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STANDARD

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**666**

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**Machine tools — Mounting of plain  
grinding wheels by means of hub flanges**

**iTeh STANDARD PREVIEW**

*Machines-outils — Montage des meules plates par moyeux-flasques*

**(standards.iteh.ai)**

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Reference number  
ISO 666:1996(E)

## Foreword

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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.

International Standard ISO 666 was prepared by Technical Committee ISO/TC 29, *Small tools*, Subcommittee SC 5, *Grinding wheels and abrasives*.

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This second edition cancels and replaces the first edition (ISO 666:1975), which has been technically revised.

Annex A of this International Standard is for information only.

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# Machine tools — Mounting of plain grinding wheels by means of hub flanges

## iTeh STANDARD PREVIEW (standards.iteh.ai)

### 1 Scope

This International Standard specifies the essential dimensions and characteristics which allow the safe and efficient design and use of hub flanges with grinding wheels having bores larger than the machine spindle.

It is not applicable to cut-off wheels and to diamond or CBN grinding wheels with metal core.

### 2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 525:1986, *Bonded abrasive products — General — Designation, marking, range of outside diameters and tolerances.*

### ISO 666:1996 3 General

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Hub flanges are meant to position and drive grinding wheels without slippage under normal working conditions.

They shall be designed to remain undistorted and to exert an acceptable compression stress on the wheel when clamped as specified in the machine instruction book.

They are made up of two parts (see figure 1):

- a) a fixed flange locked on the machine shaft by keying, threading, interference fit or any equivalent system;
- b) a loose (or clamping) flange.

Each flange shall have an annular gripping rim with an undercut at its inner diameter to avoid exerting pressure too close to the wheel bore. The axial depth of this undercut shall not be less than 0,5 mm.

Remachining of the surface of the gripping rims may be needed after a certain time in service to correct distortions, remove burrs etc. The undercut may then also have to be remachined to keep its minimum depth at 0,5 mm.

The grinding machine instruction book shall accurately describe the possible remachining operations to maintain the minimum depth at 0,5 mm and a sufficient rigidity in the gripping rim.

To avoid interference with the screw head holes, the total thickness removed during remachining of the undercut shall not exceed 3 mm (see 4.6.2).

The two flanges, fixed and loose, shall have the same outside diameter and the same gripping rim surface.

The dimensions specified in this International Standard, together with the manufacturing requirements and checks to be made before use (see clause 5), have been determined taking into account the conditions necessary for ensuring safe assembly of the grinding wheel and the hub flanges, these being as follows:

- a) dimensions of gripping rim and thickness of flanges shall be calculated taking into consideration the following parameters:
  - maximum permissible pressure of the surface of the grinding tool,
  - power of the machine spindle,
  - maximum permissible unbalance of the grinding tool,
  - required pressure on the work piece (grinding pressure);
- b) the width of the gripping rim,  $R$ , shall be great enough to ensure a sufficient contact surface, but small enough to maintain a sufficient clamping pressure and to reduce the risks of abnormal stress due to imperfect flatness of the grinding wheel;
- c) the radial width,  $U$ , of the gripping rim undercut shall be at least 4 mm;
- d) the difference between the diameter of the recess of recessed grinding wheels and the external diameter,  $D_f$ , of the hub flange shall not be less than 10 mm and the flange shall never interface with the corner radius of the grinding wheel recess.

## 4 Manufacturing requirements

### 4.1 Gripping rim

The value,  $R$ , of the radial width of the gripping rim shall be calculated taking into consideration the maxi-

imum permissible pressure at the surface of the grinding tool. The tolerance of this shall be within  ${}_{-2}^0$  mm.

### 4.2 Thickness of flanges

The thickness of the flange,  $b$ , shall be determined by the manufacturer in such a way that the effective thickness at the point of maximum stress, after allowing, if necessary, for the depth of the balancing groove and screw head holes, will not create any significant distortion in normal use.

The values given in table 1 are for guidance only; they are for steel flanges with an elasticity limit of 800 MPa to 1 000 MPa used on common, medium power precision grinding machines (see note 1).

Other flange materials, power ratings or operations may require different values for  $b$  to be specified by the machine manufacturer.

NOTE 1 Power considered for the values of  $b$  in table 1 are as follows:

- 3 kW for wheel diameters 250 mm, 300 mm and 350 mm/356 mm;
- 5 kW for wheel diameters 400 mm/406 mm and 500 mm/508 mm;
- 15 kW for wheel diameters 600 mm/610 mm and 750 mm/762 mm;
- 30 kW for wheel diameters 900 mm/914 mm, 1 060 mm/1 067 mm and 1 250 mm.

### 4.3 Dimensions $L$ and $Q$ (see figure 1)

The dimension  $L$ , nominal diameter of the loose (or clamping) flange bore and  $Q$ , length of the fixed flange hub, are not standardized, as they are a function of the dimensions of the shaft end of the machine.

Nevertheless the following requirements shall be met:

- a) for dimension  $L$  a tolerance of grade 8 or finer, with fit H for the loose flange and f (or even e or d) for the fixed flange;
- b) for dimension  $Q$  a value at least 6 mm greater than the greatest thickness of the wheel to be gripped.

#### 4.4 Machining of the loose flange bore

In order to allow a certain freedom of self-orientation of the loose flange during gripping, the bore shall be machined with a cylindrical entry of diameter  $L$ , on the side of the wheel, of maximum length 5 mm followed by a small tapered or cylindrical part (see figure 1).

#### 4.5 Tolerances on $H$

The grinding wheel hole,  $H$ , shall always have a tolerance H or C according to ISO 525.

Loose flange: same nominal dimension,  $H$ , with tolerance a11.

Fixed flange: same nominal dimension,  $H$ , with tolerance f7 (or e7) for plain wheels for external cylindrical grinding and for surface grinding, d8 for plain fettling wheels.

#### 4.6 Clamping system

##### 4.6.1 General

Any system may be used provided the gripping force is evenly applied and does not distort the flanges and clamping is maintained.

The multiple screws system described in this International Standard is for guidance only and the values are given for applications corresponding to powers listed in 4.2.

##### 4.6.2 Clearance between screw head holes and loose flange spigot and undercut (see figure 1, detail A and variant on A)

To leave enough metal to resist to the clamping force developed by each screw, the following rules have been used to determine  $b$  min. and the screw ring diameter  $P$ :

- if  $A \geq 2$  mm (see figure 1, variant on A),  $B$  can have any value as there is no risk of interference with the undercut even if it is remachined;
- if  $A < 2$  mm (see figure 1, detail A),  $B$  shall be equal to or greater than 4 mm to allow a total metal removal of 3 mm when remachining the undercut (see clause 3).

#### 4.7 Gripping rim perpendicularity

The gripping rim shall be machined perpendicular to the rotational axis; it shall never be at an angle of more than  $90^\circ$  to the flange bearing surface. Any concave taper (angle of less than  $90^\circ$ ) shall not exceed 0,05 mm, measured between the outer and inner diameter of the rim.

#### 4.8 Bearing surface concentricity

Concentricity of bearing surfaces with the rotational axis: 0,05 mm.

#### 4.9 Gripping rim surface finish

The surface of the gripping rim shall be free from burrs.

The surface texture of the flange bearing surface shall be as follows:

- for flanges for fettling grinding wheels:  
 $3,2 \mu\text{m} \leq R_a \leq 6,3 \mu\text{m}$ ;
- for flanges for precision grinding wheels:  
 $0,8 \mu\text{m} \leq R_a \leq 1,6 \mu\text{m}$ .

#### 4.10 Marking

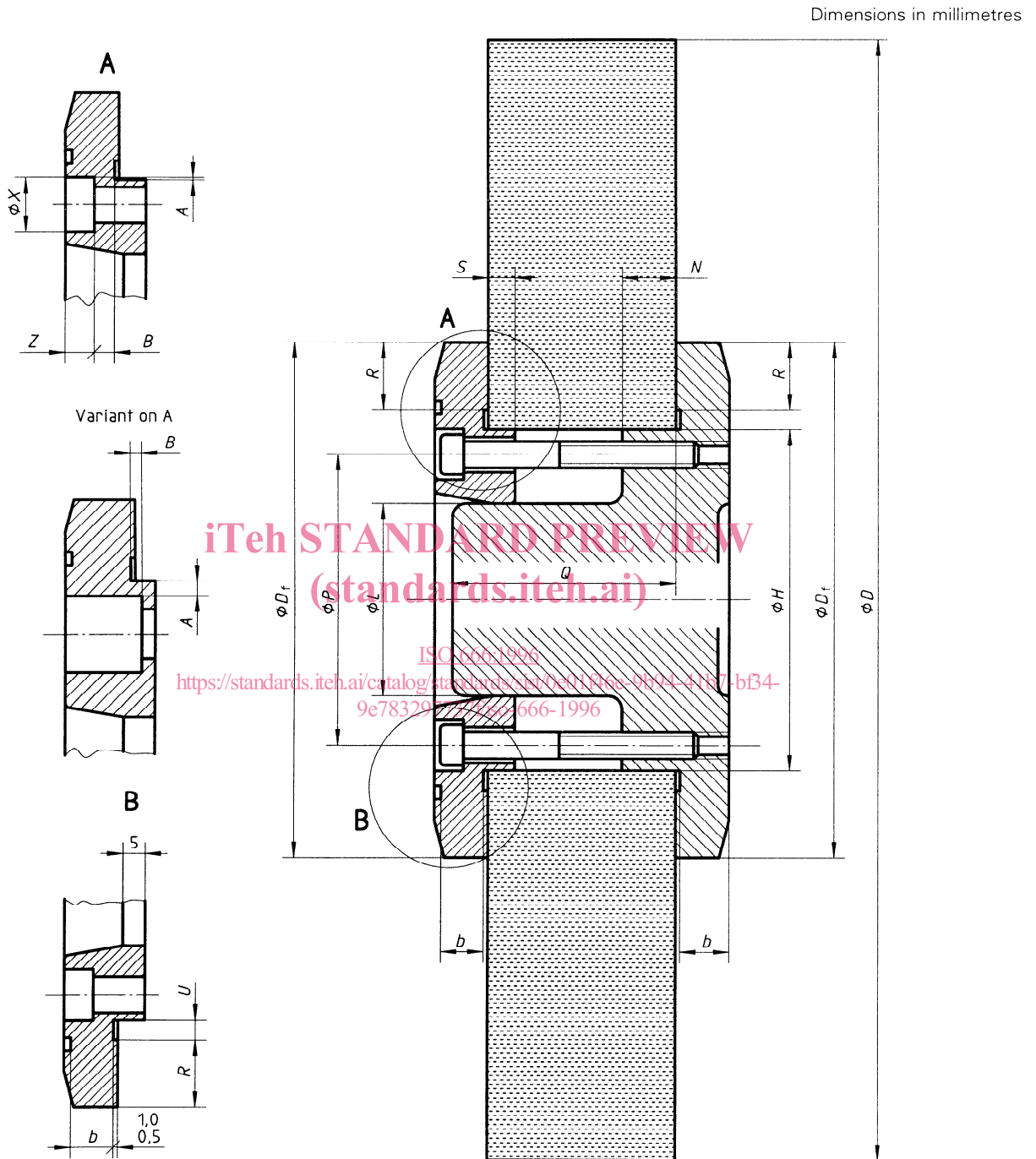
Each hub flange shall bear the following indications, visible before and after mounting the wheel:

- reference to this International Standard;
- maximum nominal outside diameter (OD) of the wheel;
- minimum and maximum thicknesses of the wheel;
- nominal bore of the wheel.

##### EXAMPLE

A hub flange for grinding wheel of outside diameter 508 mm, of minimum thickness 32 mm, of maximum thickness 80 mm and bore of 304,8 mm shall be marked as follows:

**Hub flange ISO 666 - 508 × 32 - 80 × 304,8**



NOTE — The multiple screws clamping system is shown for guidance only. The balancing groove is optional.

**Figure 1 — Basic dimensions**

Table 1

Dimensions in millimetres

Wheel		Flanges								Screws <sup>1)</sup>			Screw head hole		Clearance	
<i>H</i>	<i>D</i>	<i>D<sub>f</sub></i>	<i>R</i>	<i>b</i> <sup>2)</sup> min.	<i>N</i>	<i>S</i>	<i>V</i> <sup>3)</sup>	<i>U</i>	Surface of gripping rim cm <sup>2</sup>	<i>P</i>	Number	Thread	<i>X</i>	<i>Z</i>	<i>A</i>	<i>B</i>
76,2	250	115	15	11	12	6	20	4,4	47	65	6	M6	11	6,5	0,1	4,5
76,2	300	115	15	11	12	6	20	4,4	47	65	6	M6	11	6,5	0,1	4,5
127	250	165	14	13	12	6	20	5	66	110	6	M8	14	8,5	1,5	4,5
127	300	165	14	13	12	6	20	5	66	110	6	M8	14	8,5	1,5	4,5
127	350/356	175	19	15	16	8	26	5	93	110	6	M10	17	10,5	0	4,5
127	400/406	175	19	15	16	8	26	5	93	110	6	M10	17	10,5	0	4,5
127	450/457	185	24	16	20	8	30	5	121	110	8	M10	17	10,5	0	5,5
127	500/508	190	26	16	20	8	30	5,5	134	110	8	M10	17	10,5	0	5,5
152,4	350/356	190	18	13	16	8	26	5,8	72	130	6	M10	17	10,5	2,7	2,5
152,4	400/406	200	18	13	16	8	26	5,8	103	130	6	M10	17	10,5	2,7	2,5
152,4	450/457	210	23	16	20	8	30	5,8	135	130	8	M10	17	10,5	2,7	5,5
152,4	500/508	210	23	16	20	8	30	5,8	135	130	8	M10	17	10,5	2,7	5,5
203,2	400/406	240	12	13	16	10	28	6,4	86	178	8	M12	20	13	2,6	0
203,2	450/457	260	22	17	20	10	32	6,4	164	178	8	M12	20	13	2,6	4
203,2	500/508	260	22	17	20	10	32	6,4	164	178	8	M12	20	13	2,6	4
203,2	600/610	270	27	17	25	10	38	6,4	206	178	8	M12	20	13	2,6	4
203,2	750/762	300	42	19	25	12	40	6,4	340	178	8	M12	20	13	2,6	6
304,8	500/508	365	23	18	20	12	34	7,1	247	274	8	M16	26	17	2,4	1
304,8	600/610	365	23	18	25	12	40	7,1	247	274	8	M16	26	17	2,4	1
304,8	750/762	380	30	19	25	12	40	7,6	330	274	8	M16	26	17	2,4	2
304,8	900/914	410	45	22	25	12	40	7,6	516	274	8	M16	26	17	2,4	5
304,8	1 060/1 067	435	57	22	25	12	40	8,1	677	274	10	M16	26	17	2,4	5
304,8	1 250	465	72	25	25	12	40	8,1	889	274	10	M16	26	17	2,4	8
406,4	900/914	490	33	25	25	6	35	8,8	474	370	10	M20	32	21	2,2	4
406,4	1 060/1 067	520	46	25	25	6	35	8,8	631	370	10	M20	32	21	2,2	4
406,4	1 250	550	63	25	25	6	35	8,8	964	370	10	M20	32	21	2,2	4
508	900/914	580	27	25	25	12	40	9	469	475	10	M20	32	21	0,5	4
508	1 060/1 067	600	37	25	25	12	40	9	654	475	10	M20	32	21	0,5	4
508	1 250	635	54	25	25	12	40	9,5	986	475	10	M20	32	21	0,5	4

1) For guidance only, see 4.6.  
2) For guidance only, see 4.2.  
3) Minimum thickness capable of being gripped (minimum web thickness in the case of recessed wheels).

## 5 Checking before mounting the wheels

- 5.1** Mounting shall be carried out in accordance with the manufacturer's recommendations.
- 5.2** Check that the nominal dimensions of the grinding wheel do not exceed the limit marked on the hub flange.
- 5.3** Check, in the case of recessed grinding wheels, that the diameter of the recess is at least 10 mm greater than the external diameter of the hub flanges [see clause 3 d)].
- 5.4** Check that wheels are mounted with two washers (blotters), one placed on the fixed flange, the other on the loose flange.
- 5.5** When the grinding wheel has a positioning mark, care must be taken to ensure that this mark occupies the position stated by the wheel manufacturer.

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## **Annex A** (informative)

### **Bibliography**

- [1] ISO 468:1982, *Surface roughness — Parameters, their values and general rules for specifying requirements.*
- [2] ISO 2632-1:1985, *Roughness comparison specimens — Part 1: Turned, ground, bored, milled, shaped and planed.*

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