

---

---

**Belt drives — Pulleys — Limiting  
values for adjustment of centres**

*Transmissions par courroies — Poulies — Limites de réglage  
d'entraxe*

STANDARDSISO.COM : Click to view the full PDF of ISO 155:2019



STANDARDSISO.COM : Click to view the full PDF of ISO 155:2019



**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2019

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
CP 401 • Ch. de Blandonnet 8  
CH-1214 Vernier, Geneva  
Phone: +41 22 749 01 11  
Fax: +41 22 749 09 47  
Email: [copyright@iso.org](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

Published in Switzerland

# Contents

Page

Foreword .....	iv
1 Scope .....	1
2 Normative references .....	1
3 Terms and definitions .....	1
4 Symbols .....	1
5 Specifications .....	2
6 Factors .....	3
Bibliography .....	6

STANDARDSISO.COM : Click to view the full PDF of ISO 155:2019

## 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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 41, *Pulleys and belts (including veebelts)*, Subcommittee SC 1, *Friction*.

This fourth edition cancels and replaces the third edition (ISO 155:1998), which has been technically revised. The main changes compared to the previous edition are as follows:

- adding of curvilinear sections to [Table 6](#);
- editorial clarifications of the document.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

# Belt drives — Pulleys — Limiting values for adjustment of centres

## 1 Scope

This document specifies the limiting values for the adjustment of centres of two transmission pulleys.

It is applicable to:

- crowned pulleys for flat belts;
- grooved pulleys for V-belts, either single, multiple or joined;
- grooved pulleys for V-ribbed belts;
- toothed pulleys for synchronous belts.

## 2 Normative references

There are no normative references in this document.

## 3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

## 4 Symbols

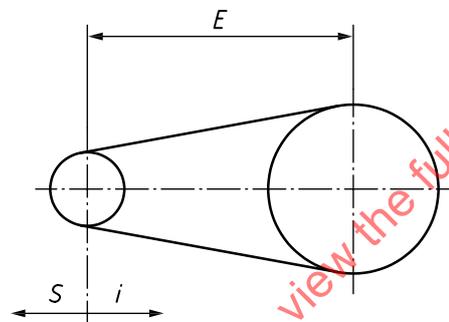
For the purpose of this document, the following symbols apply.

Symbol	Definition	Unit
$d \pm \delta_1$	Limits of small flat pulley diameter	mm
$D \pm \delta_2$	Limits of large flat pulley diameter	mm
$e$	Groove pitch of a V-ribbed pulley	mm
$E$	Nominal centre distance	mm
$E - i$	Lower limit for the adjustment of centre distance	mm
$E + s$	Upper limit for the adjustment of centre distance	mm
$i_1$	Factor related to the pulley dimensions and tolerances	—
$i_2$	Factor related to belt length tolerances	—
$L$	Nominal belt length	mm

$p_b$	Pitch of synchronous belt teeth	mm
$s_1$	Factor related to the pulley dimensions and tolerances	—
$s_2$	Factor related to belt length tolerances	—
$s_3$	Factor related to flat pulley crowning	—
$s_4$	Factor related to elastic properties of the belt	—
$W_d$	Datum width of a V-groove	mm
$W_e$	Effective width of a V-groove	mm

## 5 Specifications

Limiting values for adjustment of centre distance are specified in terms of factors  $i$  and  $s$  which are respectively subtracted from and added to the nominal centre distance,  $E$  (see [Figure 1](#)).



**Figure 1 — Limiting values for adjustment of centre distance of pulleys**

Values of  $i$  and  $s$  shall be rounded to the nearest millimetre.

Values of  $i$  and  $s$  are expressed as the sums of various components parts:

— for slack-off, see [Formula \(1\)](#):

$$i = i_1 + i_2 \quad (1)$$

where

$i_1$  is a factor related to the pulley dimensions and tolerances;

$i_2$  is a factor related to belt length tolerances;

— for take-up, see [Formula \(2\)](#):

$$s = s_1 + s_2 + s_3 + s_4 \quad (2)$$

where

- $s_1$  is a factor related to the pulley dimensions and tolerances;
- $s_2$  is a factor related to belt length tolerances;
- $s_3$  is a factor related to flat pulley crowning;
- $s_4$  is a factor related to elastic properties of the belt.

Factors with subscripts 1 to 3 determine the centre distance adjustment necessary to install a belt onto the pulleys and to readjust working tension.

Factor  $s_4$  determines the centre distance adjustment necessary to maintain correct operation of a belt under the influence of belt extension and dimensional wear.

These limiting values should be considered by the belt manufacturers as maxima, and by the designers and makers of the machinery as minima.

## 6 Factors

The values of the different factors are given in the following tables:

- for factor  $i$  and factor  $s$ , see [Table 1](#);
- for diameter tolerance for flat pulley, see [Table 2](#);
- for datum widths for V-belts, see [Table 3](#);
- for effective widths for joined V-belts, see [Table 4](#);
- for Groove pitch for V-ribbed belts, see [Table 5](#);
- for values of  $i_1$  for synchronous belts, see [Table 6](#);
- for values of  $s_4$  related to belt material, see [Table 7](#).

**Table 1 — Factor  $i$  and  $s$**

Factor	Belt type					Variation of centre distance
	Flat	Classical and narrow V-belt		V-ribbed	Synchronous	
		Individual	Joined			
$i_1$	$2 (\delta_1 + \delta_2)$	$2 w_d$	$5,1 w_e$	$5,1 e^a$	(see <a href="#">Table 6</a> )	Slack-off
$i_2$	$0,01 L$	$0,009 L$		$0,009 L$	0	
$s_1$	$1,5 (\delta_1 + \delta_2)$	0	0	0	0	Take-up
$s_2$	$0,01 L$	$0,009 L$		$0,009 L$	0	
$s_3$	$0,003 (d + D)$	0		0	0	
$s_4$	(see <a href="#">Table 7</a> )	$0,011 L$		(see <a href="#">Table 7</a> )	$0,005 L$	

<sup>a</sup> In case of the pulleys with flanges, the value shall be agreed with the belt manufacturers.

**Table 2 — Diameter tolerance for flat pulley**

Dimensions in millimetres

$d$	$\delta_1$
40	0,5
45 and 50	0,6
56 and 63	0,8
71 and 80	1
90 to 112	1,2
125 and 140	1,6
160 to 200	2
224 and 250	2,5
280 to 355	3,2
400 to 500	4
560 to 710	5

$d$	$\delta_2$
800 to 1 000	6,3
1 120 to 1 400	8
1 600 to 2 000	10

**Table 3 — Datum widths for V-belts**

Dimensions in millimetres

Classical section	Narrow section	Datum width
		$w_d$
Y	—	5,3
Z	SPZ	8,5
A	SPA	11
B	SPB	14
C	SPC	19
D	—	27
E	—	32

**Table 4 — Effective widths for joined V-belts**

Dimensions in millimetres

Classical section	Effective width	Narrow section	Effective width
	$w_e$		$w_e$
AJ	13	9J	8,9
BJ	16,5	15J	15,2
CJ	22,4	20J	20,9
DJ	32,8	25J	25,4

**Table 5 — Groove pitch for V-ribbed belts**

Dimensions in millimetres

Profile	Groove pitch <i>e</i>
PH	1,6
PJ	2,34
PK	3,56
PL	4,7
PM	9,4

**Table 6 — Values of  $i_1$  for synchronous belts**

Dimensions in millimetres

Pitch designation	$P_b$	$i_1^a$		
		With flange on belt assembly side of large pulley or on both pulleys	With flange on belt assembly side of small pulley only	Without flange on belt assembly side
MXL	2,032	2,5 $p_b$	1,3 $p_b$	0,9 $p_b$
XXL	3,175	2,5 $p_b$		
XL	5,08	1,8 $p_b$		
L	9,525	1,5 $p_b$		
H	12,7	1,5 $p_b$		
XH	22,225	2 $p_b$		
XXH	31,75	2 $p_b$		
H3M, R3M	3	4,8 $p_b$	2,5 $p_b$	2,0 $p_b$
H5M, R5M	5	4,8 $p_b$		
G8M, H8M, R8M, S8M	8	3,8 $p_b$		
H14M, R14M, S14M	14	3,8 $p_b$		
H20M, R20M	20	3,8 $p_b$		
T2.5	2,5	3,0 $p_b$	1,5 $p_b$	0,9 $p_b$
AT3	3	3,3 $p_b$	1,7 $p_b$	
T5/AT5	5	2,4 $p_b$	1,3 $p_b$	
T10/AT10	10	2,4 $p_b$	1,3 $p_b$	
T20/AT20	20	2,0 $p_b$	1,1 $p_b$	

<sup>a</sup> Values are valid for minimum flange heights as specified in ISO 19347:2015, Table A.1, ISO 13050:2014, Annex D and ISO 17396:2017, Table A.6. If these flange heights are exceeded, the centre adjustment values should be increased accordingly.

**Table 7 — Values of  $s_4$  related to belt material**

Material of belt, tensile members	$s_4$
Low modulus of elasticity, e.g. polyamide or similar	0,016 $L$
Mid modulus of elasticity, e.g. polyester or similar	0,011 $L$
High modulus of elasticity, e.g. aramid, glass fibre or metal	0,005 $L$