INTERNATIONAL STANDARD

ISO 525

Fourth edition
2013-03-15

Bonded abrasive products — General requirements

Produits abrasifs agglomérés — Exigences générales

Reference number
ISO 525:2013(E)

COPYRIGHT PROTECTED DOCUMENT

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2. www.iso.org/directives

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received. www.iso.org/patents

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

The committee responsible for this document is ISO/TC 29, *Small tools*, Subcommittee SC 5, *Grinding wheels and abrasives*.

This fourth edition cancels and replaces the third edition (ISO 525:1999).

Significant changes against the previous edition are as follows:

a) clarification has been included in the Scope to explicitly exclude coated abrasive products;

b) a note has been included in Clause 4 on the relationship with the ISO 603 series and the dimensional requirements given there;

c) in Clause 4, Table 2, the description of some existing types of bonded abrasives products has been changed and type numbers 17, 17R, 19R, 29 and 40 have been included;

d) all specific requirements on dimensions (outside diameter, thickness and bore diameter) have been removed from Clause 5 and reference is now made to the ISO 603 series;

e) in Clause 5, requirements for maximum operating speeds have been deleted;

f) Clause 6 on designation has been reworded and included in Clause 5;

g) additional marking requirements have been included.

Bonded abrasive products — General requirements

1 Scope

This International Standard is applicable to bonded abrasive products (e.g. grinding wheels, segments, sticks and stones) in general, excluding superabrasive products and coated abrasive products.

This International Standard specifies:

a) the ISO type number and shape;

b) dimensional symbols;

c) standard profiles;

d) requirements for dimensions, limit deviations and tolerances as well as permissible unbalance;

e) the specification mark;

f) the marking requirements.

NOTE This International Standard is general and is complemented by the ISO 603 series, ISO 6103 and ISO 13942.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 6103, *Bonded abrasive products — Permissible unbalances of grinding wheels as delivered — Static testing*

ISO 8486-1, *Bonded abrasives — Determination and designation of grain size distribution — Part 1: Macrogrits F4 to F220*

ISO 8486-2, *Bonded abrasives — Determination and designation of grain size distribution — Part 2: Microgrits F230 to F2000*

ISO 13942, *Bonded abrasive products — Limit deviations and run-out tolerances*

3 Symbols

See Table1.

Table 1 — Symbols and their meaning

Symbol	Meaning
A	Smallest width of a trapezoidal segment
B	Width of a segment, stick or stone
C	Thickness of a segment, stick or stone
D	Outside diameter of abrasive products
E	Thickness at bore of cup, dish, recessed and relieved wheels
F	Depth of the first recess
G	Depth of the second recess
H	Abrasive product bore diameter, thread diameter of wheels, plugs and cones with threaded insert
J	Smallest diameter of tapered cup, dish, tapered and hubbed wheels
K	Internal diameter of recess of tapered cup and dish wheels
L	Length of segments, length of thread bore of wheels with threaded insert, sticks and stones
L_2	Length of the spindle of spindle mounted wheels and points
N	Depth of the relief
P	Recessed diameter
R	Radius of recessed grinding wheels, cones and plugs, spindle mounted wheels and points, and outer radius segments
R_1	Inside radius of segments
S_d	Diameter of spindle of spindle mounted wheels and points
T	Overall thickness
U	Smallest thickness of tapered, hubbed and depressed centre wheels, e.g. in type 4 or type 38
V	profile angle[a]
W	Rim width of cups, cylinders and dishes
➡	Symbolizes the grinding face of bonded abrasive products.

[a] For wheel profiles, see 4.2.

4 Types — Designation of shapes and symbols

4.1 Designation of basic shapes and dimensions

The designation of shapes and dimensions shall be in accordance with Table 2.

Table 2 — Designation of shapes and dimensions

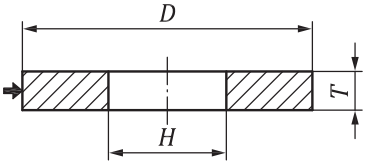
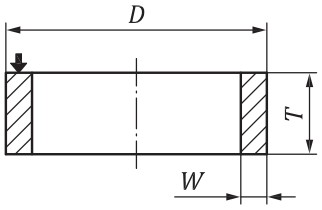
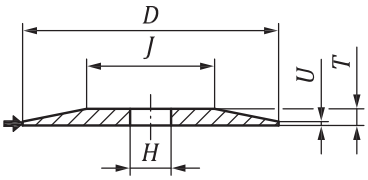
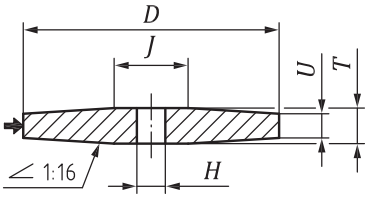
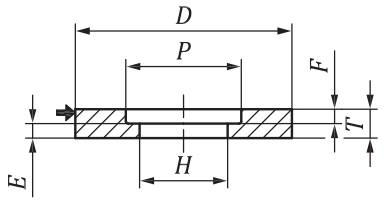
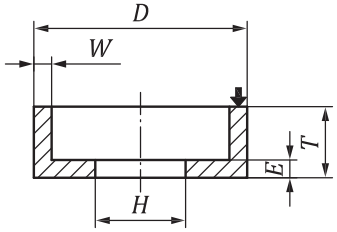
Type number	Illustration	Designation of shapes and dimensions	International Standard reference number	
			NOTE Information on dimensions can be found in the International Standards listed in this column. It is not compulsory to follow the dimensions given there in order to fulfil the requirements of this International Standard.	
1		Straight grinding wheel Type 1 profile[a] $D \times T \times H$	ISO 603-1 603-2 603-3 603-4 603-6	ISO 603-7 603-8 603-9 603-12 603-18
2		Cylinder wheel, cemented or clamped Type 2 $D \times T \times W$	ISO 603-5	
3		Wheel tapered on one side Type 3 $D/J \times T \times H$	ISO 603-6	
4		Wheel tapered on both sides Type 4 $D \times T \times H$	ISO 603-12	
5		Wheel, recessed on one side Type 5 profile[a] $D \times T \times H - P \times F$	ISO 603-1 603-2 603-3	ISO 603-4 603-6 603-7
6		Straight cup wheel Type 6 $D \times T \times H - W \times E$	ISO 603-5 603-6 603-7	ISO 603-13 603-14 603-18

Table 2 *(continued)*

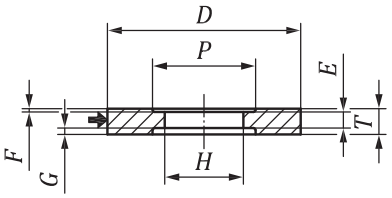
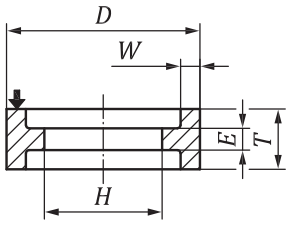
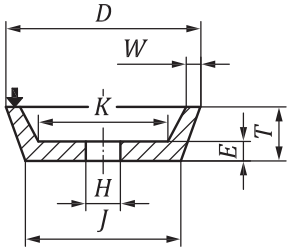
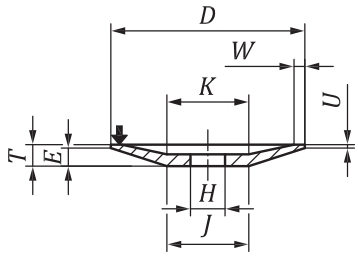
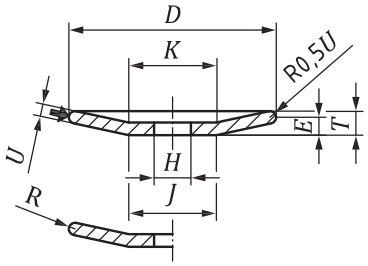
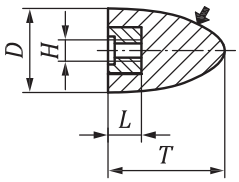
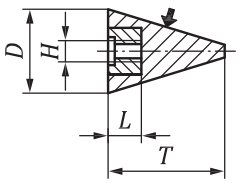
Type number	Illustration	Designation of shapes and dimensions	International Standard reference number
7		Wheel recessed on both sides Type 7 profile[a] $D \times T \times H - P \times F/G$	ISO 603-1 ISO 603-2 ISO 603-4 ISO 603-6
9		Double cup wheel Type 9 $D \times T \times H - W \times E$	–
11		Taper cup wheel Type 11 $D/J \times T \times H - W \times E$	ISO 603-6 ISO 603-14
12		Dish wheel Type 12 $D/J \times T \times H$	ISO 603-6
13		Saucer Type 13 $D/J \times T/U \times H - K$	–
16		Tapered cone, curved sides Type 16 $D \times T - H \times L$	ISO 603-12
17		Tapered cone, straight sides, square tip Type 17 $D \times T - H \times L$	ISO 603-12

Table 2 *(continued)*

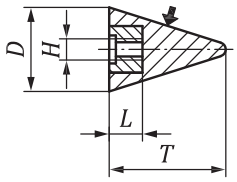
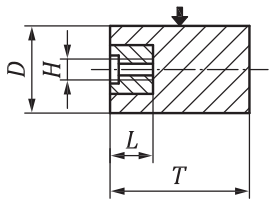
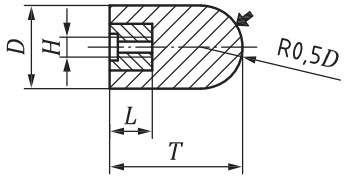
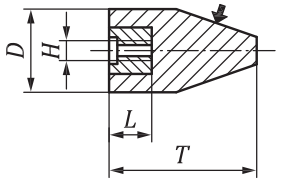
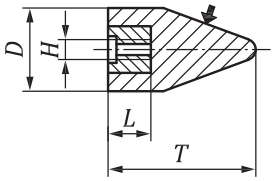
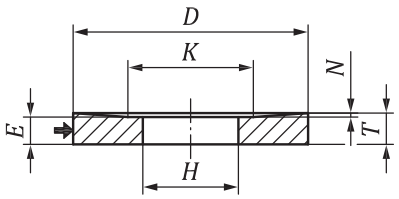
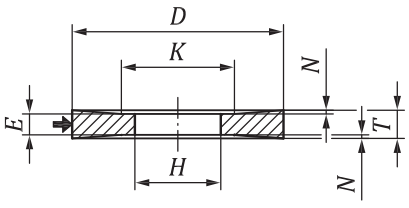
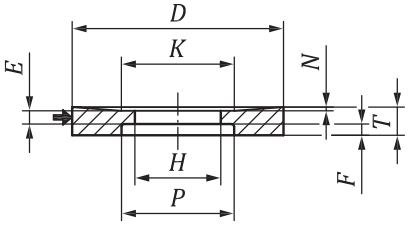
Type number	Illustration	Designation of shapes and dimensions	International Standard reference number
17R		Tapered cone, straight sides, rounded tip Type 17R $D \times T - H \times L$	ISO 603-12
18		Cylindrical plug, flat tip Type 18 $D \times T - H \times L$	ISO 603-12
18R		Cylindrical plug, round tip Type 18R $D \times T - H \times L$	ISO 603-12
19		Plug, conical end, square tip Type 19 $D \times T - H \times L$	ISO 603-12
19R		Plug, conical end, rounded tip Type 19R $D \times T - H \times L$	ISO 603-12
20		Wheel relieved on one side Type 20 $D/K \times T/N \times H$	ISO 603-1 ISO 603-4
21		Wheel relieved on both sides Type 21 $D/K \times T/N \times H$	ISO 603-1 ISO 603-4
22		Wheel relieved on one side, recessed on the other side Type 22 $D/K \times T/N \times H - P \times F$	ISO 603-1 ISO 603-4

Table 2 *(continued)*

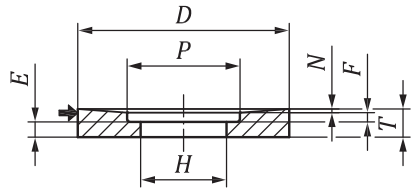
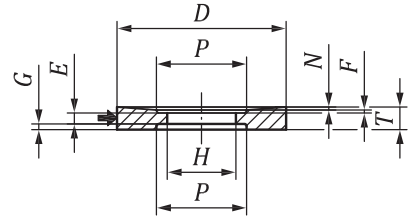
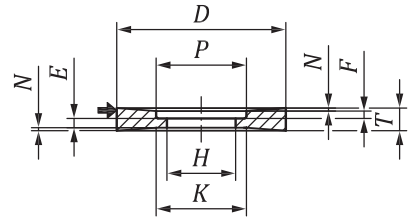
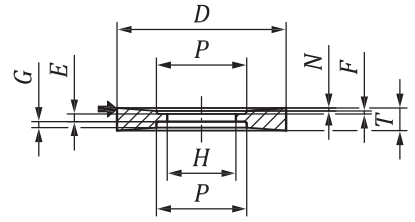
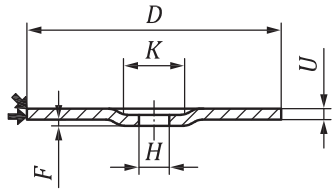
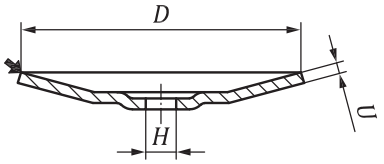
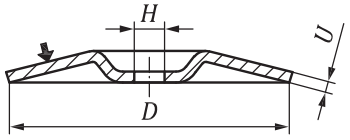
Type number	Illustration	Designation of shapes and dimensions	International Standard reference number
23		Wheel relieved and recessed on one side Type 23 $D \times T/N \times H - P \times F$	ISO 603-1 ISO 603-4
24		Wheel relieved and recessed on one side, recessed on the other side Type 24 $D \times T/N \times H - P \times F/G$	ISO 603-1 ISO 603-4
25		Wheel relieved and recessed on one side, relieved on the other side Type 25 $D/K \times T/N \times H - P \times F$	ISO 603-1 ISO 603-4
26		Wheel relieved and recessed on both sides Type 26 $D/K \times T/N \times H - P \times F/G$	ISO 603-1 ISO 603-4
27		Depressed centre wheel for grinding or grinding/cutting including semi-flexible wheels Type 27 $D \times U \times H$	ISO 603-14
28		Depressed centre grinding wheel Cone-shaped Type 28 $D \times U \times H$	ISO 603-14
29		Flexible depressed centre grinding wheel Type 29 $D \times U \times H$	ISO 603-14

Table 2 *(continued)*

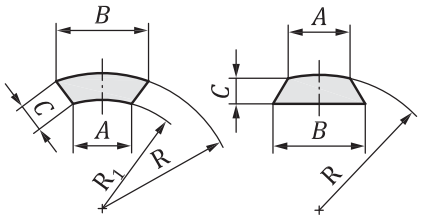
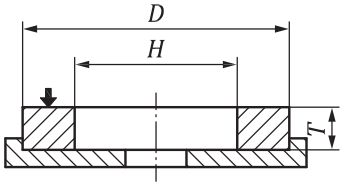
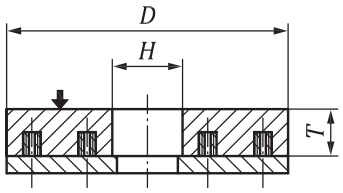
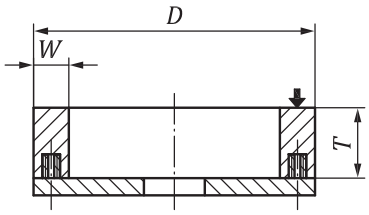
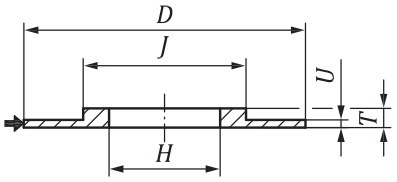
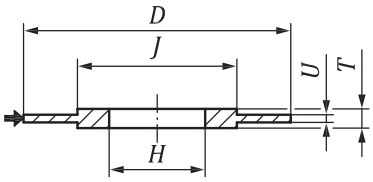
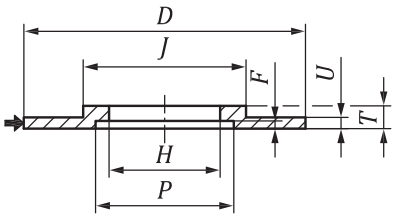
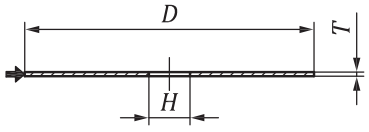
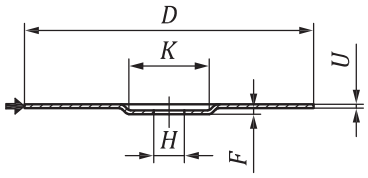
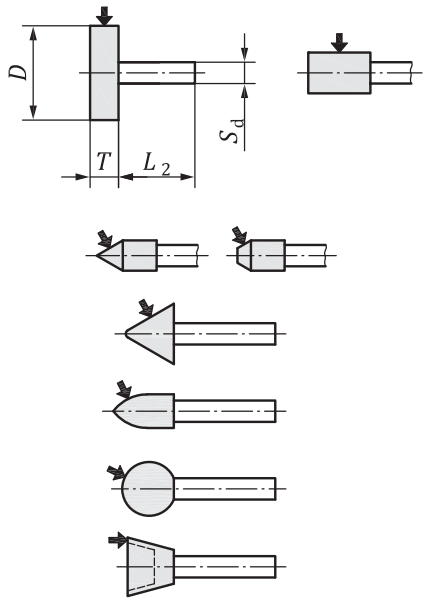
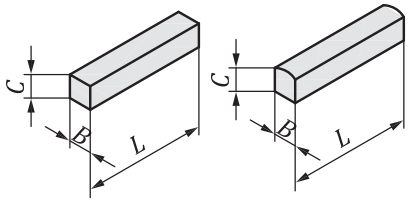
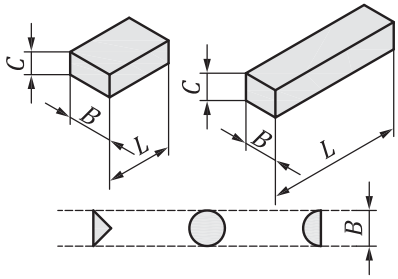
Type number	Illustration	Designation of shapes and dimensions	International Standard reference number
31		Segments Type 31 $B/A \times C \times L$	ISO 603-5
35		Disc wheel, cemented or clamped Type 35 $D \times T \times H$	ISO 603-5 ISO 603-7 ISO 603-13 ISO 603-18
36		Inserted nut disc Type 36 $D \times T \times H$ – inserts[b]	ISO 603-5 ISO 603-7 ISO 603-13
37		Inserted nut cylinder Type 37 $D \times T \times W$ – inserts[b]	ISO 603-5 ISO 603-7
38		Single hubbed wheel Type 38 profile[a] $D/J \times T/U \times H$	ISO 603-1 ISO 603-4
39		Double hubbed wheel Type 39 profile[a] $D/J \times T/U \times H$	ISO 603-1 ISO 603-4
40		Wheel with single hub and a single recess on the other side Type 40 $D/J \times T/U \times H - P \times F$	–
41		Flat cutting-off wheel Type 41 $D \times T \times H$	ISO 603-15 ISO 603-16

Table 2 *(continued)*

Type number	Illustration	Designation of shapes and dimensions	International Standard reference number
42		Depressed centre cutting-off wheel Type 42 $D \times U \times H$	ISO 603-15 ISO 603-16
52		Mounted points and wheels Type 52 $D \times T \times S_d$	ISO 603-17
54		Honing stones Type 54 $B \times C \times L$	ISO 603-10
90		Sticks and stones Type 90 $B \times C \times L$	ISO 603-11

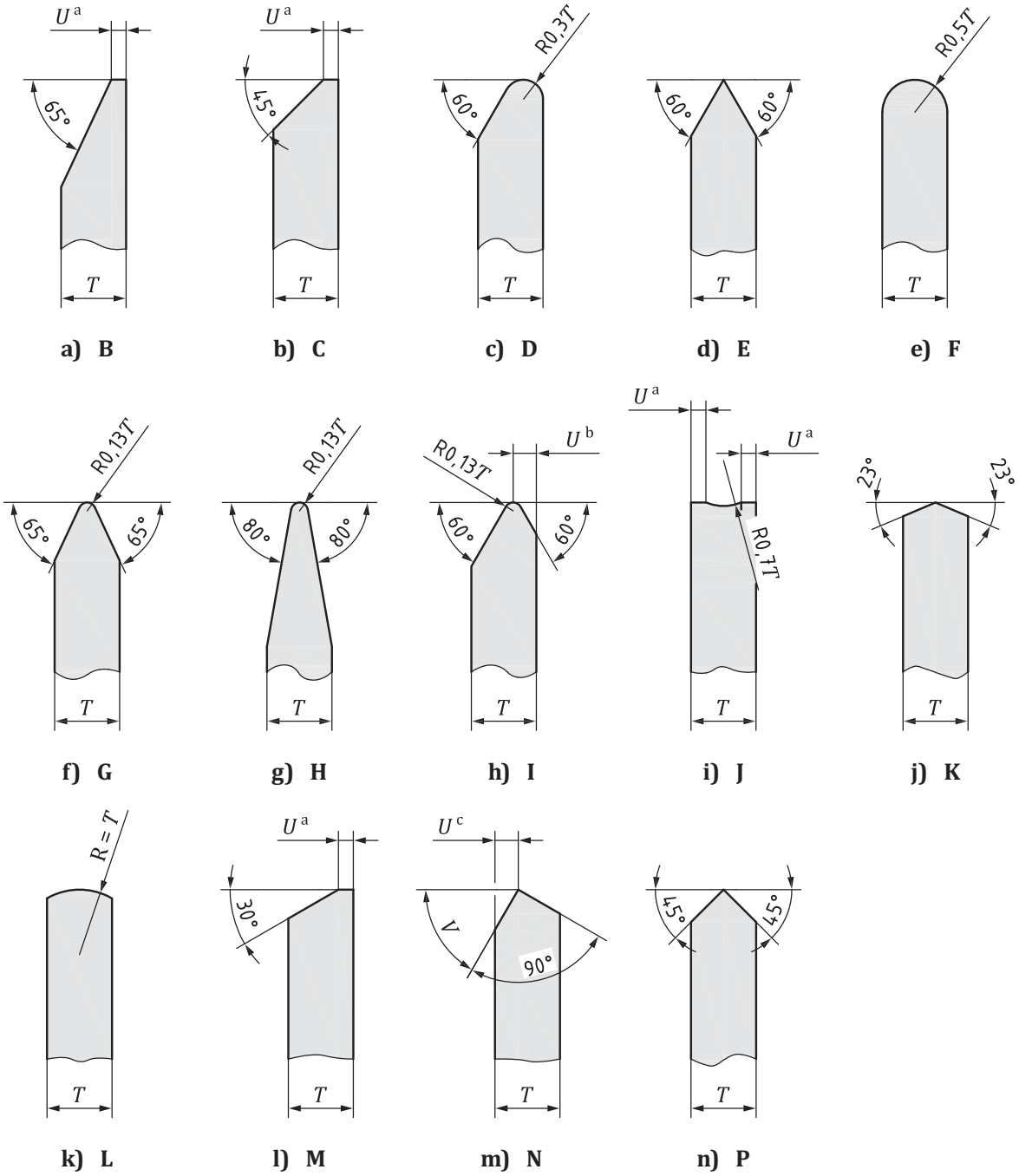
NOTE The illustrations shown for forms 29, 31, 52, 54 and 90 are only examples.

a Profile, where appropriate, see 4.2.

b For size and position of inserts, refer to ISO 603-5, ISO 603-7 and ISO 603-13.

4.2 Profiles

Straight wheels, such as recessed on one or both sides and simple or double hubbed wheels can have a shaped profile on their periphery. Some of these profiles are standardized and are specified by a letter which immediately follows the type number (see Figure 1).



a) B **b) C** **c) D** **d) E** **e) F**

f) G **g) H** **h) I** **i) J** **j) K**

k) L **l) M** **m) N** **n) P**

[a] $U = 0{,}25 \times T$ (up to 3,2mm maximum) unless otherwise specified.

[b] $U = 0{,}33 \times T$.

[c] For profile N, U and V shall be specified.

Figure 1 — Standard peripheral shapes

5 Requirements

5.1 Dimensions

Common dimensions of bonded abrasives are given in the ISO 603 series.

5.2 Limit deviations and tolerances

Limit deviations and tolerances shall be in accordance with ISO 13942.

5.3 Permissible unbalance

Permissible unbalance shall be in accordance with ISO 6103.

5.4 Specification mark

5.4.1 General

Marking according to Clause 6 shall follow the example given in Table 3 with the explanations given in 5.4.2 to 5.4.9.

Table 3 — Example of specification mark

51	**A**	**36**	**1**	**L**	**5**	**V**	**23**
Optional	**Mandatory**	**Mandatory**	Optional	**Mandatory**	Optional	**Mandatory**	Optional
Mixture of abrasive types	**Main abrasive type**	**Main abrasive grain size**	Mixture of abrasive grain sizes	**Grade of hardness**	Structure or porosity	**Bond type**	Manufacturer's special code

5.4.2 Mixture of abrasive types

An optional manufacturer's code shall be used to denote mixtures of the same abrasive type such as white aluminium oxide and brown aluminium oxide.

5.4.3 Abrasive type

The standard recommended code letter specified in Table 4 shall be used to denote the three basic abrasive types:

Table 4 — Basic abrasive types

A	Aluminium oxide
C	Silicon carbide
Z	Zirconia alumina

Special abrasives types may be coded using a manufacturer's personal code.

5.4.4 Abrasive grain size

The standard mandatory code number specified in Table 5 shall be used to denote abrasive grit or grain size.

Table 5 — Abrasive grain size

Macrogrits F4 to F220 in accordance with ISO 8486-1			Microgrits F230 to F2000 in accordance with ISO 8486-2
Coarse	**Medium**	**Fine**	**Very fine**
4	30	70	230
5	36	80	240
6	40	90	280
7	46	100	320
8	54	120	360
10	60	150	400
12		180	500
14		220	600
16			800
20			1000
22			1200
24			1500
			2000

5.4.5 Mixtures of abrasive grain sizes (grit combination)

The optional manufacturer's code, usually a number from 1 to 9, shall be used to denote mixtures of abrasive grain sizes.

5.4.6 Grade of hardness

The mandatory manufacturer's code letter specified in Table 6 shall be used to denote wheel hardness, A being the softest, Z being the hardest.

Table 6 — Grade of hardness

A	B	C	D	Extremely soft
E	F	G	–	Very soft
H	I	J	K	Soft
L	M	N	O	Medium
P	Q	R	S	Hard
T	U	V	W	Very hard
X	Y	Z	–	Extremely hard

5.4.7 Structure or porosity

The optional standard code number shall be used to denote structure or porosity, usually 0 to 99. The higher the number, the more "open" the structure and the greater the porosity. Higher numbers indicate extremely open structures.

5.4.8 Bond type

The mandatory standard code letter(s) specified in Table 7 shall be used to denote bond type.

Table 7 — Bond types

B	Resinoid and other thermosetting organic bonds
BF	Reinforced resinoid bond
E	Shellac bond
MG	Magnesite bond
PL	Thermoplastic bonds
R	Rubber bond
RF	Reinforced rubber bond
V	Vitrified bond

5.4.9 Manufacturer's special code

The optional manufacturer's code, comprising numbers and/or letters, shall be used to denote special features of the product (impregnation, reinforced centre, slots, etc.).

6 Marking

All abrasive products shall be marked with the following information necessary for correct identification and to ensure correct procedures for handling, storing, mounting and use.

The minimum information required is as follows:

a) name of manufacturer, supplier or importer or the registered trademark;

b) dimensions, in millimetres (mm);

c) specification mark, see Table 3;

d) maximum operating speed, in metres per second (m/s) (not mandatory for segments and spindle mounted points);

e) maximum permissible rotational frequency of the unused abrasive product in revolutions per minute (r/min or min^{-1}), not mandatory for segments;

f) traceability code, e.g. a production/batch number, expiry date or date of manufacture or series number;

g) expiry date for resinoid wheels used on hand-held machines, e.g. "04/2011".

Optional additional marking, such as ISO type number according to Table 2, may be made.

For wheels greater than 80 mm in diameter, the marking shall appear on the wheel or on a label or blotter firmly attached to the wheel.

For wheels 80 mm in diameter and under, and for products where it is not possible for the marking to appear on the wheel, the details shall be printed on a label attached to every package. In these cases, where possible, at least the maximum operating speed in revolutions per minute (r/min or min^{-1}) should be marked on the product.

Bibliography

[1] ISO 603-1, *Bonded abrasive products — Dimensions — Part 1: Grinding wheels for external cylindrical grinding between centres*

[2] ISO 603-2, *Bonded abrasive products — Dimensions — Part 2: Grinding wheels for centreless external cylindrical grinding*

[3] ISO 603-3, *Bonded abrasive products — Dimensions — Part 3: Grinding wheels for internal cylindrical grinding*

[4] ISO 603-4, *Bonded abrasive products — Dimensions — Part 4: Grinding wheels for surface grinding/peripheral grinding*

[5] ISO 603-5, *Bonded abrasive products — Dimensions — Part 5: Grinding wheels for surface grinding/face grinding*

[6] ISO 603-6, *Bonded abrasive products — Dimensions — Part 6: Grinding wheels for tool and tool room grinding*

[7] ISO 603-7, *Bonded abrasive products — Dimensions — Part 7: Grinding wheels for manually guided grinding*

[8] ISO 603-8, *Bonded abrasive products — Dimensions — Part 8: Grinding wheels for deburring and fettling/snagging*

[9] ISO 603-9, *Bonded abrasive products — Dimensions — Part 9: Grinding wheels for high-pressure grinding*

[10] ISO 603-10, *Bonded abrasive products — Dimensions — Part 10: Stones for honing and superfinishings*

[11] ISO 603-11, *Bonded abrasive products — Dimensions — Part 11: Hand finishing sticks*

[12] ISO 603-12, *Bonded abrasive products — Dimensions — Part 12: Grinding wheels for deburring and fettling on a straight grinder*

[13] ISO 603-13, *Bonded abrasive products — Dimensions — Part 13: Grinding wheels for deburring and fettling on a vertical grinder*

[14] ISO 603-14, *Bonded abrasive products — Dimensions — Part 14: Grinding wheels for deburring and fettling/snagging on an angle grinder*

[15] ISO 603-15, *Bonded abrasive products — Dimensions — Part 15: Grinding wheels for cutting-off on stationary or mobile cutting-off machines*

[16] ISO 603-16, *Bonded abrasive produtcs — Dimensions — Part 16: Grinding wheels for cutting-off on hand held power tools*

[17] ISO 603-17, *Bonded abrasive products — Dimensions — Part 17: Spindle mounted wheels*

[18] ISO 603-18, *Bonded abrasive products — Dimensions — Part 18: Grinding wheels for flat glass edge grinding machines*

ICS 25.100.70

Price based on 13 pages