

Power transmission elements

## Grooved pulleys for narrow V-belts

Dimensions, materials

**DIN**  
**2211**  
 Part 1

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*In keeping with current practice in standards published by the International Organization for Standardization (ISO), a comma has been used throughout as the decimal marker.*

See Explanatory notes for connection with International Standard ISO 4183 – 1980 published by the International Organization for Standardization (ISO).

Dimensions in mm

## 1 Field of application

This standard deals with grooved pulleys for narrow V-belts (hereinafter briefly referred to as pulleys) used in mechanical engineering. The pulleys specified in this standard are used for narrow V-belts conforming to DIN 7753 Part 1. They can also be used for V-belts conforming to DIN 2215 and DIN 2216 (see table 1).

## 2 Dimensions, designation

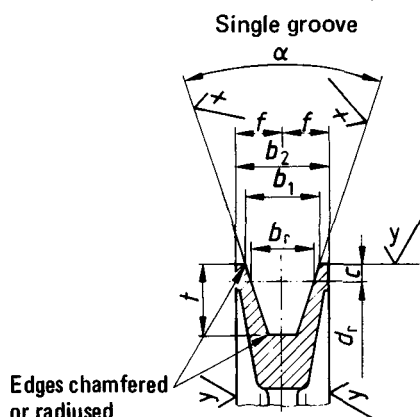
The pulleys need not conform to the illustration; only the dimensions specified shall be adhered to.

General tolerance: DIN 7168 – m

For hub (boss) length  $l$ : + IT 14 as defined in DIN 7151, lower deviation 0.

### Rim shapes

$$\sqrt{\text{R}_z 25} \quad \sqrt{\text{R}_z 100}$$



See figure 2 for run-out tolerances

$$\begin{aligned} x/\sqrt{\text{R}_z 25} \\ y/\sqrt{\text{R}_z 100} \end{aligned}$$

Figure 1.

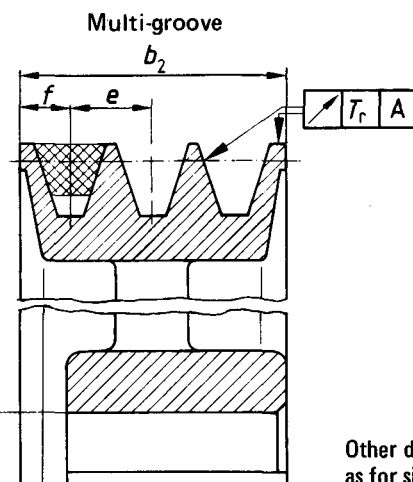


Figure 2.

Other dimensions and data as for single groove rim.

Continued on pages 2 to 10



Table 1.

| Narrow V-belt cross sections as in                           |                             | DIN 7753 Part 1 | ISO symbols | SPZ                                       | SPA             | SPB             | SPC             |
|--------------------------------------------------------------|-----------------------------|-----------------|-------------|-------------------------------------------|-----------------|-----------------|-----------------|
| V-belt cross sections as in                                  |                             | DIN 2215        | Symbols     | 10                                        | 13              | 17              | 22              |
|                                                              |                             | DIN 2216        | Symbols     | 10                                        | 13              | 17              | 22              |
| Datum width                                                  |                             | $b_r$ 2)        |             | 8,5                                       | 11              | 14              | 19              |
|                                                              |                             | $b_1 \approx$   |             | 9,7                                       | 12,7            | 16,3            | 22              |
|                                                              |                             | $c$ 3)          |             | 2                                         | 2,8             | 3,5             | 4,8             |
| Hub diameter                                                 |                             | $d_3$           |             | $\approx (1,8 \text{ to } 1,6) \cdot d_2$ |                 |                 |                 |
| Distances between grooves                                    |                             | $e$ 3), 4)      |             | $12 \pm 0,3$                              | $15 \pm 0,3$    | $19 \pm 0,4$    | $25,5 \pm 0,5$  |
|                                                              |                             | $f$ 3), 7)      |             | $8 \pm 0,6$                               | $10 \pm 0,6$    | $12,5 \pm 0,8$  | $17 \pm 1$      |
| Groove depth                                                 |                             | $t$ 3)          |             | $11^{+0,6}_0$                             | $13,8^{+0,6}_0$ | $17,5^{+0,6}_0$ | $23,8^{+0,6}_0$ |
| $\alpha$ $\frac{34^\circ}{38^\circ}$                         | for datum diameter $d_r$ 5) |                 |             | $\leq 80$                                 | $\leq 118$      | $\leq 190$      | $\leq 315$      |
|                                                              |                             |                 |             | $> 80$                                    | $> 118$         | $> 190$         | $> 315$         |
| Permissible deviation for $\alpha = 34^\circ$ and $38^\circ$ |                             |                 |             | $\pm 1^\circ$                             | $\pm 1^\circ$   | $\pm 1^\circ$   | $\pm 30'$       |
| Rim width $b_2$ 7)<br>$= (z - 1) e + 2 f$                    | for number of grooves $z$   | 1               | 16          | 20                                        | 25              | 34 6)           |                 |
|                                                              |                             | 2               | 28          | 35                                        | 44              | 59,5 6)         |                 |
|                                                              |                             | 3               | 40          | 50                                        | 63              | 85              |                 |
|                                                              |                             | 4               | 52          | 65                                        | 82              | 110,5           |                 |
|                                                              |                             | 5               | 64          | 80                                        | 101             | 136             |                 |
|                                                              |                             | 6               | 76          | 95                                        | 120             | 161,5           |                 |
|                                                              |                             | 7               | 88          | 110                                       | 139             | 187             |                 |
|                                                              |                             | 8               | 100         | 125                                       | 158             | 212,5           |                 |
|                                                              |                             | 9               | 112         | 140                                       | 177             | 238             |                 |
|                                                              |                             | 10              | 124         | 155                                       | 196             | 263,5           |                 |
|                                                              |                             | 11              | 136         | 170                                       | 215             | 289             |                 |
|                                                              |                             | 12              | 148         | 185                                       | 234             | 314,5           |                 |

2) The datum width  $b_r$  is the reference value for specifying the pulley groove profile. As a rule it is located at the level of the zone of action of the V-belt for which the pulley groove is intended. The datum width has previously been known as the working width (see Explanatory notes).

3) Calculated on the basis of the decisions made by ISO/TC 41:  $c \approx 0,25 b_r$ ,  $e \approx 1,35 b_r$ ,  $f \approx 0,9 b_r$ ,  $t \approx 1,25 b_r$ .

4) The permissible deviation in the distance between grooves for the case of non-neighbouring grooves is double the values stated for  $e$ .  $e$  can be up to 3 mm greater for sheet metal pulleys and their pairs, and in exceptional cases.

5) The datum diameter  $d_r$  is the diameter associated with the datum width  $b_r$ ; it is determinant in the calculation of the transmission ratio. The datum diameter has previously been known as the working diameter (see Explanatory notes).

6) No hub diameter specified.

7) Values other than those in table 1 may result for  $b_2$  and  $f$  in the case of sheet metal pulleys and their pairs, and in exceptional cases.

Table 2. Datum diameter

| Belt cross sections as in                                                   | DIN 7753 Part 1 | SPZ |     |    | SPA |     |    | SPB |       | SPC |      | Datum diameter $d_r$ |        | Concentricity tolerance and run-out tolerance <sup>8)</sup><br>$T_r$ |
|-----------------------------------------------------------------------------|-----------------|-----|-----|----|-----|-----|----|-----|-------|-----|------|----------------------|--------|----------------------------------------------------------------------|
|                                                                             | DIN 2215        |     | 10  |    |     | 13  |    |     | 17    |     | 22   |                      |        |                                                                      |
|                                                                             | DIN 2216        |     |     | 10 |     |     | 13 | 17  |       | 22  |      | mIn.                 | max.   |                                                                      |
| Datum diameter $d_r$ <sup>5)</sup>                                          |                 |     | 50  |    |     |     |    |     |       |     |      | 49,6                 | 50,4   | 0,2                                                                  |
|                                                                             |                 |     | 56  |    |     |     |    |     |       |     |      | 55,6                 | 56,4   |                                                                      |
|                                                                             |                 | 63  | 63  |    |     |     |    |     |       |     |      | 62,5                 | 63,5   |                                                                      |
|                                                                             |                 | 71  | 71  |    |     | 71  |    |     |       |     |      | 70,4                 | 71,6   |                                                                      |
|                                                                             |                 |     | 80  |    |     | 80  |    |     |       |     |      | 79,4                 | 80,6   |                                                                      |
|                                                                             |                 |     | 90  |    | 90  | 90  |    |     |       |     |      | 89,3                 | 90,7   |                                                                      |
|                                                                             |                 |     | 100 |    |     | 100 |    |     |       |     |      | 99,2                 | 100,8  |                                                                      |
|                                                                             |                 |     | 112 |    |     | 112 |    |     | 112   |     |      | 111,1                | 112,9  | 0,3                                                                  |
|                                                                             |                 |     |     |    |     | 118 |    |     | (118) |     |      | 117                  | 119    |                                                                      |
|                                                                             |                 |     | 125 |    |     | 125 |    |     | 125   |     |      | 124                  | 126    |                                                                      |
|                                                                             |                 |     |     |    |     | 132 |    |     | (132) |     |      | 131                  | 133    |                                                                      |
|                                                                             |                 |     | 140 |    |     | 140 |    |     | 140   |     |      | 138,9                | 141,1  |                                                                      |
|                                                                             |                 |     | 150 |    |     | 150 |    |     | 150   |     |      | 148,8                | 151,2  |                                                                      |
|                                                                             |                 |     | 160 |    |     | 160 |    |     | 160   |     |      | 158,7                | 161,3  |                                                                      |
|                                                                             |                 |     | 180 |    |     | 180 |    |     | 180   |     | 180  | 178,6                | 181,4  | 0,4                                                                  |
|                                                                             |                 |     |     |    |     | 190 |    |     | 190   |     | 190  | 188,5                | 191,5  |                                                                      |
|                                                                             |                 |     | 200 |    |     | 200 |    |     | 200   |     | 200  | 198,4                | 201,6  |                                                                      |
|                                                                             |                 |     |     |    |     |     |    |     |       |     | 212  | 210,3                | 213,7  |                                                                      |
|                                                                             |                 |     | 224 |    |     | 224 |    |     | 224   |     | 224  | 222,2                | 225,8  |                                                                      |
|                                                                             |                 |     |     |    |     | 236 |    |     | 236   |     | 236  | 234,1                | 237,9  |                                                                      |
|                                                                             |                 |     | 250 |    |     | 250 |    |     | 250   |     | 250  | 248                  | 252    |                                                                      |
|                                                                             |                 |     | 280 |    |     | 280 |    |     | 280   |     | 280  | 277,8                | 282,2  | 0,5                                                                  |
|                                                                             |                 |     | 300 |    |     | 300 |    |     | 300   |     | 300  | 297,6                | 302,4  |                                                                      |
|                                                                             |                 |     | 315 |    |     | 315 |    |     | 315   |     | 315  | 312,5                | 317,5  |                                                                      |
|                                                                             |                 |     | 355 |    |     | 355 |    |     | 355   |     | 355  | 352,2                | 357,8  |                                                                      |
|                                                                             |                 |     | 400 |    |     | 400 |    |     | 400   |     | 400  | 396,8                | 403,2  |                                                                      |
|                                                                             |                 |     | 450 |    |     | 450 |    |     | 450   |     | 450  | 446,4                | 453,6  |                                                                      |
|                                                                             |                 |     | 500 |    |     | 500 |    |     | 500   |     | 500  | 496                  | 504    | 0,6                                                                  |
|                                                                             |                 |     |     |    |     | 560 |    |     | 560   |     | 560  | 555,5                | 564,5  |                                                                      |
|                                                                             |                 |     |     |    |     | 630 |    |     | 630   |     | 630  | 625                  | 635    |                                                                      |
|                                                                             |                 |     |     |    |     |     |    |     | 710   |     | 710  | 704,3                | 715,7  | 0,8                                                                  |
|                                                                             |                 |     |     |    |     |     |    |     | 800   |     | 800  | 793,6                | 806,4  |                                                                      |
|                                                                             |                 |     |     |    |     |     |    |     |       |     | 900  | 892,8                | 907,2  |                                                                      |
|                                                                             |                 |     |     |    |     |     |    |     |       |     | 1000 | 992                  | 1008   |                                                                      |
|                                                                             |                 |     |     |    |     |     |    |     |       |     | 1120 | 1111                 | 1129   | 1,0                                                                  |
|                                                                             |                 |     |     |    |     |     |    |     |       |     | 1250 | 1240                 | 1260   |                                                                      |
|                                                                             |                 |     |     |    |     |     |    |     |       |     | 1400 | 1388,8               | 1411,2 |                                                                      |
|                                                                             |                 |     |     |    |     |     |    |     |       |     | 1600 | 1587,2               | 1612,8 |                                                                      |
|                                                                             |                 |     |     |    |     |     |    |     |       |     | 1800 | 1785,6               | 1814,4 | 1,2                                                                  |
|                                                                             |                 |     |     |    |     |     |    |     |       |     | 2000 | 1984                 | 2016   |                                                                      |
| Difference between the datum diameters of the various grooves <sup>9)</sup> |                 | 0,4 |     |    |     |     |    |     |       | 0,6 |      | —                    |        |                                                                      |

Datum diameters printed bold shall be preferred. Values printed in brackets are to be avoided where possible.

The datum diameters  $d_r$  shall be selected in accordance with table 2, datum diameters above 2000 mm shall be taken from the standard number series R 20.

The datum diameter of the pulleys shall be selected to be as large as possible, taking the service life of the belt into consideration; however, a belt velocity of  $v = 40$  m/s for narrow V-belts and  $v = 30$  m/s for classic V-belts should not be exceeded as the belts reach their optimum power transmission at these velocities.

5) See page 3.

8) To be measured with a dial gauge when the pulley is mounted on the bore:

concentricity tolerance at the external diameter;

run-out tolerance on the flank at the line of the datum diameter.

9) Grooves inspected in accordance with DIN 2211 Part 2.