INTERNATIONAL STANDARD

ISO 155

Third edition
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Belt drives — Pulleys — Limiting values for adjustment of centres

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

Reference number
ISO 155:1998(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 voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 155 was prepared by Technical Committee ISO/TC 41, *Pulleys and belts (including veebelts),* Subcommittee SC 1, *Veebelts and grooved pulleys.*

This third edition cancels and replaces the second edition (ISO 155:1989), which has been technically revised. In particular, the grooved pulleys for V-ribbed belts have been added.

Annex A of this International Standard is for information only.

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Belt drives — Pulleys — Limiting values for adjustment of centres

1 Scope

This International Standard 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.

NOTE — All dimensions are expressed in millimetres.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this International Standard. At the time of the publication, the edition indicated was 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 edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 5294:1989 *Synchronous belt drives — Pulleys.*

3 Symbols

E = Nominal centre distance

$E - i$ = Lower limit for the adjustment of centre distance

$E + s$ = Upper limit for the adjustment of centre distance

L = Nominal belt length

$d \pm \delta_1$ = Limits of small flat pulley diameter

$D \pm \delta_2$ = Limits of large flat pulley diameter

w_d = Datum width of a V-groove

W_e = Effective width of a V-groove

e = Groove pitch of a V-ribbed pulley

p_b = Pitch of synchronous belt teeth

4 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).

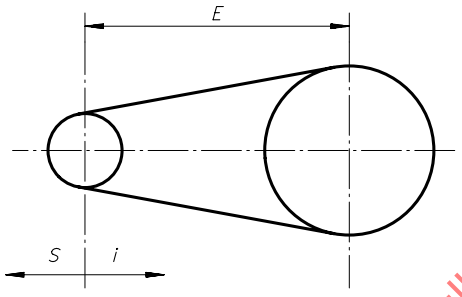

Figure 1

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:

$i = i_1 + i_2$ (slack-off)

$s = s_1 + s_2 + s_3 + s_4$ (take-up)

where

i_1 and s_1 relate to the pulley dimensions and tolerances;

i_2 and s_2 relate to belt length tolerances;

s_3 relates to flat pulley crowning;

s_4 relates 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.

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

5 Factors

Table 1 — Factors *i* and *s*

Factors	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	5,1e *)	(see table 6)	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 table 7)	0,011 L		(see table 7)	0,005 L	
*) In case of the pulleys with flanges, the value shall be agreed with the belt manufacturers.						

Table 2 — Diameter tolerance for flat pulley

d mm	δ_1 mm
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 mm	δ_2 mm
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

Classical section	Narrow section	Datum width w_d mm
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

Classical section	Effective width w_e mm	Narrow section	Effective width w_e mm
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

Profile	Groove pitch e mm
PH	1,6
PJ	2,34
PK	3,56
PL	4,7
PM	9,4

Table 6 — Values of i_1 for synchronous belts

Pitch designation	p_b mm	i_1 *)		
		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		
XXL	3,175	2,5 p_b		
XL	5,08	1,8 p_b		
L	9,525	1,5 p_b	1,3 p_b	0,9 p_b
H	12,7	1,5 p_b		
XH	22,225	2 p_b		
XXH	31,75	2 p_b		

*) Values are valid for minimum flange heights as specified in ISO 5294:1989, table 7. 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, for example polyamide or similar	0,016 *L*
Mid modulus of elasticity, for example polyester or similar	0,011 *L*
High modulus of elasticity, for example aramid, glass fibre or metal	0,005 *L*

Annex A
(informative)

Bibliography

[1] ISO 22:1991, *Flat transmission belts and corresponding pulleys — Dimensions and tolerances*.

[2] ISO 4183:1995, *Belt drives — Classical and narrow V-belts — Grooved pulleys (system based on datum width).*

[3] ISO 41841992, *Belt drives — Classical and narrow V-belts — Length in datum system*.

[4] ISO 5290:1993, *Belt drives — Grooved pulleys for joined narrow V-belts — Grooved sections 9J, 15J, 20J and 25 J (effective system).*

[5] ISO 5291:1993, *Belt drives — Grooved pulleys for joined classical V-belts — Grooved sections AJ, BJ, CJ and DJ (effective system).*

[6] ISO 5296-1:1989, *Synchronous belt drives — Belts — Part 1: Pitch codes MXL, HL, L, H, HX and XXH — Metric and inch dimensions.*

[7] ISO 5296-2:1989, *Synchronous belt drives — Belts — Part 2: Pitch codes MXL and XXL — Metric dimensions*.

[8] ISO 8419:1994, *Belt drives — Narrow joined V-belts — Length in effective system*.

[9] ISO 9982:1998, *Belt drives — Pulleys and V-ribbed belts for industrial applications — PH, PJ, PK, PL and PM profiles: Dimensions.*