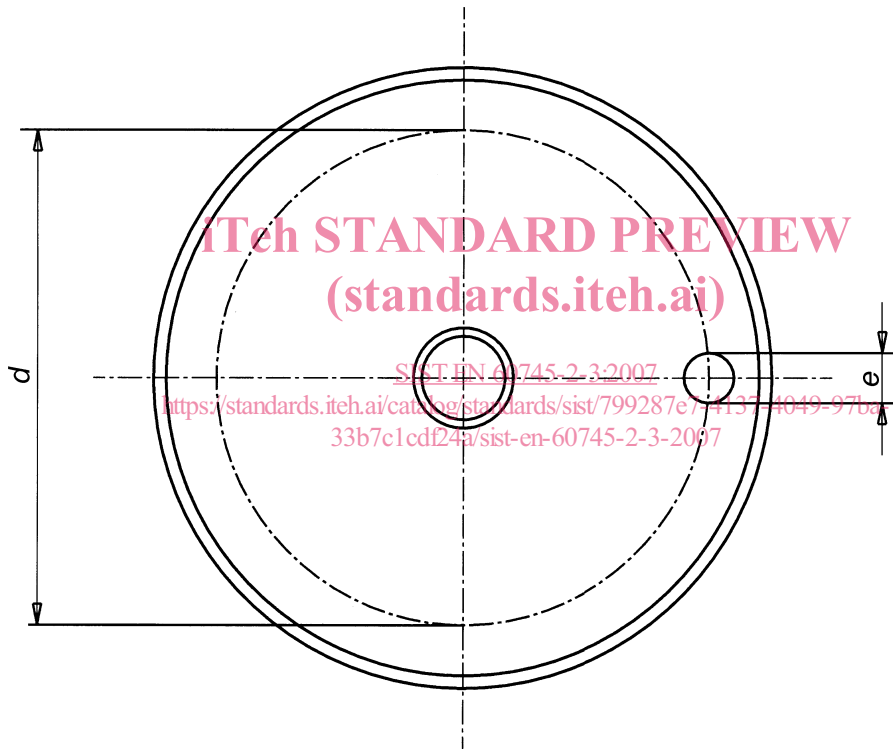
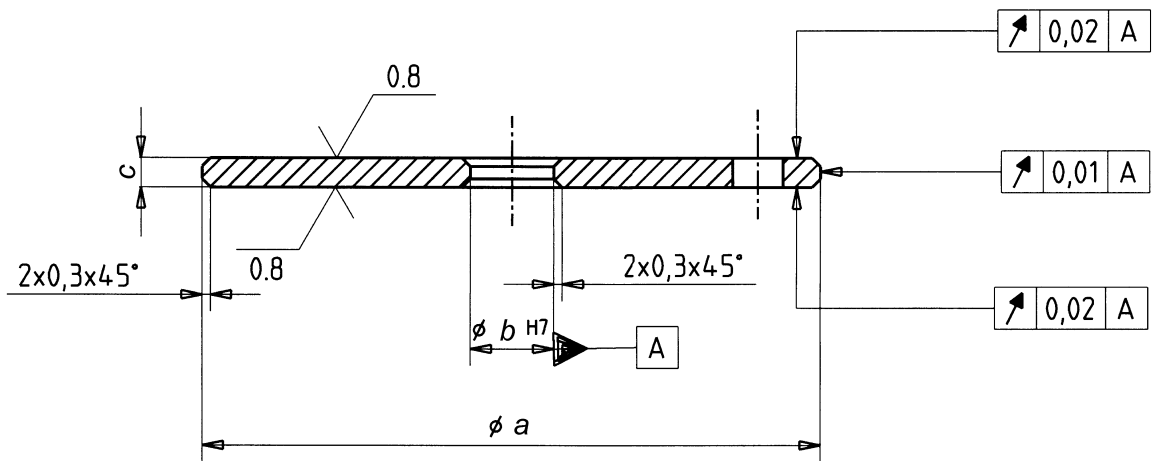
Figure Z101 – Working positions of operator and application of force



Material: aluminium

Dimensions in millimetres

Figure Z102 – Artificial grinding wheel for angle grinding



Material: aluminium

Dimensions in millimetres

Figure Z103 – Artificial grinding wheel for straight grinding

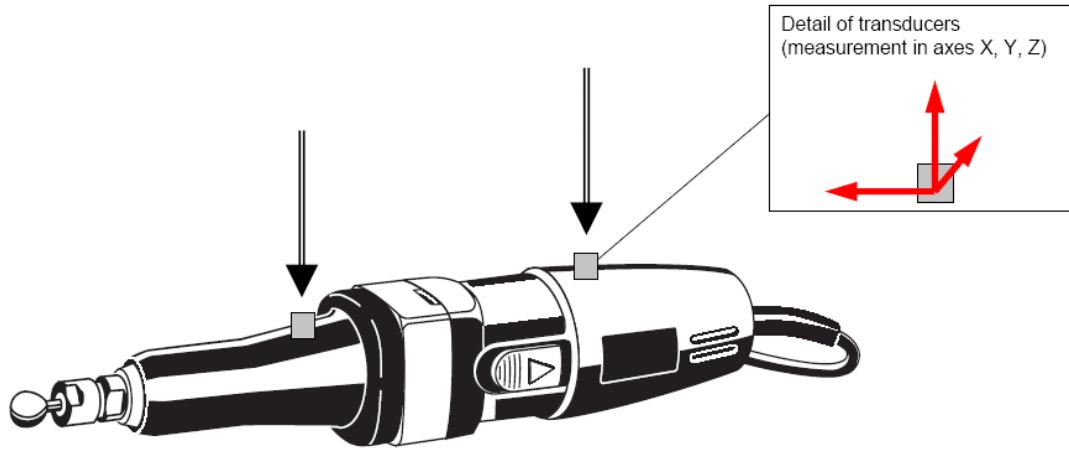
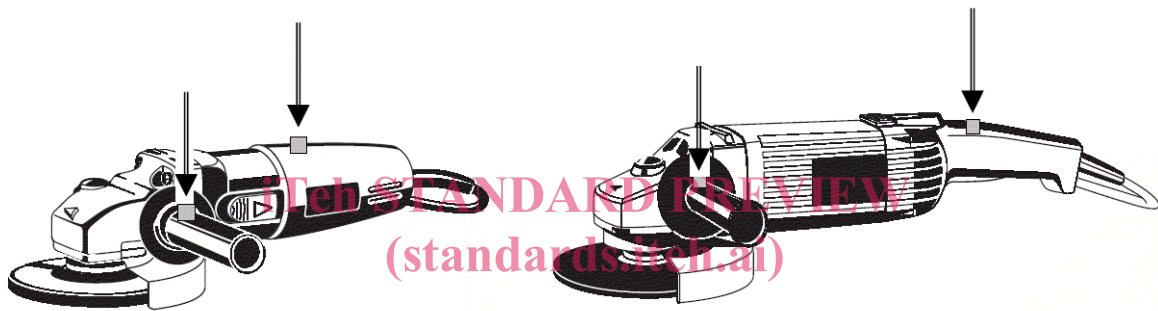


Figure Z104 – Positions of transducers for straight grinders



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Figure Z105 – Positions of transducers for angle grinders

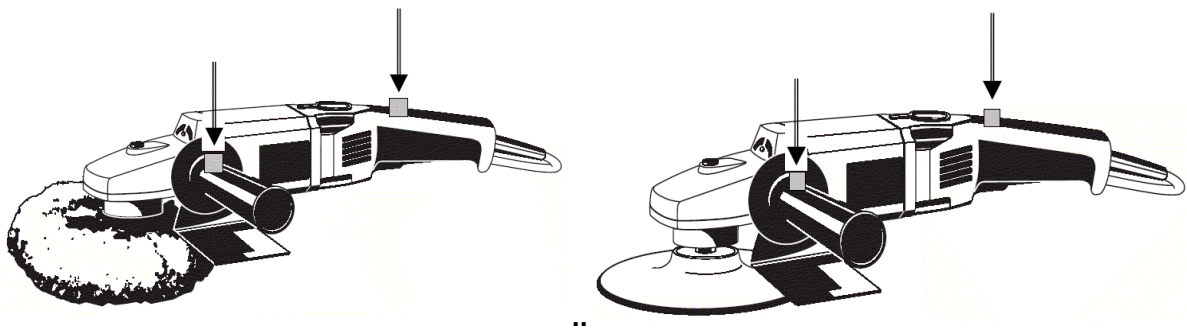


Figure Z106 – Positions of transducers for polishers and disk-type sanders