

Australian/New Zealand Standard™

Hand-held Motor-operated Electric Tools—Safety

Part 2.3: Particular requirements for grinders, polishers and disk-type sanders (IEC 60745-2-3 Ed 2.2, MOD)



AS/NZS 60745.2.3:2011

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee EL-002, Safety of Household and Similar Electrical Appliances and Small Power Transformers. It was approved on behalf of the Council of Standards Australia on 18 April 2011 and on behalf of the Council of Standards New Zealand on 21 April 2011.

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Consumer Electronic Suppliers Association, Australia
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AUSTRALIA/NEW ZEALAND STANDARD

HAND-HELD MOTOR-OPERATED ELECTRIC TOOLS – SAFETY –

Part 2.3: Particular requirements for grinders, polishers and disk-type sanders

FOREWORD

This standard was prepared by the Joint Standards Australia/Standards New Zealand Committee EL-002- Safety of Household and Similar Electrical Appliances and Small Power Transformers to supersede AS/NZS 60745.2.3:2006, *Hand-held motor-operated electric tools – Safety – Part 2.3: Particular requirements for grinders, polishers and disk-type sanders*, two years from publication. During this period it is anticipated that regulatory authorities will approve grinders, polishers and disk-type sanders to either standard.

The objective of this Standard is to provide manufacturers, designers, regulatory authorities, testing laboratories and similar organizations with safety requirements designed to give the user protection against hazards that might occur during normal operation and abnormal operation of the tool and which may be used as the basis for approval for sale or for connection to the electricity supply mains in Australia and New Zealand.

A1 | This Standard incorporates Amendment No. 1 (June 2013). The changes required by the amendments are indicated in the text by a marginal bar and amendment number against the clause, note, table, figure or part thereof affected. Where an application date other than immediate is applicable to an amendment the date of application (DOA) and the date of withdrawal (DOW) if relevant, is indicated by the marginal bar against the part affected.

A1 | This Standard is an adoption with national modifications and contains the full text of the second edition of IEC 60745-2-3, *Hand-held motor-operated electric tools – Safety – Part 2-3: Particular requirements for grinders, polishers and disk-type sanders* and its amendment 1 (2010) and its corrigendum 1 (2011) and its amendment 2 (2011) and has been varied as indicated to take account of Australian and New Zealand conditions.

This part is to be used in conjunction with AS/NZS 60745.1:2009 and its amendments. The Parts 2 contain clauses to supplement or modify the corresponding clauses in this part to provide the relevant requirements for each type of tool.

NOTE 1 The following print types are used:

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

A1 | The numbering of clauses, subclauses, notes, tables, figures and annexes follows that of IEC 60745-2-3 Ed 2.2. To allow for the introduction of additional material by the IEC, the numbers 101 to 200 have been reserved. To allow for additional material to be introduced by Australia and New Zealand, the numbers 201 to 300 are used to number further clauses, subclauses, notes, tables and figures in part 1. Additional annexes are lettered ZA, ZB and so on.

This scheme has been introduced to reduce the likelihood of the IEC and Australia and New Zealand using the same identifier for different purposes.

The use of the word VOID indicates that the IEC text is not used in Australia or New Zealand. The use of this word also avoids the need to renumber, clauses, notes, tables and figure if an earlier clause, note, table or figure is not used.

As this Standard is reproduced from an International Standard, the following applies:

- (a) Its number does not appear on each page of text and its identity is shown on the cover and title page only.
- (b) In the source text "this International Standard" should read "this Australian/New Zealand Standard".
- (c) A full point substitutes for a comma when referring to a decimal marker.

A1 | Variations to IEC 60745-2-3 Ed 2.2 are indicated at the appropriate places throughout this standard. Strikethrough (~~example~~) identifies IEC tables, figures and passages of text which, for the purposes of this Australian/New Zealand standard are deleted. Where Australian/New Zealand tables, figures or passages of text are added, each is set in its proper place and identified by shading (~~example~~). Added figures are not themselves shaded, but are identified by a shaded border.

A1 | Variations made to IEC 60745-2-3 Ed 2.2 form the New Zealand variations for the purposes of the IECEE scheme for recognition of testing to standards for safety of electrical equipment (the CB scheme). These variations have been incorporated in the body of the standard. They are listed in Annex ZZ for easy reference.

The essential safety requirements in AS/NZS 3820 that could be applicable to grinders, polishers and disk-type sanders are covered by this standard.

HAND-HELD MOTOR-OPERATED ELECTRIC TOOLS – SAFETY –

Part 2.3: Particular requirements for grinders, polishers and disk-type sanders

1 Scope

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

Addition:

This standard applies to grinders, polishers and disk-type sanders, including angle, straight and vertical tools, with a rated capacity not exceeding 230 mm. For grinders, the rated speed does not exceed a peripheral speed of the accessory of 80 m/s at rated capacity.

This standard does not apply to dedicated cut-off machines which are covered by IEC 60745-2-22.

This standard does not apply to random-orbit polishers and random-orbit sanders which are covered by IEC 60745-2-4.

This standard does not apply to die grinders utilizing collets or chucks for mounting threaded cones and mandrel mounted wheels which are covered by IEC 60745-2-23.

2 Normative references

This clause of Part 1 is applicable except as follows:

Addition:

ISO 603-12	1999	<i>Bonded abrasive products – Dimensions – Part 12: Grinding wheels for deburring and fettling on a straight grinder</i>
ISO 603-14	1999	<i>Bonded abrasive products – Dimensions – Part 14: Grinding wheels for deburring and fettling/snagging on an angle grinder</i>
ISO 603-16	1999	<i>Bonded abrasive products – Dimensions – Part 16: Grinding wheels for cutting-off on hand held power tools</i>
ANSI B7.1	2000	<i>Safety Requirements for the Use, Care and Protection of Abrasive Wheels</i>

ANSI B74.2	2003	<i>Specifications for Shapes and Sizes of Grinding Wheels, and for Shapes, Sizes and Identification of Mounted Wheels</i>
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3 Terms and definitions

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

3.101

blotter

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

3.102

disk-type sander

tool, constructed like a grinder, intended for sanding

3.102.1

angle disk-type sander

tool with the rotating spindle at a right angle to the motor shaft, intended for lateral sanding

3.102.2

straight disk-type sander

tool with the rotating spindle in-line with the motor shaft, intended for peripheral or lateral sanding

3.102.3

vertical disk-type sander

tool with the rotating spindle in-line with the motor shaft, intended for lateral sanding

3.103

flange

collar, disc or plate between or against which wheels are mounted

3.103.1

unrecessed flange

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

3.103.2

recessed flange

flange fixed to the machine spindle having a recessed flat surface

3.103.3

flange outside diameter

outside diameter of the contact surface of a flange

3.103.4

backing flange

contacts and provides support to the back side of the wheel and is located on the spindle between wheel and tool

3.103.5**locking flange**

supports the front side of the wheel and secures and clamps the wheel to the spindle and the backing flange

3.104**grinder**

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

3.104.1**angle grinder**

tool with the rotating spindle at a right angle to the motor shaft, intended for peripheral and lateral grinding

3.104.2**straight grinder**

tool with the rotating spindle in-line with the motor shaft, either equipped with an abrasive wheel intended for peripheral grinding or equipped with a collet or chuck intended for use with mounted wheels, points or burrs

3.104.2**straight grinder**

tool with the rotating spindle in-line with the motor shaft, equipped with an abrasive wheel intended for peripheral grinding, but not equipped with a collet or chuck

3.104.3**vertical grinder**

tool with the rotating spindle in-line with the motor shaft, intended for lateral grinding

3.104.3**vertical grinder**

tool with the rotating spindle in-line with the motor shaft, intended for peripheral and lateral grinding

3.105**mounted wheels**

various shapes and sizes that may be either organic or inorganic bonded abrasives and are mounted on a mandrel or threaded onto a mandrel

3.105**threaded wheels**

organic or inorganic bonded abrasives of various types provided with a threaded insert for direct mounting to the grinder spindle

3.106**polisher**

tool equipped with a rotating disk or pad intended for polishing

3.106.1**angle polisher**

tool with the rotating spindle at a right angle to the motor shaft, intended for peripheral and lateral polishing

3.106.2**straight polisher**

tool with the rotating spindle in-line with the motor shaft, intended for peripheral polishing

3.106.3**vertical polisher**

tool with the rotating spindle in-line with the motor shaft, intended for lateral polishing

3.107**rated capacity**

maximum diameter of the rotating accessory to be fitted on the tool as recommended by the manufacturer's instruction

3.108**rated speed**

maximum attainable speed as designated by the manufacturer, with any recommended accessory installed, at rated voltage or at the upper limit of the rated voltage range

3.109**wheel guard**

device which partly encloses the abrasive wheel and gives protection to the operator

3.110**wheel types**

wheels for different applications in accordance with ISO 603-12, ISO 603-14, ISO 603-16 or ANSI B 7.1

3.110**wheel types**

wheels for different applications in accordance with ISO 603-12, ISO 603-14, ISO 603-16 or ANSI B 74.2

3.111**minor fragment**

particles less than 1/16 of the mass of the abrasive wheel

4 General requirements

This clause of Part 1 is applicable.

5 General conditions for the tests

This clause of Part 1 is applicable.

6 Void**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:

Tools shall also be marked with:

- rated speed in revolutions per minute;
- rated capacity in mm;
- tools provided with a threaded spindle shall be marked with the spindle thread size;
- “ **WARNING** Always wear eye protection” or sign M004 of ISO 7010 or the following safety sign:



The eye protection symbol may be modified by adding other personal protective equipment such as ear protection, dust mask, etc.

Tools fitted with an electronic speed or load regulator that interrupts the operation of the tool and that allows automatic resumption of the operation of the tool within 2 s shall be fitted with a label permanently attached to the supply cord. The label shall contain the substance of the following warning:

WARNING: This tool will restart automatically if stalled. Do not remove this label.

8.6 Addition:

n.....rated speed

8.12.1 Addition:

For the following safety instructions specified in 8.12.1.101 to 8.12.1.107, terms such as grinding/grinder, sanding/sander, wire brushing/wire brush, polishing/polisher or cutting off/cut-off tool are selected as recommended by the manufacturer. These terms in the warnings and headings shall be consistently used or deleted based on the selected operations. The “and”/“or” conjunctions may be used as appropriate.

If the power tool is recommended only for one of the listed operations, the heading of that section is to be used for all warnings.

8.12.1.101 Safety instructions for all operations

Safety Warnings Common for Grinding, Sanding, Wire Brushing, Polishing or Abrasive Cutting-Off Operations:

NOTE In the above heading, those operations not applicable may be omitted.

- This power tool is intended to function as a grinder, sander, wire brush, polisher or cut-off tool. Read all safety warnings, instructions, illustrations and specifications provided with this power tool. Failure to follow all instructions listed below may result in electric shock, fire and/or serious injury.**

NOTE List only those operations that are recommended.

- Operations such as grinding, sanding, wire brushing, polishing or cutting-off are not recommended to be performed with this power tool. Operations for which the power tool was not designed may create a hazard and cause personal injury.**

NOTE List only those operations that were not included in the first warning. If all listed operations are recommended, then this warning may be omitted, but all subsequent warnings are to be given without exclusion.

- c) **Do not use accessories which are not specifically designed and recommended by the tool manufacturer.** *Just because the accessory can be attached to your power tool, it does not assure safe operation.*
- d) **The rated speed of the accessory must be at least equal to the maximum speed marked on the power tool.** *Accessories running faster than their rated speed can break and fly apart.*
- e) **The outside diameter and the thickness of your accessory must be within the capacity rating of your power tool.** *Incorrectly sized accessories cannot be adequately guarded or controlled.*
- f) **The arbour size of wheels, flanges, backing pads or any other accessory must properly fit the spindle of the power tool.** *Accessories with arbour holes that do not match the mounting hardware of the power tool will run out of balance, vibrate excessively and may cause loss of control.*
- f) **Threaded mounting of accessories must match the grinder spindle thread. For accessories mounted by flanges, the arbour hole of the accessory must fit the locating diameter of the flange.** *Accessories that do not match the mounting hardware of the power tool will run out of balance, vibrate excessively and may cause loss of control.*
- g) **Do not use a damaged accessory. Before each use inspect the accessory such as abrasive wheels for chips and cracks, backing pad for cracks, tear or excess wear, wire brush for loose or cracked wires. If power tool or accessory is dropped, inspect for damage or install an undamaged accessory. After inspecting and installing an accessory, position yourself and bystanders away from the plane of the rotating accessory and run the power tool at maximum no-load speed for one minute. Damaged accessories will normally break apart during this test time.**
- h) **Wear personal protective equipment. Depending on application, use face shield, safety goggles or safety glasses. As appropriate, wear dust mask, hearing protectors, gloves and workshop apron capable of stopping small abrasive or workpiece fragments. The eye protection must be capable of stopping flying debris generated by various operations. The dust mask or respirator must be capable of filtering particles generated by your operation. Prolonged exposure to high intensity noise may cause hearing loss.**
- i) **Keep bystanders a safe distance away from work area. Anyone entering the work area must wear personal protective equipment. Fragments of workpiece or of a broken accessory may fly away and cause injury beyond immediate area of operation.**
- j) **Hold the power tool by insulated gripping surfaces only, when performing an operation where the cutting accessory may contact hidden wiring or its own cord. Cutting accessory contacting a "live" wire may make exposed metal parts of the power tool "live" and could give the operator an electric shock.**

NOTE The above warning may be omitted if polishing or sanding are the only recommended operations.

- k) **Position the cord clear of the spinning accessory. If you lose control, the cord may be cut or snagged and your hand or arm may be pulled into the spinning accessory.**
- l) **Never lay the power tool down until the accessory has come to a complete stop. The spinning accessory may grab the surface and pull the power tool out of your control.**
- m) **Do not run the power tool while carrying it at your side. Accidental contact with the spinning accessory could snag your clothing, pulling the accessory into your body.**
- n) **Regularly clean the power tool's air vents. The motor's fan will draw the dust inside the housing and excessive accumulation of powdered metal may cause electrical hazards.**
- o) **Do not operate the power tool near flammable materials. Sparks could ignite these materials.**
- p) **Do not use accessories that require liquid coolants. Using water or other liquid coolants may result in electrocution or shock.**

NOTE The above warning does not apply for power tools specifically designed for use with a liquid system.

8.12.1.102 Further safety instructions for all operations

Kickback and Related Warnings

Kickback is a sudden reaction to a pinched or snagged rotating wheel, backing pad, brush or any other accessory. Pinching or snagging causes rapid stalling of the rotating accessory which in turn causes the uncontrolled power tool to be forced in the direction opposite of the accessory's rotation at the point of the binding.

For example, if an abrasive wheel is snagged or pinched by the workpiece, the edge of the wheel that is entering into the pinch point can dig into the surface of the material causing the wheel to climb out or kick out. The wheel may either jump toward or away from the operator, depending on direction of the wheel's movement at the point of pinching. Abrasive wheels may also break under these conditions.

Kickback is the result of power tool misuse and/or incorrect operating procedures or conditions and can be avoided by taking proper precautions as given below.

- a) **Maintain a firm grip on the power tool and position your body and arm to allow you to resist kickback forces. Always use auxiliary handle, if provided, for maximum control over kickback or torque reaction during start-up. The operator can control torque reactions or kickback forces, if proper precautions are taken.**
- b) **Never place your hand near the rotating accessory. Accessory may kickback over your hand.**
- c) **Do not position your body in the area where power tool will move if kickback occurs. Kickback will propel the tool in direction opposite to the wheel's movement at the point of snagging.**
- d) **Use special care when working corners, sharp edges etc. Avoid bouncing and snagging the accessory. Corners, sharp edges or bouncing have a tendency to snag the rotating accessory and cause loss of control or kickback.**
- e) **Do not attach a saw chain woodcarving blade or toothed saw blade. Such blades create frequent kickback and loss of control.**

8.12.1.103 Additional safety instructions for grinding and cutting-off operations

NOTE If grinding and cut-off operations are not recommended by the manufacturer, this section may be omitted.

Safety Warnings Specific for Grinding and Abrasive Cutting-Off Operations:

- a) **Use only wheel types that are recommended for your power tool and the specific guard designed for the selected wheel. Wheels for which the power tool was not designed cannot be adequately guarded and are unsafe.**
- b) **The grinding surface of centre depressed wheels must be mounted below the plane of the guard lip. An improperly mounted wheel that projects through the plane of the guard lip cannot be adequately protected.**
- c) **The guard must be securely attached to the power tool and positioned for maximum safety, so the least amount of wheel is exposed towards the operator. The guard helps to protect the operator from broken wheel fragments, accidental contact with wheel and sparks that could ignite clothing.**

NOTE The above warning may be omitted for grinders or cut-off grinders with a rated capacity of less than 55 mm.

- d) **Wheels must be used only for recommended applications. For example: do not grind with the side of cut-off wheel. Abrasive cut-off wheels are intended for peripheral grinding, side forces applied to these wheels may cause them to shatter.**

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