

AS 1788.2—1987

Australian Standard[®]

Abrasive wheels

Part 2: Selection, care, and use

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Australian Standard®

Abrasive wheels

Part 2: Selection, care, and use

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PREFACE

This standard was prepared by the Association's Committee on Abrasive Wheel Safety, to supersede (in part) AS 1788—1975, SAA Abrasive Wheels Safety Code.

This standard specifies safety requirements for the application and operation of abrasive wheels. In addition, requirements are given for the correct storage, handling, and mounting of abrasive wheels.

The design, construction, and safeguarding requirements for abrasive wheels are dealt with in AS 1788.1, Abrasive Wheels, Part 1—Design, Construction, and Safeguarding.

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STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard for ABRASIVE WHEELS

PART 2—SELECTION, CARE, AND USE

SECTION 1. SCOPE AND GENERAL

1.1 SCOPE. This standard sets out requirements for the application and operation of abrasive wheels (excluding natural sandstones). Requirements for the proper storage, handling, and mounting of abrasive wheels are also included.

The operating requirements included in this standard are limited to important safety requirements. Requirements for the manufacture and installation of abrasive wheels and ancillary equipment are specified in AS 1788.1.

1.2 APPLICATION. The application, assembly and operation of abrasive wheels and ancillary equipment shall comply with the requirements of the following Sections of this standard:

- Section 2 Machine and wheel assembly
- Section 3 Operational speeds
- Section 4 Specific requirements for operation
- Section 5 Handling, storage, and inspection

1.3 RELATIONSHIP WITH REGULATIONS. The requirements of this standard do not take precedence over the regulations of a Regulatory Authority that may apply in any area.

1.4 INTERPRETATIONS. Questions concerning the meaning, application, or effect of any part of this standard may be referred to the SAA Committee on Abrasive Wheel Safety for explanation. The authority of this committee is limited to matters of interpretation and it will not adjudicate in disputes.

1.5 REFERENCED DOCUMENTS. The following standards are referred to in this standard:

- AS 1270 Hearing Protection Devices
- AS 1336 Recommended Practices for Eye Protection in the Industrial Environment
- AS 1470 Code of General Principles for Safe Working in Industry
- AS 1668 SAA Mechanical Ventilation and Airconditioning Code Part 2—Ventilation Requirements
- AS 1715 Selection, Use and Maintenance of Respiratory Protective Devices
- AS 1788.1 Abrasive Wheels Part 1—Design, Construction, and Safeguarding
- AS 1885 Code of Practice for Recording and Measuring Work Injury Experience

1.6 DEFINITIONS. For the purpose of this standard, the following definitions apply:

1.6.1 Abrasive wheel—a revolving cutting tool consisting of abrasive grains held together by organic, inorganic, or vitrified bonding materials.

1.6.2 Accompanying documents—documents accompanying the equipment and containing all important information for the user, in particular that relevant to safety.

1.6.3 Blotters—compressible material generally used between an abrasive wheel and its flanges. The purpose of blotters is to distribute the clamping pressure of the flanges evenly on the wheel.

1.6.4 Bonded wheel.

1.6.4.1 Organic bonded wheel—a wheel which is bonded by means of an organic material (e.g. resinoid, rubber, shellac, or similar bonding agent).

1.6.4.2 Inorganic bonded wheel—a wheel which is bonded by means of inorganic material (e.g. sodium silicate, magnesium, oxychloride, or metal).

1.6.4.3 Vitrified bonded wheel—a wheel which is bonded by means of vitrified material (e.g. clay, glass, porcelain, or other related materials).

1.6.5 Chuck—a device to hold abrasive segments or certain types of wheels, and mounted on the machine spindle or machine face plate.

1.6.6 Exhaust zone—the effective area of the ventilation system used for control of dust or fumes.

1.6.7 Flanges—collars, discs, or plates between which wheels are mounted, and are referred to as adaptor, sleeve, or back-up types.

1.6.8 Grinding—face - the surface of the abrasive wheel upon which grinding is performed. (See Fig. 1.1.)

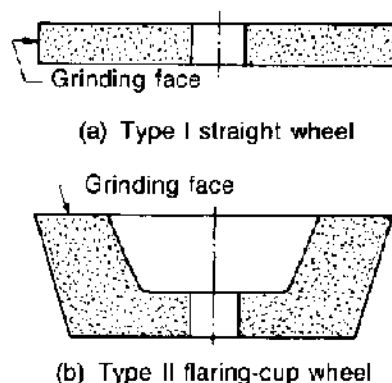


Fig. 1.1. GRINDING FACE

1.6.9 Grinding operations.

1.6.9.1 *Centreless grinding*—the precision grinding of the outer surface of any cylindrical work piece which is rotated by a regulating wheel and supported by a work blade. (See Fig. 1.2.)

1.6.9.2 *Coping*—the sawing or grooving of any non-metallic material with an abrasive wheel.

1.6.9.3 *Cutting off*—the slicing or parting of any material or part. (See Fig. 1.3.)



Fig. 1.2. TYPICAL THROUGH-FEED CENTRELESS GRINDING OPERATION

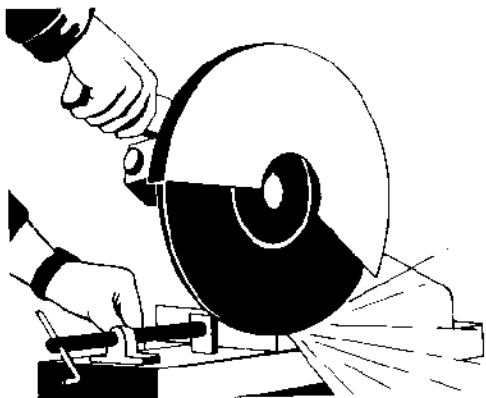


Fig. 1.3. CUTTING OFF

1.6.9.4 Cylindrical grinding—the precision grinding of the outer surface of any cylindrical work piece.

1.6.9.5 Internal grinding—the precision grinding of the inside surface of the hole in a work piece. (See Fig. 1.4.)

1.6.9.6 Off-hand grinding—the grinding of any material or part which is held in the operator's hand.

1.6.9.7 Portable grinding—a grinding operation where the grinding machine is hand-held and may be easily moved from one location to another. (See Fig. 1.5.)

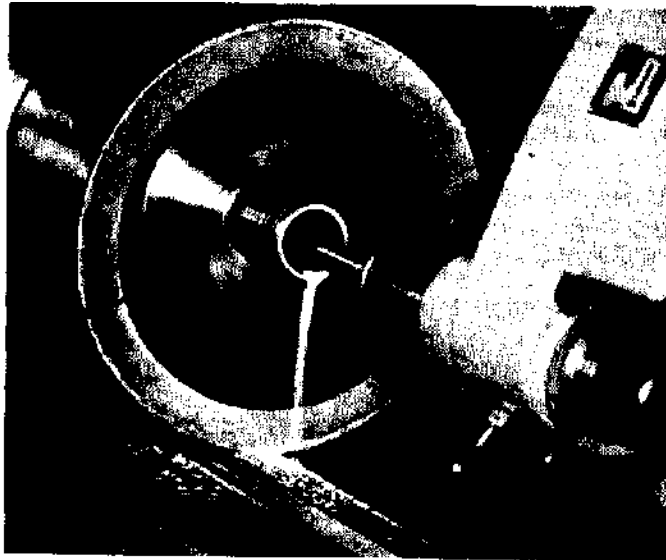


Fig. 1.4. INTERNAL GRINDING



Fig. 1.5. PORTABLE GRINDING USING A CUP WHEEL

1.6.9.8 Precision grinding—grinding operations performed by machines used to finish work parts to specific dimensions and finish.

1.6.9.9 Snagging—grinding which removes relatively large amounts of material without regard to close tolerance or surface finish.

1.6.9.10 Surface grinding—the precision grinding of a plane surface.

1.6.9.11 Tool grinding—the precision grinding or sharpening of various types of cutting tools.

1.6.9.12 Tuck pointing—removal, by grinding, of cement, mortar, or other non-metallic jointing materials.

1.6.10 Guard—an enclosure designed to retain the pieces of the abrasive wheel should it be broken in operation.

1.6.11 Maximum operating speed—the safe maximum rotational frequency of an abrasive wheel. (Unit symbol: r/min)

1.6.12 Peripheral speed—the distance travelled by a point on the outside surface of an abrasive wheel divided by time. (Unit symbol: m/s)

NOTES:

1. The peripheral speed of an abrasive wheel can be calculated from the following equation:

$$u = 5236 \times 10^{-8} \times d \times n$$

where

- u = peripheral speed, in metres per second
- d = diameter of the wheel, in millimetres
- n = rotational frequency, in revolutions per minute.

2. A speed conversion table is given in [Appendix B](#).

1.6.13 Reducing bush—inserts or devices used to reduce the hole size in an abrasive wheel so that it can be mounted correctly on a smaller diameter spindle. (See Fig. 1.6.)

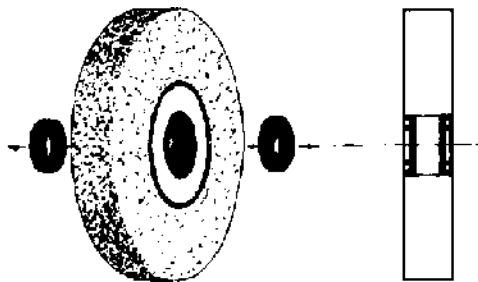


Fig. 1.6. TYPICAL REDUCING BUSH

1.6.14 Regulating wheel—the wheel on centreless grinding operations located opposite the abrasive wheel. The regulating wheel controls the rotational rate and through feed rate of the workpiece.

1.6.15 Regulatory Authority—a Minister of the Crown, a government department or other public authority having power to issue regulations, orders or other instructions having the force of law in respect of any subject covered by this standard.

1.6.16 Rotational frequency—the number of revolutions of the abrasive wheel divided by time. (Unit symbol: r/min)

1.6.17 Segments—bonded abrasive sections of various shapes assembled in a chuck to form a continuous or intermittent grinding surface.

1.6.18 Shall and should—the word 'shall' is to be understood as mandatory, and the word 'should' as non-mandatory, advisory, or recommended.

1.6.19 Tape winding (or wire winding)—a winding used on the periphery of cylinder, cup, or segmental disc wheels to help retain the pieces of the wheel should accidental breakage occur. Adequate guards are always used with this type of wheel.

NOTE: Any winding should be removed when the grinding face wears close. If not removed, the winding will become a hazard as it is worn through and unwinds.

1.6.20 Wheel shape—the designation of particular forms of abrasive wheels with respect to dimensional and operational limitations.

1.7 WHEEL SHAPE APPLICATION.

1.7.1 Straight wheel, Type 1. Grinding operations for Type 1 wheels should be performed on the periphery of the wheel. Type 1 wheel shape may be applied to all forms of grinding operations provided that the wheel is mounted between flanges (see [Clause 2.3.6](#)).

1.7.2 Cylinder wheel, Type 2. Grinding operations for Type 2 wheels shall be performed on the rim face only. The cylinder wheel may be applied for usage as a plain, plate mounted, or inserted nut type.

1.7.3 Abrasive disc. Abrasive discs are mounted and used in a similar manner to Type 2 cylinder wheels and are subject to the same conditions and limitations of use.

1.7.4 Taper-sided wheel, Type 4. Type 4 wheels have the same limitations on mounting and usage as Type 1 wheels (see [Clause 1.7.1](#)).

1.7.5 Recessed-one-side wheel, Type 5. Type 5 wheels are subject to the same limitations of use and mounting as Type 1 wheels (see [Clause 1.7.1](#)).

NOTE: Recessed wheels allow a wider faced grinding wheel to be used when the available mounting thickness is less than the required overall thickness. The recess allows grinding clearance for the nut and flange.

1.7.6 Straight cup wheel, Type 6. Grinding operations for Type 6 wheels shall be performed on the rim face only.

NOTE: This type differs from Type 5 in that the grinding is performed on the wall of the abrasive wheel created by the difference between the diameter of the recess and the outside diameter of the wheel.

1.7.7 Double recessed wheel, Type 7. Type 7 wheels are subject to the same limitations of use and mounting as Type 5 wheels (see [Clause 1.7.5](#)).

NOTE: Type 7 wheels are peripheral grinding wheels having both sides recessed to allow grinding clearance for both flanges, or are recessed so that unusually wide-faced wheels may be mounted where the available mounting thickness is less than overall thickness.

1.7.8 Flaring cup wheel, Type 11. Type 11 wheels are subject to the same limitations of use and mounting as Type 6 straight-sided cup wheels (see [Clause 1.7.6](#)). Grinding is always performed on the rim face.

1.7.9 Dish wheel, Type 12 (See Fig. 1.7). Grinding operations for Type 12 wheels are primarily performed on the rim face (see dimension A).

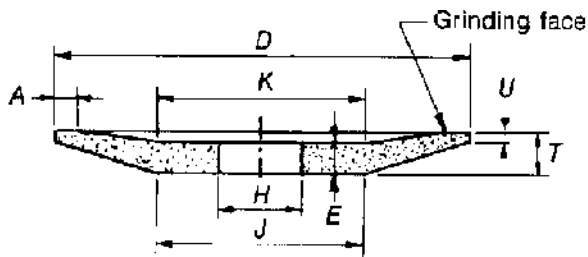


Fig. 1.7. DISH WHEEL-TYPE 12

1.7.10 Saucer wheels, Type 13. Grinding operations for Type 13 wheels shall be performed on the wheel periphery only.

1.7.11 Cone and plug wheels, Types 16, 17, 18, 18R and 19. Grinding operations for cone and plug wheels may be performed on all surfaces except the flat mounting surface.

Cone and plug type wheels are mounted by screwing onto a threaded machine spindle so that the flat mounting surface seats firmly against the unrelieved, flat back-up flange (see Clause 2.3.10). It is recommended that the maximum size or mass of these cones and plugs, used on a 9.5 mm spindle, be not greater than that of a 75 mm diameter by 125 mm long Type 18 plug wheel.

1.7.12 Relieved and/or recessed wheels, Types 20, 21, 22, 23, 24, 25, and 26. Types 20 to 26 wheels are subject to the same limitations of use and mounting as Type 5 wheels (see Clause 1.7.5).

1.7.13 Depressed centre wheels, Types 27 and 28. Type 27 and Type 28 wheels are both reinforced, organic-bonded wheels having offset hubs which permit side and peripheral grinding operations without interference with the mounting. Special supporting back adaptor, and inside flange nuts are required for the proper mounting of these types of wheels (see Clause 2.3.15).

NOTE: Type 27 wheel has a flat-shaped outside centre area and is suitable for notching and cutting operations. Type 28 wheel has a saucer-shaped outer area and is better suited for corner cleaning work.

1.7.14 Cutting off wheels. Cutting off wheels are subject to the same limitations of use and mounting as Type 1 wheels (see Clause 1.7.1). Cutting off wheels are usually plain or reinforced organic bonded.

Cutting off wheels are recommended only for use on specially designed and fully guarded machines.

1.7.15 Coping wheels. Coping wheels are peripheral cutting wheels and are subject to the same limitations of use and mounting as Type 1 wheels (see Clause 1.7.1). Coping wheels may be reinforced organic bonded, and should be used only on specially designed and fully guarded machines.

1.7.16 Tuck pointing wheels. Tuck pointing wheels, usually Type 1 reinforced organic bonded wheels, are subject to the same limitations of use and mounting as Type 1 wheels (see Clause 1.7.1). Tuck pointing wheels should be used only on specially designed and fully guarded machines.

1.7.17 Notching wheels. Notching wheels are subject to the same limitations of use and mounting as Type 27 and Type 28 wheels (see Clause 1.7.13). In addition, notching wheels are to be used only for notching or cutting and should not be used for general purpose grinding.

1.7.18 Mounted wheels. Mounted wheels usually 50 mm diameter or smaller, and of various shapes, may be either organic bonded or vitrified bonded abrasive wheels. They are secured to plain or threaded steel mandrels. (See Clauses 2.3.14 and 4.1.13 for safe operation and mounting requirements.)

1.7.19 Threaded hole wheels. Threaded hole wheels are designed for use on straight, vertical, right-angle head, or flexible shaft portable grinders. They are mounted by being screwed onto a threaded machine spindle so that the wheel back seats firmly against an unrelieved flat back flange.

Threaded hole wheel mounting should not be used with wheels larger than 150 mm diameter. Back flanges used in mounting threaded hole wheels shall be flat and unrelieved. (For limitations of the use of cones and plugs, see Clause 1.7.11.)