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Superabrasives — Limit deviations and run-out tolerances for grinding wheels with diamond or cubic boron nitride

Superabrasifs — Écarts limites et tolérances de battement pour les meules à base de diamant et de nitrure de bore

Reference number
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Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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 document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 22917 was prepared by Technical Committee ISO/TC 29, *Small tools*, Subcommittee SC 5, *Grinding wheels and abrasives*.

Superabrasives — Limit deviations and run-out tolerances for grinding wheels with diamond or cubic boron nitride

1 Scope

This International Standard applies to all rotating grinding tools with diamond or cubic boron nitride with metal, vitrified or resinoid bonded cores, and circular bores for mounting the grinding tool on a clamping flange as well as to grinding points with cylindrical spindle for mounting in collets. It contains the significant limit deviations and run-out tolerances of these grinding tools.

2 Normative references

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

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*

3 Terms and definitions

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

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

3.1
size
number expressing, in a particular unit, the numerical value of a linear dimension

3.1.1
basic size
nominal size
size from which the limits of size are derived by the application of the upper and lower deviations

3.1.2
actual size
size of a feature, obtained by measurements

3.1.3
limits of size
two extreme permissible sizes of a feature, between which the actual size should lie, the limits of size being included

3.1.3.1
maximum limit of size
greatest permissible size of a feature

3.1.3.2
minimum limit of size
smallest permissible size of a feature

3.2
deviation
algebraic difference between a size (actual size, limit of size, etc.) and the corresponding basic size

3.2.1
limit deviations
upper deviation and lower deviation

3.2.1.1
upper deviation
algebraic difference between the maximum limit of size and the corresponding basic size

3.2.1.2
lower deviation
algebraic difference between the minimum limit of size and the corresponding basic size

3.3
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 Limit deviations and run-out tolerance abbreviations

See Table 1.

Table 1 — Limit deviations and run-out tolerance abbreviations

Symbol	Designation	
	Abrasive product	Mounted points
T_D	Limit deviations of outside diameter	Limit deviations of outside diameter
T_E	Limit deviations of thickness at bore	
T_H	Limit deviations of bore diameter	
T_J	Limit deviations of contact surface diameter	
T_K	Limit deviations of recess diameter	
T_L		Limit deviations of overall length
T_{L4}		Limit deviations of reduced length of spindle
T_{PL}	Limit deviations of circular run-out tolerance, axial	
T_R	Limit deviations of the radii	
T_{RL}	Limit deviations of circular run-out tolerance, radial	Limit deviations of circular run-out tolerance, radial
T_{Sd}		Limit deviations of spindle diameter
T_{S1}		Limit deviations of reduced diameter of spindle
T_T	Limit deviations of overall thickness	Limit deviations of thickness
T_U	Limit deviations of thickness of superabrasive section	
T_W	Limit deviations of rim width	
T_X	Limit deviations of depth of superabrasive section	Limit deviations of depth of superabrasive section
T_α	Limit deviations of angles	

5 Straight, recessed, tapered and hubbed grinding wheels

5.1 Grinding wheels for peripheral grinding

5.1.1 Designations

See Table 2.

Table 2

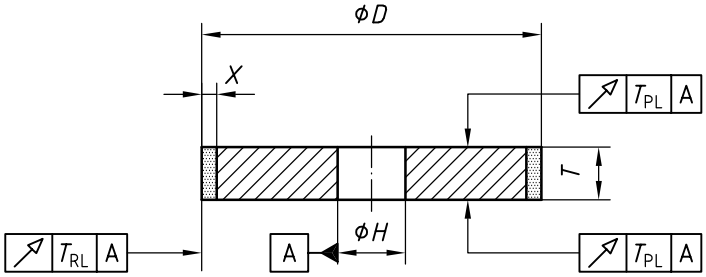
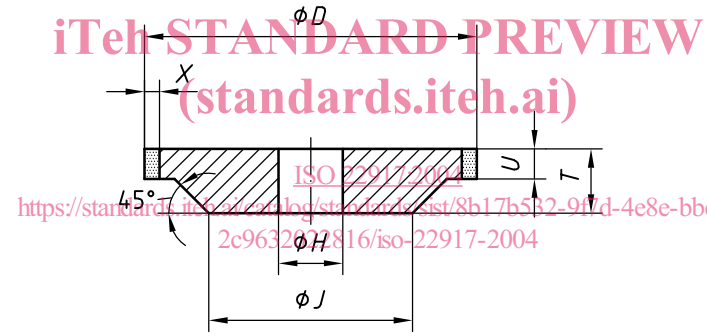
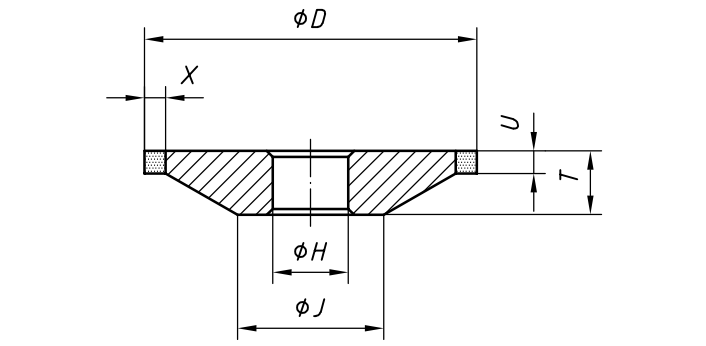
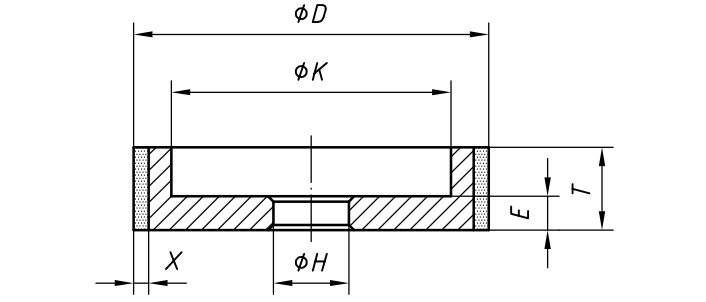
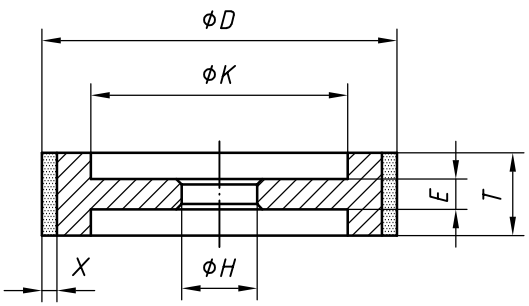
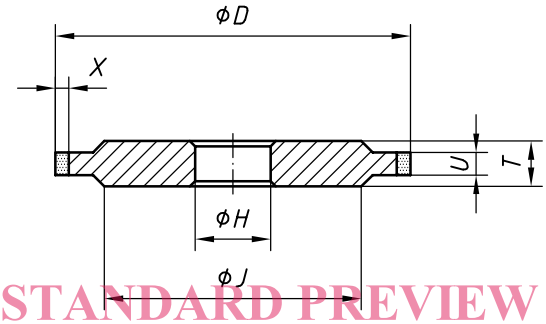
Designation	Sketch	Basic core shape
Straight grinding wheel		1
Hubbed wheel		3
Tapered wheel		4
Grinding wheel recessed on one side		6

Table 2 (*continued*)

Designation	Sketch	Basic core shape
Grinding wheel recessed on both sides		9
Double hubbed wheel		14

5.1.2 Limit deviations and run-out tolerances for grinding wheels for peripheral grinding

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

The limit deviations T_D of the outside diameter, the circular run-out tolerance, axial T_{PL}, and circular run-out tolerance, radial T_{RL}, as specified in Table 3, apply to the respective range of diameters D.

Table 3

Dimensions in millimetres

Outside diameter D	T_D	T_{PL}	T_{RL}
$D \leqslant 3$	± 0,1	0,05	0,03
$3 < D \leqslant 6$	± 0,15		
$6 < D \leqslant 30$	± 0,2		
$30 < D \leqslant 120$	± 0,3		
$120 < D \leqslant 400$	± 0,5		0,05
$D > 400$	± 0,8		

5.1.2.2 Limit deviations T_H of the hole diameter

The limit deviations T_H of the hole diameters, as specified in Table 4, correspond to the tolerance zone H7 in accordance with ISO 286-2:1988, Table 6, and apply to the respective range of hole diameters H.

Table 4

Dimensions in millimetres

Bore diameter H	T_H
$H \leqslant 3$	$^{+0,010}_{0}$
$3 < H \leqslant 6$	$^{+0,012}_{0}$
$6 < H \leqslant 10$	$^{+0,015}_{0}$
$10 < H \leqslant 18$	$^{+0,018}_{0}$
$18 < H \leqslant 30$	$^{+0,021}_{0}$
$30 < H \leqslant 50$	$^{+0,025}_{0}$
$50 < H \leqslant 80$	$^{+0,030}_{0}$
$80 < H \leqslant 120$	$^{+0,035}_{0}$
$120 < H \leqslant 180$	$^{+0,040}_{0}$
$180 < H \leqslant 250$	$^{+0,046}_{0}$
$250 < H \leqslant 315$	$^{+0,052}_{0}$
$315 < H \leqslant 400$	$^{+0,057}_{0}$
$400 < H \leqslant 500$	$^{+0,063}_{0}$

5.1.2.3 Limit deviations T_T of overall thickness and T_U of thickness of superabrasive section

The limit deviations T_T of the overall thickness and T_U of the thickness of the superabrasive section, as specified in Table 5, apply to the respective ranges of thickness T and U.

Table 5

Dimensions in millimetres

Thicknesses T and U	T_T	T_U
T or $U < 30$	± 0,2	± 0,2
$30 < T$ or $U \leqslant 120$	± 0,5	± 0,3
$120 < T$ or $U \leqslant 400$	± 0,8	± 0,5
$400 < T$ or $U \leqslant 500$	± 1,0	± 0,8

5.1.2.4 Limit deviations T_X of depth of superabrasive section

The limit deviations T_X of the depth of superabrasive section, as specified in Table 6, apply to the respective range of depths of the superabrasive section X.

Table 6

Dimensions in millimetres

Depth of superabrasive section X	T_X [a]
$0,5 \leqslant X \leqslant 1$	$^{+0,2}_{0}$
$1 < X \leqslant 6$	$^{+0,2}_{-0,1}$
$6 < X \leqslant 30$	$^{+0,3}_{-0,2}$

[a] Excluding electroplated single layer.

5.1.2.5 Limit deviations T_E of thickness at bore

For grinding wheels with one recess (see type 6), or grinding wheels with two recesses (see type 9), the limit deviations T_E of thickness at bore, as specified in Table 7, apply to the respective range of thickness at bore E.

Table 7

Dimensions in millimetres

Thickness at bore E	T_E
$E \leqslant 6$	± 0,1
$6 < E \leqslant 30$	± 0,2
$30 < E \leqslant 120$	± 0,3

5.1.2.6 Limit deviations T_J of contact surface diameter and T_K of recessed diameter

The limit deviations T_J of contact surface diameter (see types 3, 4, 14) and T_K of the recessed diameter (see types 6, 9), as specified in Table 8, apply to the respective range of outside diameters D.

Table 8

Dimensions in millimetres

Outside diameter D	T_J, T_K
$6 \leqslant D \leqslant 120$	± 1
$D > 120$	± 2