

---

---

**Belt drives — Pulleys and V-ribbed belts for  
the automotive industry — PK profile:  
Dimensions**

*Transmissions par courroies — Poulies et courroies striées pour la  
construction automobile — Profil PK: Dimensions*

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

ISO 9981:1998

<https://standards.iteh.ai/catalog/standards/sist/04e7c3f0-26db-4998-8eea-51e4f2f2c444/iso-9981-1998>



## 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 9981 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 9981:1990), which has been technically revised. In particular, a subclause on the tolerances on the diameters over balls (3.3.4) has been added.

Annex A of this International Standard is for information only.

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

ISO 9981:1998

<https://standards.iteh.ai/catalog/standards/sist/04e7c3f0-26db-4998-8cea-51e4f2f2c444/iso-9981-1998>

© ISO 1998

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

International Organization for Standardization  
Case postale 56 • CH-1211 Genève 20 • Switzerland  
Internet iso@iso.ch

Printed in Switzerland

## 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.

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

[ISO 9981:1998](https://standards.iteh.ai/catalog/standards/sist/04e7c3f0-26db-4998-8eea-51e4f2f2c444/iso-9981-1998)

<https://standards.iteh.ai/catalog/standards/sist/04e7c3f0-26db-4998-8eea-51e4f2f2c444/iso-9981-1998>

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

ISO 9981:1998

<https://standards.iteh.ai/catalog/standards/sist/04e7c3f0-26db-4998-8eea-51e4f2f2c444/iso-9981-1998>

# Belt drives — Pulleys and V-ribbed belts for the automotive industry — PK profile: 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 PK profile which are used predominantly for automotive accessory drive applications.

The complete array of V-ribbed belts and pulleys of PH, PJ, PK, PL and PM profile for industrial and other non-automotive applications is the subject of ISO 9982. PK belt profile dimensions and tolerances are the same in both International Standards.

## 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 the 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.

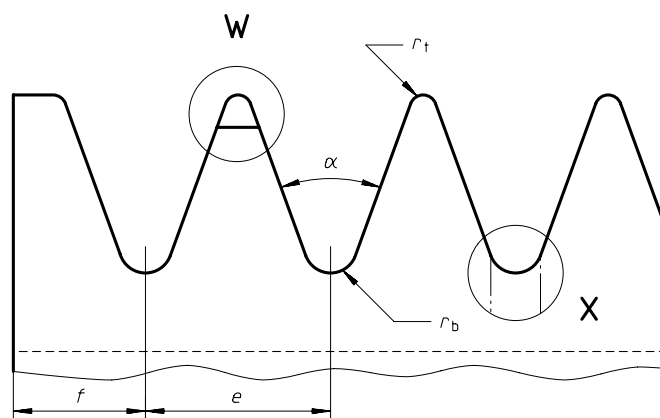
ISO 254:1998, *Belt drives — Pulleys — Quality, finish and balance*.

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

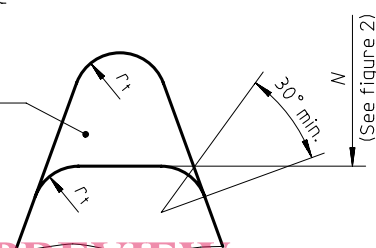
The groove dimensions of PK pulleys are shown in figures 1 and 2, and given in table 1.



W

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.

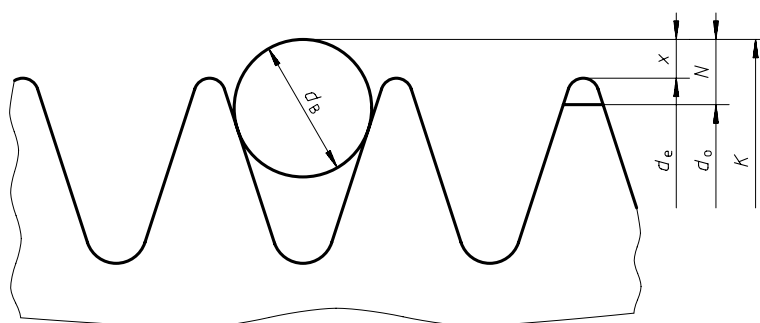


iTeh STANDARD PREVIEW  
(standards.iteh.ai)

Alternative: Pulley groove bottom



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 PK pulley grooves

Dimensions in millimetres		
Groove pitch, $e$	$\pm 0,05$ 1) 2)	3,56
Groove angle, $\alpha^3$ , for measuring	$\pm 0^\circ 15'$	$40^\circ$
Groove angle, $\alpha^3$ , for testing and actual use	$\pm 1^\circ$	$40^\circ$
$r_t$	min.	0,25
$r_b$	max.	0,5
Checking ball or rod diameter, $d_B$	$\pm 0,01$	2,5
$2x$	nom.	0,99
$2N$ 4)	max.	1,68
$f$	min.	2,5
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 one 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.		

(standards.iteh.ai)

### 3.2 Minimum effective diameter

The minimum recommended effective diameter,  $d_e$ , for PK pulleys is 45 mm.

### 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 not exceed 0,15 mm. This variation is obtained by comparing the diameters over balls or rods.

#### 3.3.3 Radial and axial circular run-out

Radial and axial circular run-outs shall not exceed 0,25 mm full indicator movement (FIM). Run-out in the two directions is measured separately with a ball mounted under spring pressure to ensure contact with the groove as the pulley is rotated.

#### 3.3.4 Diameter over balls

The tolerances on the diameters over balls ( $K$ ) shall not exceed  $\pm 0,6$  mm.

#### 3.3.5 Groove finish

The pulley grooves shall have a surface roughness  $Ra \leq 3,2 \mu\text{m}$ . 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.

A nominal value of the effective line differential,  $b_e$ , of 2 mm 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.

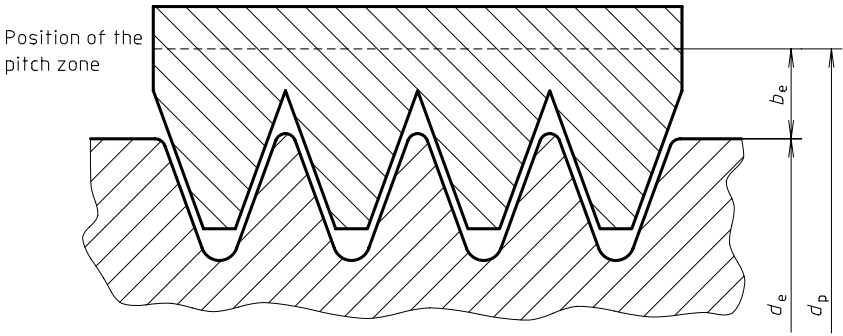
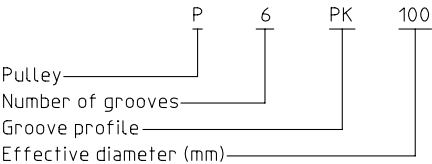


Figure 3 — Determination of pitch diameter

3.5 Designation of pulleys

ISO 9981:1998  
<https://standards.iteh.ai/catalog/standards/sist/04e7c3f0-26db-4998-8cea-51e4f2f2c444/iso-9981-1998>

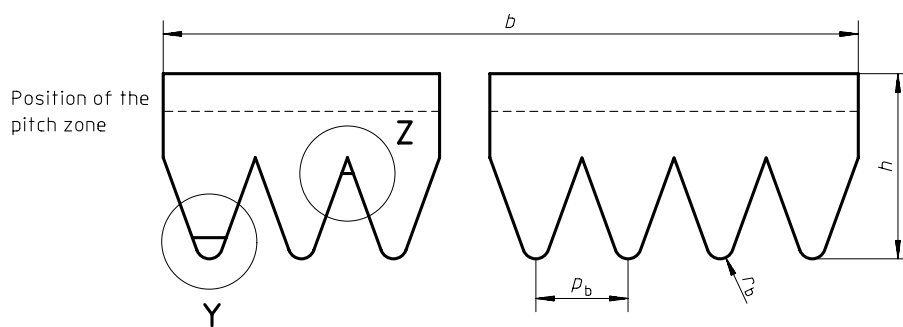


4 Belts

4.1 Belt dimensions

The dimensions of the PK belts are shown on figure 4 and given in table 2.



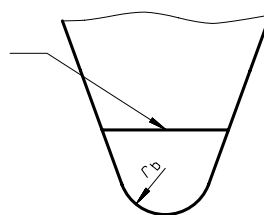


Nominal width of the belt  $b = n \times p_b$ , where  $n$  is the number of ribs

Y

Alternative: Belt rib tip

The flat belt tip is optional



iTeh STANDARD PREVIEW  
(standards.iteh.ai)

Alternative: Belt groove bottom

The configuration of the belt groove bottom may lie anywhere between the maximum and the minimum indicated

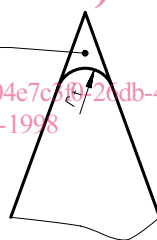


Figure 4 — Cross-section of belt

Table 2 — PK belt dimensions

Rib pitch, $p_b$		3,56
$r_b$	min.	0,5
$t$	max.	0,25
Belt height, $h$		$\approx$ 4 to 6
NOTE — Rib pitch and belt height are shown as reference dimensions only. Cumulative rib pitch tolerance is an important value but it is frequently affected by the tension at which the belt operates and the modulus of the tension member.		