
**Belt drives — Pulleys and V-ribbed belts
for industrial applications — PH, PJ, PK, PL
and PM profiles: Dimensions**

*Transmissions par courroies — Poulies et courroies striées pour
des applications industrielles — Profils PH, PJ, PK, PL et PM: Dimensions*

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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.

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 9982 was prepared by Technical Committee ISO/TC 41, *Pulleys and belts (including veebelts)*, Subcommittee SC 1, *Veebelts and grooved pulleys*.

This second edition cancels and replaces the first edition (ISO 9982:1991), which has been technically revised. In particular, one subclause on the diameters over balls and another on the manufacturing tolerances for effective lengths of V-ribbed belts have been added.

Annex A of this International Standard is for information only.

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Introduction

A V-ribbed belt drive is composed of an endless belt with a longitudinally ribbed traction surface which engages and grips, by friction, pulley grooves of similar shape. The belt ribbed surface fits the pulley grooves to make nearly total contact.

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Belt drives — Pulleys and V-ribbed belts for industrial applications — PH, PJ, PK, PL and PM profiles: Dimensions

1 Scope

This International Standard specifies the principal dimensional characteristics of V-ribbed pulley groove profiles, together with the corresponding endless V-ribbed belts, of PH, PJ, PK, PL and PM profiles which are used for general industrial applications.

The PK belt was originally established for automotive accessory drive applications and ISO 9981 deals specifically with that particular field.

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2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of the publication, the editions indicated were 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 editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

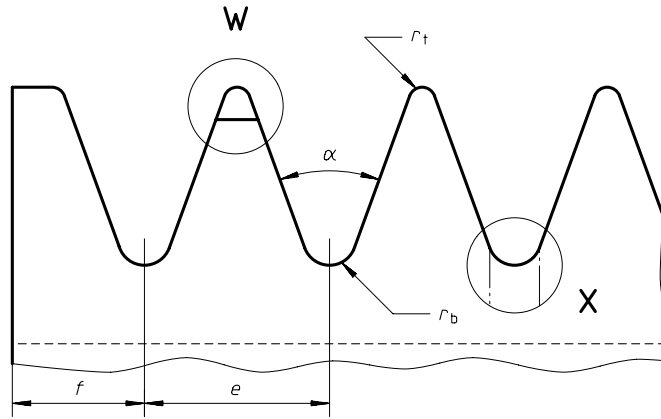
ISO 254:1998, *Belts drives — Pulleys — Quality, finish and balance.*

ISO 4287:1997, *Geometrical product specification (GPS) — Surface texture: Profile method — Terms, definitions and surface texture parameters.*

3 Pulleys

3.1 Groove dimensions and tolerances

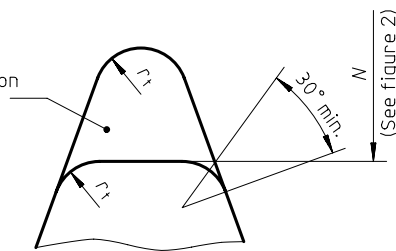
The groove dimensions of PH, PJ, PK, PL and PM belts are shown in figures 1 and 2, and given in table 1.



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Alternative: Pulley tip profile

The actual configuration of the tip profile may lie anywhere between the maximum and minimum indicated. Any configuration shall have a transitional radius r_t corresponding to a 30° minimum arc tangent to the groove sidewall



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Alternative: Pulley groove bottom

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The configuration of the groove bottom below r_b is optional

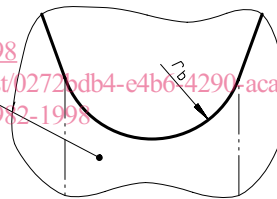
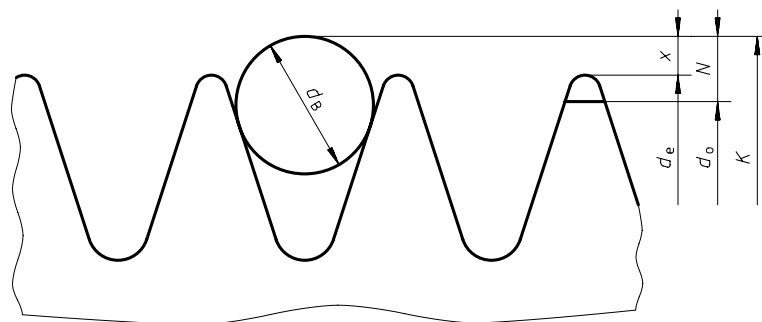


Figure 1 — Cross-section of pulley grooves



- d_e = effective diameter
- d_o = outer diameter
- K = diameter over balls or rods
- d_B = checking ball or rod diameter

Figure 2 — Pulley diameters

Table 1 — Dimensions of pulley grooves

Dimensions in millimetres

Profile		PH	PJ	PK	PL	PM
Groove pitch, e ^{1) 2)}		$1,6 \pm 0,03$	$2,34 \pm 0,03$	$3,56 \pm 0,05$	$4,7 \pm 0,05$	$9,4 \pm 0,08$
Groove angle, α ³⁾	$\pm 0,5^\circ$	40°	40°	40°	40°	40°
r_t	min.	0,15	0,2	0,25	0,4	0,75
r_b	max.	0,3	0,4	0,5	0,4	0,75
Checking ball or rod diameter, d_B	$\pm 0,01$	1	1,5	2,5	3,5	7
$2x$	nom.	0,11	0,23	0,99	2,36	4,53
$2N$ ⁴⁾	max.	0,69	0,81	1,68	3,5	5,92
f	min.	1,3	1,8	2,5	3,3	6,4

- 1) The tolerance on e applies to the distance between the axes of two consecutive grooves.
 2) The sum of all deviations from the nominal value e for all grooves in any pulley shall not exceed $\pm 0,3$.
 3) The centreline of the groove shall make an angle of $90^\circ \pm 0,5^\circ$ with the axis of the pulley.
 4) N is not related to the nominal diameter of the pulley but is measured from the actual ride position of the ball or rod in the pulley.

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3.2 Minimum effective diameter

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The minimum recommended effective diameter, d_e , for V-ribbed pulleys is given in table 2.

Table 2 — Minimum effective diameter

Dimensions in millimetres

Profile		PH	PJ	PK	PL	PM
Effective diameter, d_e	min.	13	20	45	75	180

3.3 Tolerances on finished pulley

3.3.1 Checking conditions

Profile, diameter and run-out tolerances shall be checked on the finished pulley without surface coating.

3.3.2 Groove-to-groove diameter tolerances

The variation in diameters between the grooves in any one pulley shall be within the limits given in table 3. This variation is obtained by comparing the diameter over balls or rods.

Table 3 — Groove-to-groove diameter variation

Dimensions in millimetres

Effective diameter, d_e	Number of grooves, n	Maximum diameter variation
$d_e \leq 74$	$n \leq 6$	0,1
	$n > 6$	Add 0,003 for each additional groove
$74 < d_e \leq 500$	$n \leq 10$	0,15
	$n > 10$	Add 0,005 for each additional groove
$d_e > 500$	$n \leq 10$	0,25
	$n > 10$	Add 0,01 for each additional groove

3.3. Radial circular run-out

Radial circular run-out shall be within the limits given in table 4. Radial run-out measured with a ball mounted under spring pressure to ensure contact with the groove as the pulley is rotated.

Table 4 — Radial run-out

Dimensions in millimetres

Effective diameter, d_e	FIM ¹⁾ max.
$d_e \leq 74$	0,13
$74 < d_e \leq 250$	0,25
$d_e > 250$	0,25 + 0,000 4 per millimetre of effective diameter over 250
1) Full indicator movement.	

3.3.4 Axial circular run-out

Axial circular run-out (full indicator movement) shall be within 0,002 mm per millimetre of effective diameter. Run-out is measured with a ball mounted under spring pressure to ensure contact with the groove as the pulley is rotated.

3.3.5 Diameter over balls

The tolerances on the diameter over balls (K) shall be within the limits given in table 5.

Table 5 — Tolerance on the diameter over balls

Dimensions in millimetres

Diameter over balls, K	Tolerance
$K \leq 75$	$\pm 0,3$
$75 < K \leq 200$	$\pm 0,6$
For each additional 25 mm, add	$\pm 0,1$

3.3.6 Groove finish

The pulley grooves shall have a surface roughness $R_a \leq 3,2 \mu\text{m}$. See ISO 254 and ISO 4287 for definitions and the method of measurement.

3.4 Pitch diameter, d_p

The fit of a V-ribbed belt in the corresponding pulley is shown in figure 3. The true pitch diameter of a V-ribbed pulley is slightly larger than the effective diameter and its exact value is determined with the particular belt being used.

The appropriate nominal value of the effective line differential b_e , which is:

0,8 mm for the PH profile,

1,2 mm for the PJ profile,

2 mm for the PK profile,

3 mm for the PL profile, and

4 mm for the PM profile;

may be used to calculate the speed ratio. If more precision is required, the belt manufacturer should be consulted.

Further information is given in ISO 8370.

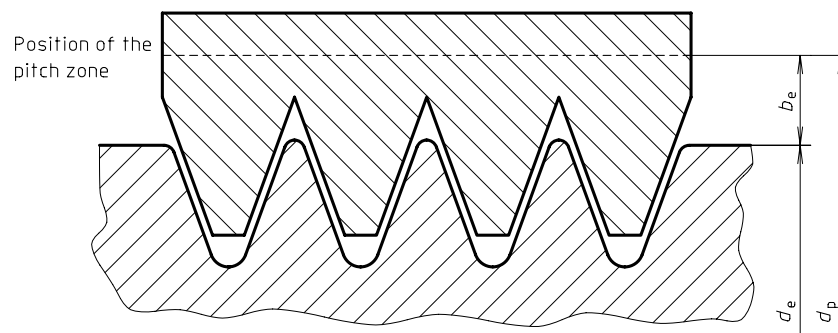


Figure 3 — Determination of pitch diameter