INTERNATIONAL STANDARD

ISO 13942

First edition
2000-12-15

Bonded abrasive products — Limit deviations and run-out tolerances

Produits abrasifs agglomérés — Écarts limites et tolérances de battement

Reference number
ISO 13942:2000(E)

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Printed in Switzerland

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 13942 was prepared by Technical Committee ISO/TC 29, *Small tools*, Subcommittee SC 5, *Grinding wheels and abrasives*.

Bonded abrasive products — Limit deviations and run-out tolerances

1 Scope

This International Standard specifies the essential limit deviations and run-out tolerances, in millimeters, for bonded abrasive products as specified in ISO 603-1 to ISO 603-16.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 286-1:1988, *ISO system of limits and fits — Part 1: Bases of tolerances, deviations and fits*.

ISO 286-2:1988, *ISO system of limits and fits — Part 2: Tables of standard tolerance grades and limit deviations for holes and shafts*.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

3 Terms and definitions

For the purposes of this International Standard, the following terms and definitions apply.

For further terms and definitions, see also ISO 286-1. It should be noted that some of the terms are defined in a more restricted sense than in common usage.

3.1
shaft
external feature of a workpiece, including features which are not cylindrical

3.2
hole
internal feature of a workpiece, including features which are not cylindrical

3.3
size
number, expressing in a particular unit, the numerical value of a linear dimension

3.3.1
basic size
nominal size
size from which the limits of size are derived by the application of the upper and lower deviations

NOTE The basic size can be a whole number or a decimal number, e.g. 32; 15; 8,75; 0,5 etc.

3.3.2
actual size
size of a feature, obtained by measurements

3.3.3
limits of size
the two extreme permissible sizes of a feature, between which the actual size should lie, the limits of size being included

3.3.3.1
maximum limit of size
greatest permissible size of a feature

3.3.3.2
minimum limit of size
smallest permissible size of a feature

3.4
deviation
algebraic difference between a size (actual size, limit of size, etc.) and the corresponding basic size

NOTE Symbols for shaft deviations are lower case letters (*es*, *ei*) and symbols for hole deviations are upper case letters (*ES*, *EI*).

3.4.1
limit deviations
upper deviation and lower deviation

3.4.1.1
upper deviation
ES, *es*
algebraic difference between the maximum limit of size and the corresponding basic size

3.4.1.2
lower deviation
EI, *ei*
algebraic difference between the minimum limit of size and the corresponding basic size

3.5
size tolerance
difference between the maximum limit of size and the minimum limit of size, i.e. the difference between the upper deviation and the lower deviation

NOTE The tolerance is an absolute value without sign.

4 Symbols and designations

See Table 1.

Table 1 — Symbols and designations

Symbol of dimension	Designation	Symbol of limit deviation
A	Smallest width of a trapezoidal segment	T_A
B	Width of a segment, stick or stone	T_B
C	Thickness of a segment, stick or stone	T_C
D	Outside diameter of abrasive products	T_D
E	Thickness at bore of cup, dish, recessed and relieved wheels	T_E
F	Depth of the 1st recess	—
G	Depth of the 2nd recess	—
H	Abrasive product bore diameter, thread diameter of wheels with threaded insert	T_H
H_1	Diameter of counterbore	T_{H1}
J	Smallest diameter of taper cup wheel, dish wheels, tapered and hubbed wheels	—
K	Internal diameter of recess of taper cup wheel and dish wheels	T_K
L	Length of segments, length of thread bore of wheels with threaded insert, sticks and stones	T_L
N	Depth of the relief	—
P	Recessed diameter	—
R	Radius of recessed grinding wheels, segments, cones and plugs	T_R
T	Overall thickness	T_T
U	Smallest thickness of tapered, hubbed and depressed centre wheels, e.g. in Type 4 or Type 38	T_U
W	Rim width of cups, cylinders and dishes	T_W
—	Axial run-out tolerance	T_{PL}
—	Radial run-out tolerance	T_{RL}

5 Straight grinding wheels, recessed, relieved and hubbed wheels

5.1 Types involved

Types 1, 3, 4, 5, 7, 20 to 26, 38 and 39. See Figures 1 to 5.

Type 1

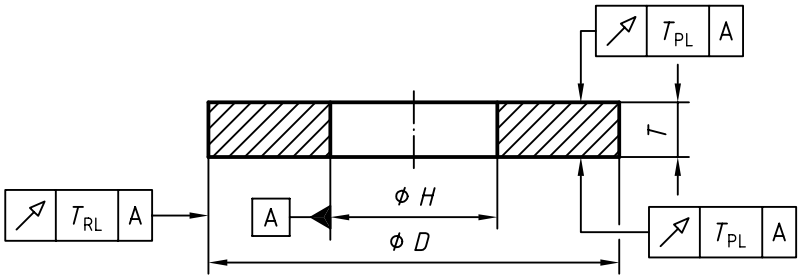

Figure 1 — Straight grinding wheel, e.g. as specified in ISO 603-1

Type 5

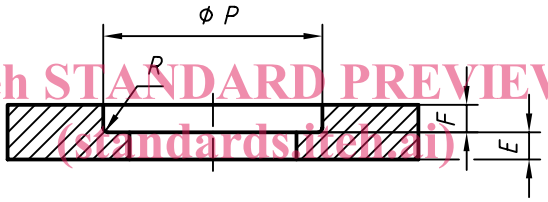

Figure 2 — Grinding wheel recessed on one side, e.g. as specified in ISO 603-1

Type 7

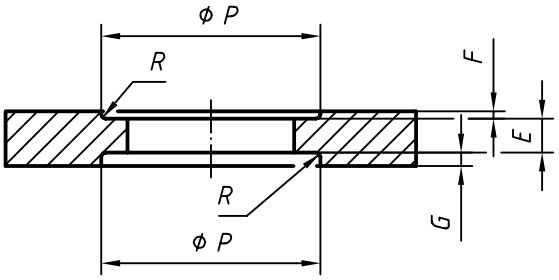

Figure 3 — Grinding wheel recessed on both sides, e.g. as specified in ISO 603-1

Type 38

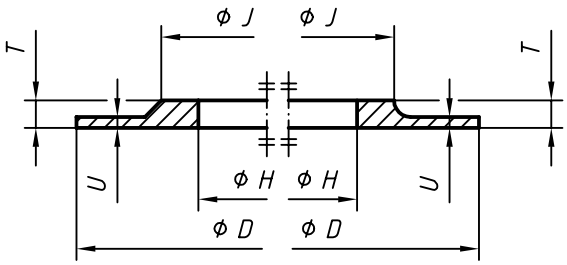

Figure 4 — Hubbed wheel, e.g. as specified in ISO 603-1

Type 39

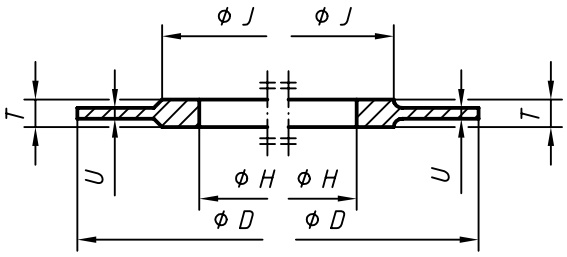

Figure 5 — Double hubbed wheel, e.g. as specified in ISO 603-1

5.2 Straight grinding wheels for general applications

5.2.1 Limit deviations T_D of the outside diameter, axial run-out tolerance T_{PL} and radial run-out tolerances, T_{RL}

The limit deviations of the outside diameter, the axial run-out tolerances, T_{PL} and the radial run-out tolerances, T_{RL} as specified in Table 2 apply to the respective range of diameters D.

Table 2 — Limit deviations for outside diameters and run-out tolerances

D	T_D	T_{PL}	T_{RL}
$3 \leqslant D \leqslant 8$	± 0,5	—	0,3
$8 < D \leqslant 20$	± 0,8	0,2	0,3
$20 < D \leqslant 50$	± 1,2	0,2	0,3
$50 < D \leqslant 125$	± 2	0,2	0,4
$125 < D \leqslant 300$	± 3,2	0,3	0,5
$300 < D \leqslant 762$	± 5	0,3	0,6
$762 < D \leqslant 2\,000$	± 8	0,4	0,8

5.2.2 Limit deviations T_H of the hole diameter

The limit deviations of the hole diameters $H > 30$ mm correspond to the tolerance class H11 as specified in ISO 286-2:1988, Table 6. For hole diameters $H < 30$ mm, the limit deviations are larger than H11 for technical reasons of manufacture. The limit deviations of hole diameters are given in Table 3.

Table 3 — Limit deviations for hole diameters

H	T_H
$1{,}6 \leqslant H \leqslant 50$	$^{+0{,}16}_{0}$
$50 < H \leqslant 80$	$^{+0{,}19}_{0}$
$80 < H \leqslant 180$	$^{+0{,}25}_{0}$
$180 < H \leqslant 250$	$^{+0{,}29}_{0}$
$250 < H \leqslant 315$	$^{+0{,}32}_{0}$
$315 < H \leqslant 400$	$^{+0{,}36}_{0}$
$400 < H \leqslant 500$	$^{+0{,}4}_{0}$
$500 < H$	$^{+0{,}44}_{0}$

5.2.3 Limit deviations T_P of the recess diameter and assignment of radii R

The limit deviations T_P of the recess diameter as specified in Table 4 apply to the respective range of diameters P.

The values for the radii R in the recess are a function of the recess diameter P and are maximum dimensions.

Table 4 — Limit deviations for recess diameters and recess radii

P	T_P	R max.
$3{,}2 \leqslant P \leqslant 8$	$^{+0{,}8}_{0}$	0,8
$8 < P \leqslant 20$	$^{+1{,}2}_{0}$	1,2
$20 < P \leqslant 50$	$^{+2}_{0}$	2
$50 < P \leqslant 125$	$^{+3{,}2}_{0}$	3,2
$125 < P \leqslant 315$	$^{+5}_{0}$	5
$315 < P \leqslant 900$	$^{+8}_{0}$	8

