# International Standard 4184

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION•МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ•ORGANISATION INTERNATIONALE DE NORMALISATION

## Classical and narrow V-belts — Lengths

*Longueurs des courroies trapézoïdales classiques et étroites*

**First edition — 1980-09-15**



**UDC 621.85.052.42** **Ref. No. ISO 4184-1980 (E)**

**Descriptors** : belts, V-belts, dimensions, length, dimensional tolerances.



Price based on 5 pages

## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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.

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.



International Standard ISO 4184 was developed by Technical Committee ISO/TC 41, *Pulleys and belts (including veebelts)*, and was circulated to the member bodies in October 1978.



It has been approved by the member bodies of the following countries :



| | | |
|---|---|---|
| Australia | France | Romania |
| Austria | Germany, F. R. | South Africa, Rep. of |
| Belgium | India | Sweden |
| Bulgaria | Ireland | United Kingdom |
| Chile | Italy | USSR |
| Finland | Netherlands | |

The member bodies of the following countries expressed disapproval of the document on technical grounds :

Canada
Czechoslovakia
USA

This International Standard cancels and replaces ISO Recommendations R 434, 460 and 608.



Printed in Switzerland

# Classical and narrow V-belts — Lengths

## 0 Introduction

This International Standard cancels and supersedes the Recommandations ISO/R 434, 460 and 608 which are regrouped here.



## 1 Scope and field of application

This International Standard specifies, for classical and narrow V-belts of sections



Y (for groove profile with datum width 5,3 mm)

Z (for groove profile with datum width 8,5 mm)

A (for groove profile with datum width 11 mm)

B (for groove profile with datum width 14 mm)

C (for groove profile with datum width 19 mm)

D (for groove profile with datum width 27 mm)

E (for groove profile with datum width 32 mm)

SPZ (for groove profile with datum width 8,5 mm)

SPA (for groove profile with datum width 11 mm)

SPB (for groove profile with datum width 14 mm)

SPC (for groove profile with datum width 19 mm)

— the recommended datum lengths;

— the tolerances for datum lengths;

— the conditions for measuring the datum length.

It is important that narrow belts are not used with pulleys uniquely designed for classical belts.

This International Standard (a combination of previous ISO Recommendations) does not imply that classical V-belts can be used as replacements on drives designed for the use of narrow V-belts.

## 2 References

ISO 1081, *Terms and definitions relating to drives using V-belts and grooved pulleys.*

ISO 4183, *Grooved pulleys for classical and narrow V-belts.*

## 3 Datum length

**3.1** The standard lengths are the datum lengths under tension measured under the conditions specified in clause 5.

**3.2** The nominal values of the standard lengths of V-belts in millimetres shall be selected from the R 20 series of preferred numbers.

### 3.2.1 Classical V-belts — Sections Y, Z, A, B, C, D, E

Standard lengths of V-belts of classical section Y are given in column 1 of annex A. They are taken from the former ISO Recommendation R 434.

Standard lengths of V-belts of classical sections Z, A, B, C, D and E corresponding to the R 20 series of preferred numbers are only applicable if the stock of moulds of the manufacturer conforms to this series. Otherwise, the lengths of these V-belts have to be those in columns 2 through 7 of annex A. These lengths are taken from the former ISO Recommendation R 608.

### 3.2.2 Narrow V-belts — Sections SPZ, SPA, SPB, SPC

Standard lengths of V-belts of narrow sections SPZ, SPA, SPB and SPC are given in annex B. Those for sections SPZ, SPA and SPB are taken from the former ISO Recommendation R 460.

## 4 Tolerances on datum lengths

### 4.1 Manufacturing tolerances for single belts

Table 1 gives the permissible tolerances for datum lengths.

**Table 1 — Manufacturing tolerances of V-belts**

Values in millimetres

| Nominal datum length $L_d$ | Permissible deviation for sections | |
|---|---|---|
| | Y, Z, A, B, C, D, E | SPZ, SPA, SPB, SPC |
| $L_d \leqslant 250$ | + 8, − 4 | |
| $250 < L_d \leqslant 315$ | + 9, − 4 | |
| $315 < L_d \leqslant 400$ | + 10, − 5 | |
| $400 < L_d \leqslant 500$ | + 11, − 6 | |
| $500 < L_d \leqslant 630$ | + 13, − 6 | ± 6 |
| $630 < L_d \leqslant 800$ | + 15, − 7 | ± 8 |
| $800 < L_d \leqslant 1\,000$ | + 17, − 8 | ± 10 |
| $1\,000 < L_d \leqslant 1\,250$ | + 19, − 10 | ± 13 |
| $1\,250 < L_d \leqslant 1\,600$ | + 23, − 11 | ± 16 |
| $1\,600 < L_d \leqslant 2\,000$ | + 27, − 13 | ± 20 |
| $2\,000 < L_d \leqslant 2\,500$ | + 31, − 16 | ± 25 |
| $2\,500 < L_d \leqslant 3\,150$ | + 37, − 18 | ± 32 |
| $3\,150 < L_d \leqslant 4\,000$ | + 44, − 22 | ± 40 |
| $4\,000 < L_d \leqslant 5\,000$ | + 52, − 26 | ± 50 |
| $5\,000 < L_d \leqslant 6\,300$ | + 63, − 32 | ± 63 |
| $6\,300 < L_d \leqslant 8\,000$ | + 77, − 38 | ± 80 |
| $8\,000 < L_d \leqslant 10\,000$ | + 93, − 46 | ± 100 |
| $10\,000 < L_d \leqslant 12\,500$ | + 112, − 56 | ± 125 |
| $12\,500 < L_d \leqslant 16\,000$ | + 140, − 70 | |
| $16\,000 < L_d \leqslant 20\,000$ | + 170, − 85 | |

The tolerances of the classical V-belts of sections Y, Z, A, B, C, D and E are approximatively + 1,2 $p$ and − 0,6 $p$, where $p$ is calculated with a certain degree of approximation, using the formula :

$$p = 0{,}8 \sqrt[3]{L} + 0{,}006\, L$$

where $L$ is the preferred number in the R 10 series equal to or immediately greater than the length expressed in millimetres.

The tolerances of the narrow V-belts of sections SPZ, SPA, SPB and SPC are approximately

$$\pm\, 0{,}01\, L$$

where $L$ is the preferred number in the R 10 series equal to or immediately greater than the length expressed in millimetres.

### 4.2 Belt matching tolerances of belts in the same set

Table 2 gives the values for the tolerances on the lengths of V-belts of the same set in multiple-grooved drives

**Table 2 — Belt matching tolerances**

Values in millimetres

| Nominal datum length $L_d$ | Maximum difference between the lengths of belts of the same set for sections | |
|---|---|---|
| | Y, Z, A, B, C, D, E | SPZ, SPA, SPB, SPC |
| $L_d \leqslant 1\,250$ | 2 | 2 |
| $1\,250 < L_d \leqslant 2\,000$ | 4 | 2 |
| $2\,000 < L_d \leqslant 3\,150$ | 8 | 4 |
| $3\,150 < L_d \leqslant 5\,000$ | 12 | 6 |
| $5\,000 < L_d \leqslant 8\,000$ | 20 | 10 |
| $8\,000 < L_d \leqslant 12\,500$ | 32 | 16 |
| $12\,500 < L_d \leqslant 20\,000$ | 48 | — |

## 5 Conditions for measuring datum length

For the measurement of the datum length, set the belt up on two identical pulleys with datum circumference according to table 3 and having functional dimensions according to ISO 4183. The pulleys shall be mounted on parallel horizontal axes on a testing-bench. Apply to the sliding pulley the measuring force indicated in table 3. Rotate the pulleys in order that the belt may effect one to three rotations and thus may seat properly in the pulley grooves. Measure the distance between the axes of the pulleys.



The datum length $L_d$ is given by the formula

$$L_d = 2\,E + C_d$$

where

$E$ is the distance between the axes of the pulleys;

$C_d$ is the pulley datum circumference.

**Table 3 — Measurement characteristics**

| Belt section | Datum circumference of the measuring pulleys mm | Measuring force N |
|---|---|---|
| Y | 90 | 40 |
| Z | 180 or 300 | 110 |
| A | 300 or 450 | 200 |
| B | 400 or 600 | 300 |
| C | 700 or 1 000 | 750 |
| D | 1 000 | 1 400 |
| E | 1 800 | 1 800 |
| SPZ | 300 | 360 |
| SPA | 450 | 560 |
| SPB | 600 | 900 |
| SPC | 1 000 | 1 500 |

## 6 Designation and marking

The physical dimensions of classical and narrow V-belts are designated by one or three letters representing the section (classical or narrow) followed by the appropriate datum length (see annexes A and B).

for example : A 1 550 or SPA 1 250

All classical or narrow V-belts manufactured in accordance with this International Standard shall be marked legibly and durably on the outer non-working face with the appropriate designation.

# Annex A

## Standard datum lengths in millimetres of classical V-belt sections

| Y | Z | A | B | C | D | E |
|---|---|---|---|---|---|---|
| 200 | 405 | 630 | 930 | 1 565 | 2 740 | 4 660 |
| 224 | 475 | 700 | 1 000 | 1 760 | 3 100 | 5 040 |
| 250 | 530 | 790 | 1 100 | 1 950 | 3 330 | 5 420 |
| 280 | 625 | 890 | 1 210 | 2 195 | 3 730 | 6 100 |
| 315 | 700 | 990 | 1 370 | 2 420 | 4 080 | 6 850 |
| 355 | 780 | 1 100 | 1 560 | 2 715 | 4 620 | 7 650 |
| 400 | 920 | 1 250 | 1 760 | 2 880 | 5 400 | 9 150 |
| 450 | 1 080 | 1 430 | 1 950 | 3 080 | 6 100 | 12 230 |
| 500 | 1 330 | 1 550 | 2 180 | 3 520 | 6 840 | 13 750 |
| | 1 420 | 1 640 | 2 300 | 4 060 | 7 620 | 15 280 |
| | 1 540 | 1 750 | 2 500 | 4 600 | 9 140 | 16 800 |
| | | 1 940 | 2 700 | 5 380 | 10 700 | |
| | | 2 050 | 2 870 | 6 100 | 12 200 | |
| | | 2 200 | 3 200 | 6 815 | 13 700 | |
| | | 2 300 | 3 600 | 7 600 | 15 200 | |
| | | 2 480 | 4 060 | 9 100 | | |
| | | 2 700 | 4 430 | 10 700 | | |
| | | | 4 820 | | | |
| | | | 5 370 | | | |
| | | | 6 070 | | | |

# Annex B

## Standard datum lengths in millimetres of narrow V-belt sections

| Nominal values | Distribution according to the sections | | | |
|---|---|---|---|---|
| | SPZ | SPA | SPB | SPC |
| 630 | + | | | |
| 710 | + | | | |
| 800 | + | + | | |
| 900 | + | + | | |
| 1 000 | + | + | | |
| 1 120 | + | + | | |
| 1 250 | + | + | + | |
| 1 400 | + | + | + | |
| 1 600 | + | + | + | |
| 1 800 | + | + | + | |
| 2 000 | + | + | + | + |
| 2 240 | + | + | + | + |
| 2 500 | + | + | + | + |
| 2 800 | + | + | + | + |
| 3 150 | + | + | + | + |
| 3 550 | + | + | + | + |
| 4 000 | + | + | + | + |
| 4 500 | | + | + | + |
| 5 000 | | | + | + |
| 5 600 | | | + | + |
| 6 300 | | | + | + |
| 7 100 | | | + | + |
| 8 000 | | | + | + |
| 9 000 | | | | + |
| 10 000 | | | | + |
| 11 200 | | | | + |
| 12 500 | | | | + |