

# INTERNATIONAL STANDARD

**ISO  
2790**

Third edition  
1989-08-15

---

---

## **Belt drives — Narrow V-belts for the automotive industry and corresponding pulleys — Dimensions**

**iTeh STANDARD PREVIEW**

*Transmissions par courroies — Courroies trapézoïdales étroites pour la construction automobile et poulies correspondantes — Dimensions*  
**(standards.iteh.ai)**

ISO 2790:1989

<https://standards.iteh.ai/catalog/standards/sist/2ea566ff-2465-4b4b-95c4-326c150eb921/iso-2790-1989>



Reference number  
ISO 2790 : 1989 (E)

## 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 approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 2790 was prepared by Technical Committee ISO/TC 41, *Pulleys and belts (including veebelts)*.

ISO 2790:1989

This third edition cancels and replaces the second edition (ISO 2790 : 1982), of which it constitutes a technical revision.

© ISO 1989

All rights reserved. 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

Printed in Switzerland

# Belt drives — Narrow V-belts for the automotive industry and corresponding pulleys — Dimensions

## 1 Scope

This International Standard specifies the requirements for belts and pulleys for V-belt drives used for driving auxiliaries of internal combustion engines for the automotive industry.

## 2 Normative references

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

ISO 1081: 1980, *Drives using V-belts and grooved pulleys — Terminology.*

ISO 8370: 1987, *V- and ribbed V-belts — Dynamic test to determine pitch zone location.*

ISO 9608: 1988, *V-belts — Uniformity of belts — Centre distance variation — Specifications and test method.*

## 3 Definitions and symbols

For the purposes of this International Standard, the terms and symbols relating to drives using V-belts (i.e. belts and grooved pulleys) defined in ISO 1081 apply.

## 4 Belts

A belt is defined by its cross-section (groove profile AV 10 or AV 13) and by its effective length, in millimetres, measured under specified conditions.

### 4.1 Cross-section and pitch zone

A cross-section of a belt is defined by the nominal top width,  $w$  (see figure 1 and table 1).

The position of the belt pitch zone in the pulley groove is defined by the effective line differential,  $b_e$  (see figure 4 and table 1).

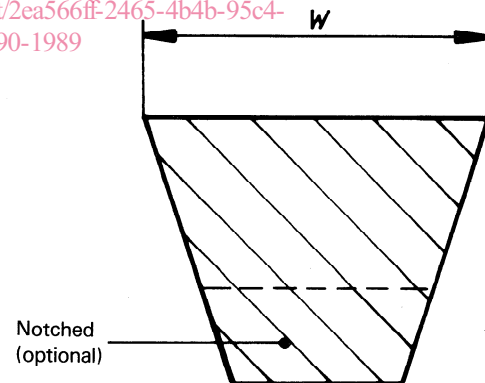


Figure 1 — Profile of the belt

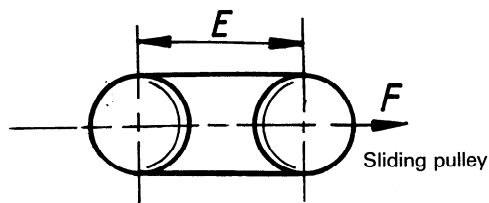
Table 1 — Dimensions of belt cross-sections

Dimensions in millimetres

Parameter	Symbol	Groove profiles			
		AV 10		AV 13	
		Wrapped belt	Raw-edged belt	Wrapped belt	Raw-edged belt
Nominal top width	$w$	10	10	13	13
Effective line differential	$b_e$	1)	1)	1)	1)

1) Values of  $b_e$  for the different types of belt are not standardized. They can be determined in accordance with ISO 8370 : 1987, 5.2.

**4.2 Measurement of the effective length of a belt and its ride-out**



**Figure 2 – Measuring device**

Set the belt up on two identical pulleys, having the dimensions shown in table 2 and mounted on a horizontal bench, and apply to the sliding pulley the measurement tension  $F$ .

Rotate the belt at least twice to seat it properly.

The effective length of the belt,  $L_e$ , is given by the formula:

$$L_e = 2E + C_e$$

where

$E$  is the centre distance of the pulleys;

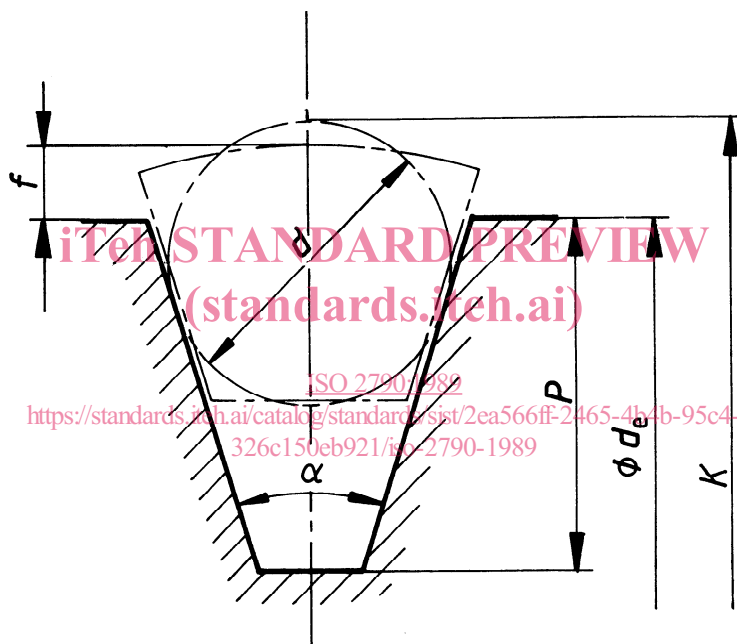
$C_e$  is the effective circumference of one pulley:

$$C_e = \pi d_e = 300 \text{ mm}$$

The ride-out,  $f$ , of the belt shall be such that

$$0 < f < 2,4 \text{ mm}$$

for each type of belt.



**Figure 3 – Groove for measuring V-belts**

**Table 2 – Dimensions of checking pulley and measuring force**

Parameter	Symbol	Unit	Groove profiles	
			AV 10	AV 13
Groove angle	$\alpha$	degrees	$36^\circ \pm 10'$	$36^\circ \pm 10'$
Effective diameter	$d_e$	mm	95,49	95,49
Outside diameter	$d_o$	mm	$95,5 \pm 0,2$	$95,5 \pm 0,2$
Diameter of balls or rods for checking the pulley grooves	$d$	mm	$7,95 \begin{smallmatrix} 0 \\ - 0,025 \end{smallmatrix}$	$11,124 \begin{smallmatrix} 0 \\ - 0,025 \end{smallmatrix}$
Distance from external tangent planes to balls or rods	$K$	mm	$99,31 \pm 0,05$	$103,53 \pm 0,05$
Minimum depth of groove	$P$	mm	11	13,75
Tension <sup>1)</sup>	$F$	N	267	267

1) The tension on each strand of the belt shall be equal to one half of the values shown.

4.3 Centre distance variations

Centre distance variations are given in relation to the belt top width given in table 3. They are determined in accordance with ISO 9608.

Table 3 – Centre distance variations

Dimensions in millimetres

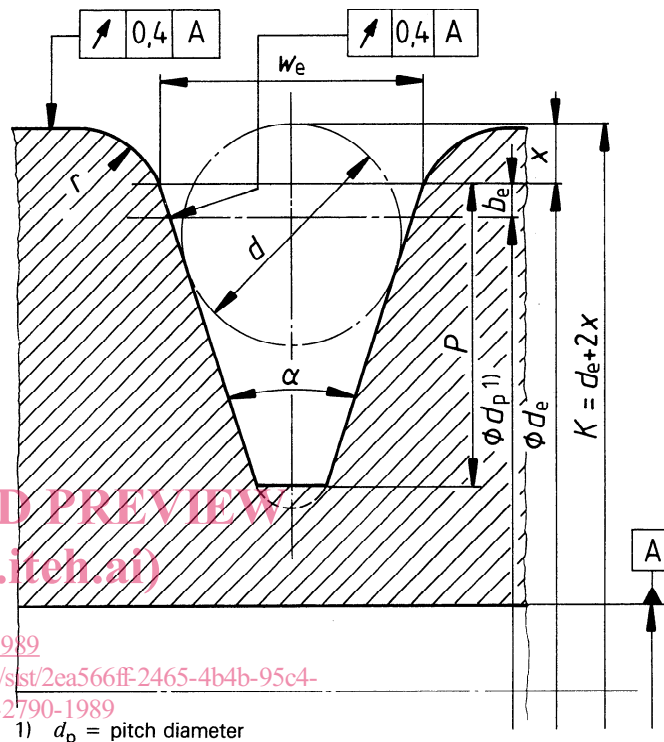
Belt length		Top width $w \leq 25$ $\Delta E$
over	up to (inclusive)	
—	1 000	1,2
1 000	2 000	1,6
2 000	5 000	2
5 000	—	2,5

5 Service pulleys

5.1 Dimensions

The dimensions of service pulleys are shown in figure 4 and given in table 4.

Tolerances of circular and radial run-out in millimetres



iTeh STANDARD PREVIEW  
(standards.iteh.ai)

ISO 2790:1989

<https://standards.iteh.ai/catalog/standards/sst/2ea566ff-2465-4b4b-95c4-326c150eb921/iso-2790-1989>

1)  $d_p$  = pitch diameter

Figure 4 – Groove for service pulley

Table 4 – Dimensions of pulleys

Dimensions in millimetres, angle in degrees

Parameter	Symbol	Groove profiles	
		AV 10	AV 13
Effective width of groove	$w_e$	9,7	12,7
Groove angle <sup>1)</sup>	$\alpha$	$36^\circ \pm 30'$	$36^\circ \pm 30'$
Minimum groove depth	$P$	11	13,75
Minimum curved radius of sides at top of groove	$r$	0,8	0,8

1) For pulley diameters less than 57 mm and 70 mm respectively for AV 10 and AV 13, it is recommended that the groove angle be reduced to 34°.

NOTES

- 1 The sides of the groove shall be smooth.
- 2 The axial and radial run-outs shall be measured separately as the total indicator reading of the movement of the ball mounted under spring pressure, to follow the groove as the pulley is rotated.
- 3 The optional bottom corner radii shall be, if used, below the depth  $P$ .
- 4 The axis of symmetry of any cross-section of the groove shall make an angle of 90°, with a maximum tolerance of 2°, with a half-plane passing through the axis of the pulley.

**5.2 Checking of effective diameter**

Place two balls or rods, the diameters of which are shown in table 5, in contact with the groove to be checked and displaced by 180°.

Then measure the distance *K* between the external tangent planes to the balls or rods and parallel to the axis of the pulley.

The effective diameter is

$$d_e = K - 2x$$

The effective diameter shall be such that

$$d_e + 2x \text{ does not vary by more than } 0,6 \text{ mm}$$

In the case of each groove in a multiple-grooved pulley of the same nominal dimensions, the distance over balls *K* shall not vary from groove to groove by more than

$$0,01 \text{ mm per } 5 \text{ mm of diameter}$$

with a top limit of

$$0,3 \text{ mm for diameters } 152 \text{ mm and above.}$$

**5.3 Designation**

A pulley is designated by

- the effective diameter, *d<sub>e</sub>*, in millimetres;
- the number of grooves;
- the groove profile (AV 10 or AV 13).

**EXAMPLE**

$$67 \times 1 \text{ AV } 10$$

(Effective diameter × number of grooves × section)

In the case of integral pulleys with different grooves: successive designation of the elements:

$$90 \times 1 \text{ AV } 13 - 67 \times 1 \text{ AV } 10$$

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

**Table 5 – Dimensions of balls or rods**

ISO 2790:1989 Dimensions in millimetres

Parameter	Symbol	Groove diameters	
		AV 10	AV 13
Diameter of balls or rods	<i>d</i>	$7,95 \begin{smallmatrix} 0 \\ - 0,025 \end{smallmatrix}$	$11,124 \begin{smallmatrix} 0 \\ - 0,025 \end{smallmatrix}$
Corrective term	<i>2x</i>	3,8	8

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

This page intentionally left blank

ISO 2790:1989

<https://standards.iteh.ai/catalog/standards/sist/2ea566ff-2465-4b4b-95c4-326c150eb921/iso-2790-1989>

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

ISO 2790:1989

<https://standards.iteh.ai/catalog/standards/sist/2ea566ff-2465-4b4b-95c4-326c150eb921/iso-2790-1989>

---

---

**UDC 621.852.42.051/.052 : 621.431.73**

**Descriptors** : road vehicles, belt drives, power transmission belts, V-belts, pulleys, grooved pulleys, dimensions, dimensional measurements, designation.

Price based on 4 pages

---

---