INTERNATIONAL STANDARD

ISO 13050

Second edition
2014-12-01

Synchronous belt drives — Metric pitch, curvilinear profile systems G, H, R and S, belts and pulleys

Transmissions synchrones — Pas métrique, systèmes à denture curviligne G, H, R et S, courroies et poulies

Reference number
ISO 13050:2014(E)

Contents

Page

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).

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).

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

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 41, *Belts and pulleys (including veebelts)*, Subcommittee SC 4, *Synchronous belt drives*.

This second edition cancels and replaces the first edition (ISO 13050:1999), which has been technically revised.

Synchronous belt drives — Metric pitch, curvilinear profile systems G, H, R and S, belts and pulleys

1 Scope

This International Standard specifies the principal characteristics of metric pitch curvilinear synchronous endless belts and pulleys in G, H, R, and S profile systems for use in synchronous belt drives (also known in the past as timing belt drives, positive belt drives, gear belt drives) for mechanical power transmission and where positive indexing or synchronization might be required.

The principal belt and pulley characteristics include the following:

a) nominal belt tooth dimensions;

b) belt tooth pitch spacing;

c) belt length and width dimensions and tolerances;

d) belt length measurement specifications;

e) pulley groove dimensions and tolerances;

f) pulley diameter and width dimensions and tolerances;

g) pulley quality specification.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

3 Synchronous belt drive system types

Four profile systems and 14 profiles for curvilinear synchronous drives are standardized.

Profile system G

Profile G8M
(Tooth/groove pitch 8mm)

Profile G14M
(Tooth/groove pitch 14mm)

Profile system R

Profile R3M
(Tooth/groove pitch 3mm)

Profile R5M
(Tooth/groove pitch 5mm)

Profile R8M
(Tooth/groove pitch 8mm)

Profile R14M
(Tooth/groove pitch 14mm)

Profile R20M
(Tooth/groove pitch 20mm)

Profile system H

Profile H3M
(Tooth/groove pitch 3mm)

Profile H5M
(Tooth/groove pitch 5mm)

Profile H8M
(Tooth/groove pitch 8mm)

Profile H14M
(Tooth/groove pitch 14mm)

Profile H20M
(Tooth/groove pitch 20mm)

Profile system S

Profile S8M
(Tooth/groove pitch 8mm)

Profile S14M
(Tooth/groove pitch 14mm)

4 Belt nomenclature

A belt is identified as follows:

a) the belt length or pitch length in millimetres, e.g. 1 400 mm;

b) the profile system, e.g. “G”,“H”, “R”, or “S”;

c) the pitch or tooth pitch in millimetres, e.g. 14 mm;

d) the width or belt width in millimetres, e.g. 40 mm (for profile system S, the width in millimetres × 10);

e) double-sided belts are designated by adding the letter “D” before the designation of the profile system.

EXAMPLE A synchronous belt in the above profile systems of 1 400 mm length, 14 mm pitch, and 40 mm wide is identified as follows:

Profile system G
1400-G14M-40
1400-DG14M-40

Profile system R
1400-R14M-40
1400-DR14M-40

Profile system H
1400-H14M-40
1400-DH14M-40

Profile system S
1400-S14M-400
1400-DS14M-400

5 Pulley nomenclature

A pulley is identified as follows:

a) the letter “P” indicates a pulley;

b) the number of grooves, e.g. 30;

c) the profile system, e.g. “G“, “H”, “R”, or “S”;

d) the pitch or groove pitch in millimetres, e.g. 14 mm;

e) the width or belt width in millimetres, e.g. 40 mm (for profile system S, the width in millimetres × 10).

EXAMPLE A pulley in the above profile systems of 30 grooves, 14 mm pitch, and 40 mm wide is identified as follows:

Profile system G
P30-G14M-40

Profile system R
P30-R14M-40

Profile system H
P30-H14M-40

Profile system S
P30-S14M-400

6 Profile system G

6.1 Belt dimensions and tolerances

6.1.1 Belt tooth dimensions

The nominal belt tooth dimensions are given in Table 1 and shown in Figure 1.

Table 1 — Nominal tooth dimensions

Dimensions in millimetres

Profile	Belt pitch	b_g	h_g	R1	Ao	a[a]	xo	L1
G8M	8	5,200	3,43	0,74	2,29	0,80	0,379	1,378
G14M	14	9,100	6,00	1,30	4,00	1,40	0,661	2,422

[a] a is the belt design pitch differential.

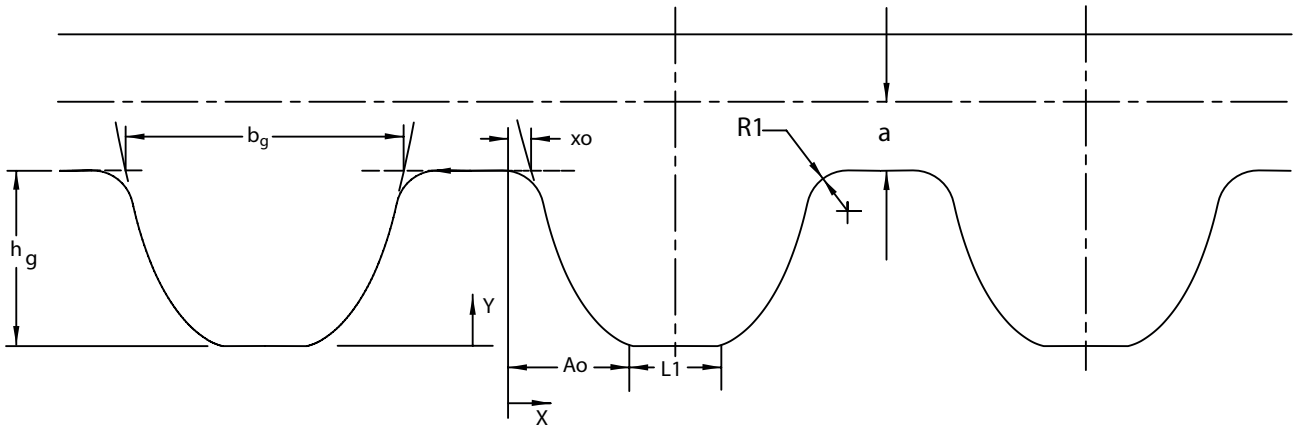


Figure 1 — Tooth dimensions — Profile system G

Detail of tooth face

For $Ao \geq x \geq xo$:

$$y = \left[In\left(Ao / x + \sqrt{(Ao / x)^2 - 1} \right) - \sqrt{1 - (x / Ao)^2} \right] \quad (1)$$

where

xo corresponds to $y = hg$;

L1 is equal to $bg - 2(Ao\text{-}xo)$.

NOTE 1 Indicated base tooth profile remains constant in all parts.

NOTE 2 "O" reference points remain in contact with the part outer surface generated by part radius of curvature.

NOTE 3 Groove profile bottom surface in circular part form is an arc whose chordal distance is L1 and whose radius originates at the part centre.

6.1.2 Belt widths and tolerances

Belt widths and tolerances are given in Table 2.

Table 2 — Widths and width tolerances

Dimensions in millimetres

Profile	Nominal belt width	Tolerance on width for belt pitch lengths		
		Up to and including 840 mm	Over 840 mm and up to and including 1 680 mm	Over 1 680 mm
G8M	12	+0,8 −0,8	+0,8 −1,2	+0,8 −1,2
	21	+0,8 −0,8	+0,8 −1,2	+0,8 −1,2
	36	+0,8 −0,8	+0,8 −1,2	+0,8 −1,2
	62	+1,2 −1,2	+1,2 −1,6	+1,6 −1,6
G14M	20	+0,8 −0,8	+0,8 −1,2	+0,8 −1,2
	37	+0,8 −0,8	+0,8 −1,2	+0,8 −1,2
	68	+1,2 −1,6	+1,6 −1,6	+1,6 −2,0
	90	+1,6 −1,6	+1,6 −2,0	+2,0 −2,0
	125	+2,4 −2,4	+2,4 −2,8	+2,4 −3,2

6.1.3 Pitch length measurement

See Annex A for tolerances and Annex B for the relationship between the centre distance and the belt pitch length.

6.1.3.1 Measuring fixture (see Figure 3)

The pitch length of a synchronous belt shall be determined by placing the belt on a measuring fixture composed of the following elements.

6.1.3.1.1 Two pulleys of equal diameter, as specified in Table 3, of the proper belt profile and having standard tooth space dimensions. These pulleys should be made to the tolerances shown in Table 3. One pulley shall be free to rotate on a fixed-position shaft, while the other shall be free to rotate on a moveable shaft to permit the centre distance to change.

6.1.3.1.2 Means of applying a total measuring force to the moveable pulley.

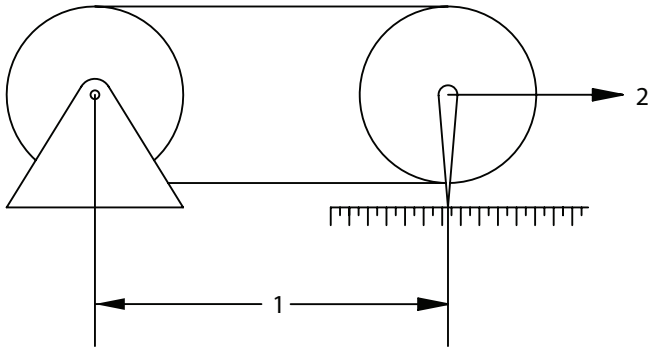
6.1.3.1.3 Means of measuring the centre distance between the two pulleys with the necessary degree of accuracy for centre distance measurement.

6.1.3.2 Total measuring force

The total measuring force to be applied for measuring belts is given in Table 4.

6.1.3.3 Procedure

In measuring the pitch length of a synchronous belt, the belt should be rotated at least two revolutions to seat it properly and to divide the total force equally between the two spans of the belt. The pitch length shall be calculated by adding the pitch circumference of one of the pulleys to twice the measured centre distance.



Key

1 centre distance

2 total measuring force

Figure 2 — Diagram of fixture for measuring pitch length

Table 3 — Belt length measuring pulleys

Dimensions in millimetres

Profile	Number of grooves	Pitch circumference	Outside diameter[a]	Radial runout F.I.M.[b]	Axial runout F.I.M.[b]
G8M	34	272	84,980 ±0,013	0,013	0,025
G14M	40	560	175,454 ±0,025	0,013	0,051

a Pulleys outside of the diameter tolerance range specified can be used if the resulting belt length measurements are corrected for the actual pulley diameters.

b Full indicator movement.

NOTE The number of pulley teeth specified in Table 3 determines the recommended sizes for measuring the belt pitch length. Practically, other sizes of pulleys could be used provided they have the same number of teeth, and meet the dimensional requirements of Table 3.

Table 4 — Total measuring force

Forces in newtons

Profile	Belt width mm								
	12	20	21	36	37	62	68	90	125
G8M	267	—	467	756	—	1223	—	—	—
G14M	—	1179	—	—	2046	—	3447	4315	5627

6.2 Pulleys, profile system G

6.2.1 General

See Annex C for tolerances.

The pulley is characterized by a curvilinear groove profile. This groove profile is defined as the profile formed by the generating tool rack form required to machine-finish the curvilinear profile. The profile is different for each pulley diameter, but can be closely approximated by a nominal groove profile over specified ranges of number of grooves.

6.2.2 Generating tool rack

Dimensions and tolerances for the generating tool rack for pulleys with profile system G are given in Table 5 and shown in Figure 3.

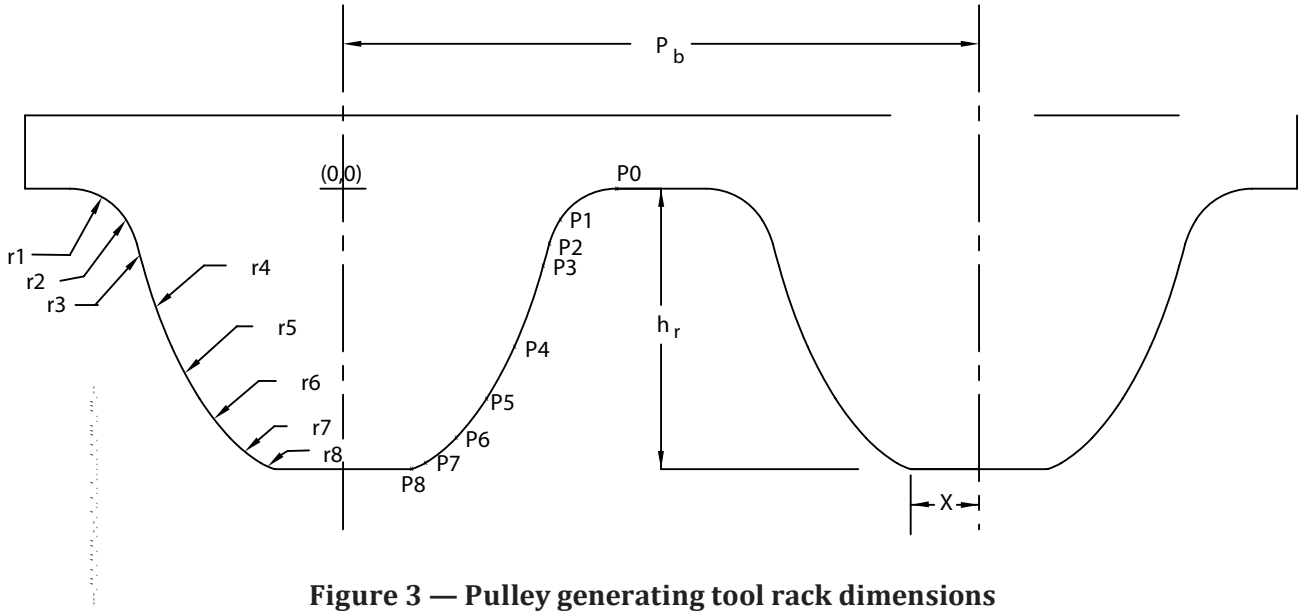


Figure 3 — Pulley generating tool rack dimensions

Table 5 — Pulley generating tool rack dimensions

Dimensions in millimetres

Profile	Number of grooves	P_b	h_r	P_0 (X,Y)	r_1	P_1 (X,Y)	r_2	P_2 (X,Y)	r_3	P_3 (X,Y)	r_4	P_4 (X,Y)	r_5	P_5 (X,Y)	r_6	P_6 (X,Y)	r_7	P_7 (X,Y)	r_8	P_8 (X,Y)	X
G8M	22 to 27	7,784	3,541	3,480	0,842	2,710	1,459	2,567	—	—	8,833	2,427	5,882	1,841	3,123	1,324	1,450	0,979	0,552	0,856	0,856
				0		−0,433		−0,788				−1,275		−2,580		−3,235		−3,491		−3,541	
	28 to 37	7,843	3,513	3,448	0,828	2,746	1,086	2,578	—	—	9,487	2,447	5,901	1,894	3,152	1,367	1,505	1,009	0,640	0,843	0,843
				0		−0,348		−0,715				−1,193		−2,486		−3,177		−3,447		−3,513	
	38 to 58	7,891	3,487	3,426	0,819	2,829	0,918	2,583	—	—	9,964	2,462	5,921	1,940	3,181	1,410	1,562	1,024	0,669	0,831	0,831
				0		−0,232		−0,668				−1,126		−2,402		−3,119		−3,414		−3,487	
	59 to 89	7,930	3,467	3,412	0,818	2,943	0,846	2,586	—	—	10,385	2,470	5,932	1,978	3,205	1,443	1,614	1,039	0,725	0,820	0,820
				0		−0,130		−0,632				−1,082		−2,328		−3,072		−3,384		−3,467	
	90 to 250	8,040	3,452	3,558	0,846	3,040	0,957	2,751	1,984	2,617	8,275	2,345	5,111	1,978	3,042	1,559	1,725	1,181	0,805	0,951	0,951
				0		−0,164		−0,512		−0,873		−1,724		−2,495		−3,056		−3,359		−3,452	
G14M	27 to 29	13,674	6,174	6,009	1,461	4,777	2,188	4,536	9,728	4,405	11,867	3,768	9,625	3,161	6,114	2,486	3,338	1,808	1,511	1,505	1,505
				0		−0,684		−1,222		−1,696		−3,487		−4,619		−5,489		−6,041		−6,174	
	30 to 35	13,725	6,147	5,986	1,453	4,738	2,206	4,519	9,448	4,418	11,919	3,800	9,584	3,213	6,129	2,522	3,433	1,850	1,588	1,496	1,496
				0		−0,717		−1,244		−1,626		−3,408		−4,531		−5,436		−5,990		−6,147	
	36 to 45	13,780	6,117	5,961	1,446	4,685	2,241	4,490	—	—	13,051	3,951	10,115	3,297	6,163	2,582	3,489	1,883	1,672	1,485	1,485
				0		−0,780		−1,312				−3,041		−4,387		−5,356		−5,942		−6,117	
	46 to 60	13,831	6,090	5,940	1,437	4,652	2,180	4,484	—	—	13,091	3,971	10,092	3,417	6,222	2,649	3,541	1,913	1,745	1,476	1,476
				0		−0,815		−1,313				−2,983		−4,172		−5,267		−5,899		−6,090	
	61 to 90	13,879	6,065	5,9190	1,429	4,608	2,151	4,484	—	—	13,183	3,988	10,067	3,463	6,236	2,702	3,586	1,940	1,812	1,467	1,467
						−0,883		−1,285				−2,928		−4,081		−5,193		−5,857		−6,065	
	91 to 149	13,927	6,040	5,900	1,420	4,568	2,586	4,476	—	—	13,304	4,014	10,051	3,505	6,245	2,746	3,629	1,969	1,872	1,458	1,458
				0		−0,955		−1,292				−2,848		−3,997		−5,128		−5,815		−6,040	
	150 to 250	13,956	6,024	5,887	1,414	4,537	5,757	4,458	—	—	13,150	4,030	10,051	3,533	6,249	2,701	3,652	1,983	1,908	1,453	1,453
				0		−1,031		−1,352				−2,799		−3,938		−5,171		−5,792		−6,024	

6.2.3 Pulley groove profile dimensions and tolerances

Dimensions and tolerances for the pulley groove profile for G8M and G14M pulleys are given in Table 6 and shown in Figures 4 and 5.

Table 6 — Pulley groove profile dimensions

Dimensions in millimetres

Profile	Number of grooves	b_g	h_g	R_1	Ao	xo	L1	a
G8M	22 to 89	5,400	3,43	0,80	2,29	0,379	1,60	0,80
	90 to 250	5,660	3,43	0,80	2,29	0,379	1,60	
G14M	28 to over	9,450	6,00	1,40	4,00	0,661	2,80	1,40

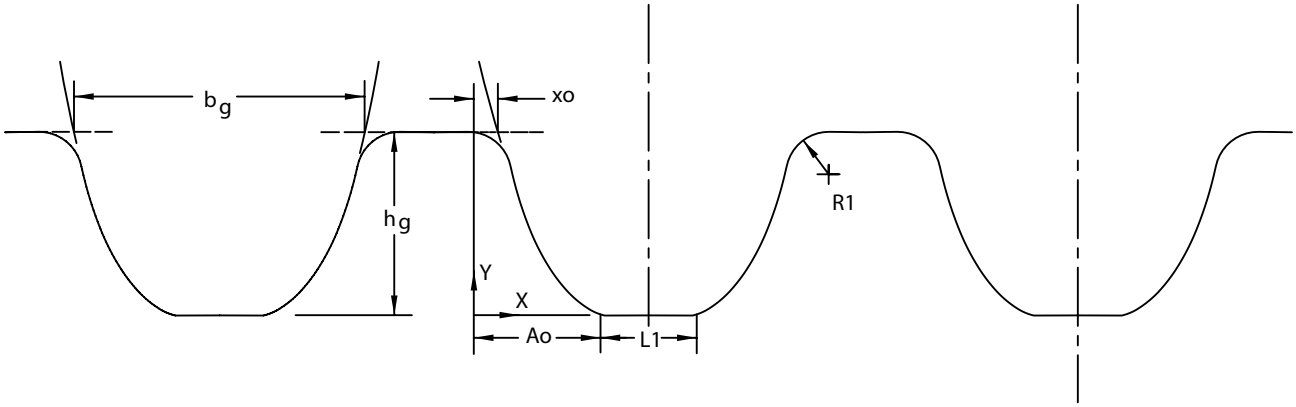


Figure 4 — Pulley groove profile

For $Ao \geq x \geq xo$:

$$y = \left[In\left(Ao/x + \sqrt{(Ao/x)^2 - 1} \right) - \sqrt{1 - (x/Ao)^2} \right] \quad (2)$$

where

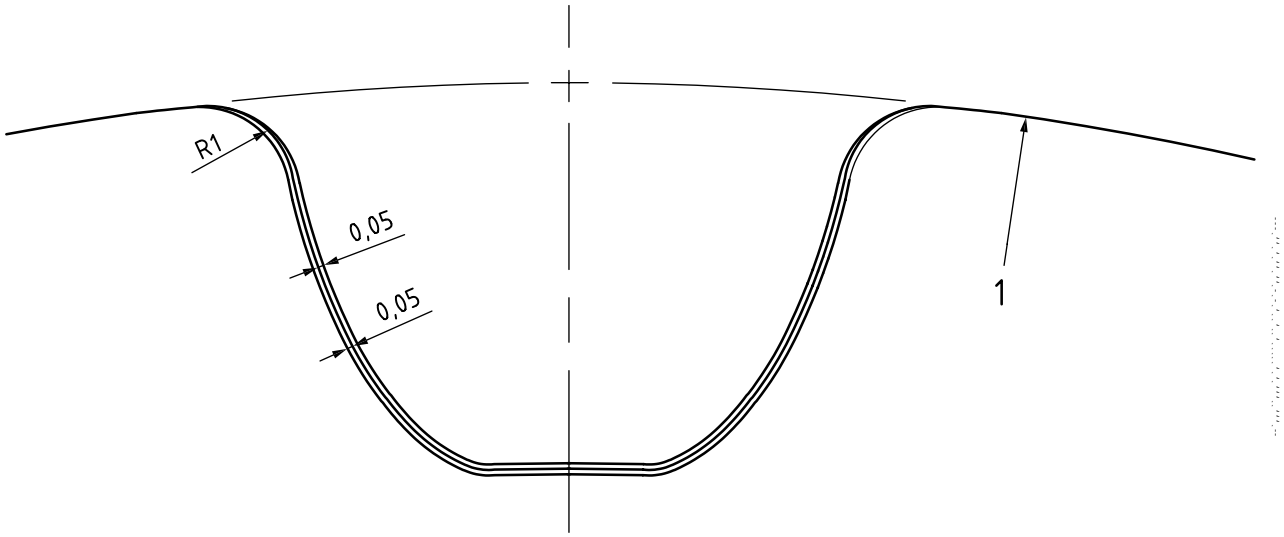
xo corresponds to $y = hg$;

L1 is equal to $bg - 2(Ao-xo)$.

NOTE 1 Indicated base tooth profile remains constant in all parts.

NOTE 2 "O" Reference points remain in contact with the part outer surface generated by part radius of curvature.

NOTE 3 Groove profile bottom surface in circular part form is an arc whose chordal distance is L1 and whose radius originates at the part centre.



Key

1 pulley outside diameter

NOTE The true profile of the groove sides can only be produced by plotting the function associated with the cross-section.

Figure 5 — Groove profile — Tolerance bands — Millimetres

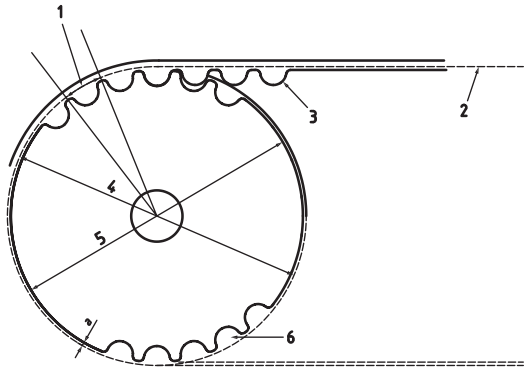
6.2.4 Pulley outside diameters

Pulleys outside diameters for the standard pulleys are given in Table 7. The relationship of the pulley outside and pitch diameters is illustrated in Figure 6 and Formulae (3) and (4).

$$\text{Pitch diameter} = \frac{\text{No. of grooves} \times \text{pulley pitch}}{\pi} \quad (3)$$

$$\text{Outside diameter} = \text{Pitch diameter} - 2a \quad (4)$$

where a is given in Table 1.



Key

1 pitch
2 belt pitch line
3 belt tooth
4 pitch diameter
5 outside diameter
6 pulley groove

Figure 6 — Pulley dimensions

Table 7 — Standard pulley sizes

Dimensions in millimetres

Number of grooves	Profile			
	G8M		G14M	
	Pitch diameter	Outside diameter	Pitch diameter	Outside diameter
22	56,02	54,42		
25	63,66	62,06		
28	71,30	69,70	124,78	121,98
29			129,23	126,43
30	76,39	74,79	133,69	130,89
31			138,15	135,35
32	81,49	79,89	142,60	139,80
33			147,06	144,26
34	86,58	84,98	151,52	148,72
35			155,97	153,17
36	91,67	90,07	160,43	157,63
37			164,88	162,08
38	96,77	95,17	169,34	166,54
39			173,80	171,00
40	101,86	100,26	178,25	175,45
42	106,95	105,35		
43			191,62	188,82
44			196,08	193,28
45	114,59	112,99	200,54	197,74
48	122,23	120,63	213,90	211,10
50	127,32	125,72	222,82	220,02
53	134,96	133,36	236,19	233,39
56	142,60	141,00	249,55	246,75
60	152,79	151,19	267,38	264,58
63	160,43	158,83	280,75	277,95
64	162,97	161,37	285,21	282,41
67	170,61	169,01	298,57	295,77
71	180,80	179,20	316,40	313,60
72			320,86	318,06
75	190,99	189,39	334,23	331,43
80	203,72	202,12	356,51	353,71
90	229,18	227,58	401,07	398,27

Table 7 *(continued)*

Number of grooves	Profile			
	G8M		G14M	
	Pitch diameter	Outside diameter	Pitch diameter	Outside diameter
112	285,21	283,61	499,11	496,31
140	356,51	354,91	623,89	621,09
168			748,66	745,86
192	488,92	487,32		
180	458,37	456,77	802,14	799,34
192			855,62	852,82
200			891,27	888,47
224	570,41	568,81	998,22	995,42

6.2.5 Pulley width

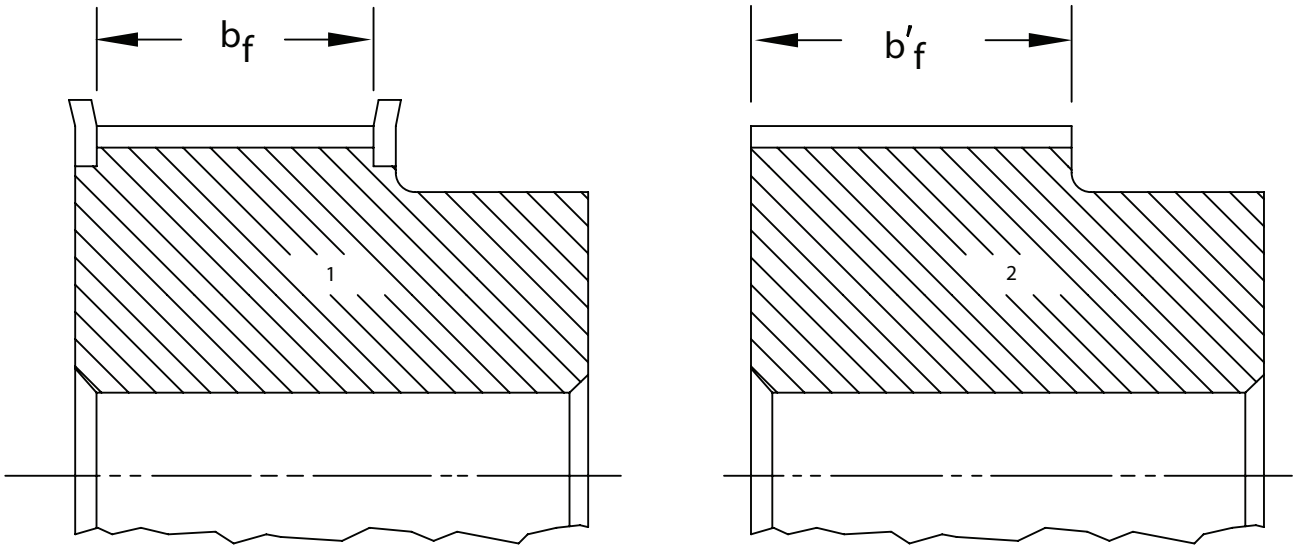
The standard nominal pulley width, and the minimum actual pulley width required, b_f for flanged pulleys, b'_f for unflanged pulleys are given in Table 8 and shown in Figure 7. Users are advised that the values given for b'_f apply also to pulleys with only one flange (see Annex D).

Table 8 — Standard pulley widths

Dimensions in millimetres

Profile	Standard nominal pulley width	Minimum pulley width	
		Flanged b_f	Unflanged b'_f
G8M	12	14	22
	21	23	30
	36	40	47
	62	66	74
G14M	20	26	35
	37	44	52
	68	76	85
	90	99	107
	125	134	143

The minimum unflanged pulley width can be reduced when the alignment of the drive can be controlled, but shall not be less than the minimum flanged pulley width.



Key

1 flanged pulley

2 unflanged pulley

Figure 7 — Minimum pulley width

7 Profile system H

7.1 Belt dimensions and tolerances

7.1.1 Belt tooth dimensions

The nominal belt tooth dimensions are the same for single-sided and double-sided belts; they are given in Table 9 and shown in Figure 8.

Table 9 — Nominal tooth dimensions

Dimensions in millimetres

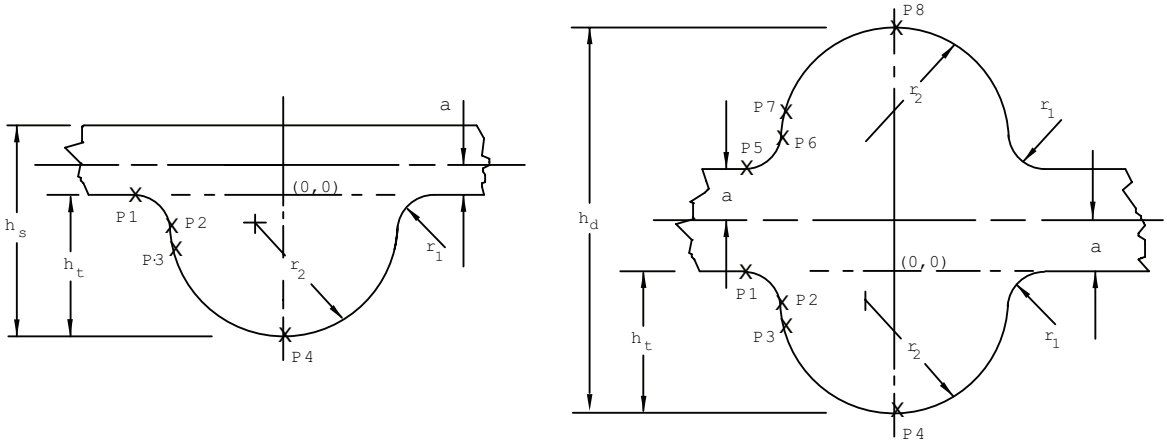
Profile	Pitch	h_s	h_d	h_t	P_1 (X, Y)	P_5 (X, Y)	r_1	P_2 (X, Y)	P_6 (X, Y)	P_3 (X, Y)	P_7 (X, Y)	r_2	P_4 (X, Y)	P_8 (X, Y)	a[a]
H3M	3	2,4	—	1,21	−1,14 0,00	—	0,30	−0,83 −0,30	—	−0,83 −0,35	—	0,86	0,00 −1,21	—	0,381
DH3M	3	—	3,2	—	—	−1,14 0,76	0,30	—	−0,83 1,06	—	−0,83 1,11	0,86	—	0,00 1,97	0,381
H5M	5	3,8	—	2,08	−1,85 0,00	—	0,41	−1,44 −0,42	—	−1,44 −0,53	—	1,50	0,00 −2,08	—	0,572
DH5M	5	—	5,3	—	—	−1,85 1,14	0,41	—	−1,44 1,56	—	−1,44 1,67	1,50	—	0,00 3,22	0,572
H8M	8	6,0	—	3,38	−3,30 0,00	—	0,76	−2,55 −0,65	—	−2,47 −1,17	—	2,59	0,00 −3,38	—	0,686
DH8M	8	—	8,1	—	—	−3,30 1,37	0,76	—	−2,55 2,02	—	−2,47 2,54	2,59	—	0,00 4,75	0,686
H14M	14	10,0	—	6,02	−5,78 0,00	—	1,42	−4,36 −1,29	—	−4,30 −1,97	—	4,46	0,00 −6,02	—	1,397

[a] a is the belt design pitch differential.

Table 9 *(continued)*

Profile	Pitch	h_s	h_d	h_t	P_1 (X, Y)	P_5 (X, Y)	r_1	P_2 (X, Y)	P_6 (X, Y)	P_3 (X, Y)	P_7 (X, Y)	r_2	P_4 (X, Y)	P_8 (X, Y)	a[a]
DH14M	14	—	14,8	—	—	−5,78 2,79	1,42	—	−4,36 4,08	—	−4,30 4,76	4,46	—	0,00 8,81	1,397
H20M	20	13,2	—	8,68	−8,34 0,00	—	2,03	−6,32 −1,84	—	−6,22 −2,90	—	6,40	0,00 −8,68	—	2,159

[a] a is the belt design pitch differential.



1 2

Key

1 single-sided
2 double-sided

Figure 8 — Tooth dimensions – Profile system H

7.1.2 Belt widths and tolerances

Belt widths and tolerances are given in Table 10.

Table 10 — Widths and width tolerances

Dimensions in millimetres

Profile	Nominal belt width	Tolerance on width for belt pitch lengths		
		Up to and including 840 mm	Over 840 mm and up to and including 1 680 mm	Over 1 680 mm
H3M, DH3M	6 9	+0,4 −0,8	+0,4 −0,8	—
	15	+0,8 −0,8	+0,8 −1,2	+0,8 −1,2
H5M, DH5M	9	+0,4 −0,8	+0,4 −0,8	—
	15 25	+0,8 −0,8	+0,8 −1,2	+0,8 −1,2

Table 10 *(continued)*

Profile	Nominal belt width	Tolerance on width for belt pitch lengths		
		Up to and including 840 mm	Over 840 mm and up to and including 1 680 mm	Over 1 680 mm
H8M, DH8M	20 30	+0,8 −0,8	+0,8 −1,2	+0,8 −1,2
	50	+0,8 −1,2	+1,2 −1,2	+1,2 −1,6
	85	+1,6 −1,6	+1,6 −2,0	+2,0 −2,0
H14M, DH14M	40	+0,8 −1,2	+1,2 −1,2	+1,2 −1,6
	55	+1,2 −1,2	+1,2 −1,6	+1,6 −1,6
	85	+1,6 −1,6	+1,6 −2,0	+2,0 −2,0
	115 170	+2,4 −2,4	+2,4 −2,8	+2,4 −3,2
H20M	115 170	+2,4 −2,4	+2,4 −2,8	+2,4 −3,2
	230 290 340	—	—	+4,8 −6,4

7.1.3 Pitch length measurement

See Annex A for tolerances and Annex B for the relationship between the centre distance and the belt pitch length.

7.1.3.1 Measuring fixture (see Figure 9)

The pitch length of a synchronous belt shall be determined by placing the belt on a measuring fixture composed of the following elements.

7.1.3.2 Two pulleys of equal diameter, as specified in Table 11, of the proper belt type and having standard tooth space dimensions. These pulleys should be made to the tolerances shown in Table 11. One pulley shall be free to rotate on a fixed-position shaft, while the other shall be free to rotate on a moveable shaft to permit the centre distance to change.

7.1.3.3 Means of applying a total measuring force to the moveable pulley.

7.1.3.4 Means of measuring the centre distance between the two pulleys with the necessary degree of accuracy for centre distance measurement.

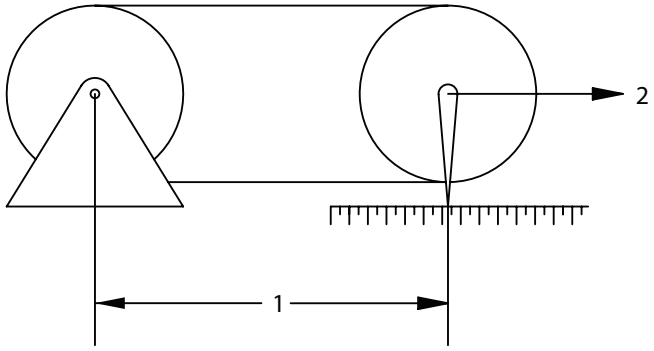
7.1.3.5 Total measuring force

The total measuring force to be applied for measuring belts is given in Table 12.

7.1.4 Procedure

In measuring the pitch length of a synchronous belt, the belt should be rotated at least two revolutions to seat it properly and to divide the total force equally between the two spans of the belt. The pitch length shall be calculated by adding the pitch circumference of one of the pulleys to twice the measured centre distance.

Check double-sided belts on both tooth faces.



Key

1 centre distance

2 total measuring force

Figure 9 — Diagram of fixture for measuring pitch length

Table 11 — Belt length measuring pulleys

Dimensions in millimetres

Profile	Number of grooves	Pitch circumference	Outside diameter[a]	Radial runout F.I.M.[b]	Axial runout F.I.M.[b]
H3M, DH3M	30	90	27,886 ±0,013	0,013	0,025
H5M, DH5M	20	100	30,687 ±0,013	0,013	0,025
H8M, DH8M	34	272	85,208 ±0,013	0,013	0,025
H14M, DH14M	40	560	175,46 ±0,025	0,013	0,051
H20M	40	800	250,33 ±0,036	0,013	0,076

[a] Pulleys outside of the diameter tolerance range specified can be used if the resulting belt length measurements are corrected for the actual pulley diameters.

[b] Full indicator movement.

NOTE The number of pulley teeth specified in Table 11 determines the recommended sizes for measuring the belt pitch length. Practically, other sizes of pulleys could be used provided they have the same number of teeth, and meet the dimensional requirements of Table 11.

Table 12 — Total measuring force

Forces in newtons

Profile	Belt width mm														
	6	9	15	20	25	30	40	50	55	85	115	170	230	290	340
H3M, DH3M	45	76	138	—	—	—	—	—	—	—	—	—	—	—	—
H5M, DH5M	—	111	214	—	376	—	—	—	—	—	—	—	—	—	—
H8M, DH8M	—	—	—	470		750	—	1 320	—	2 310	—	—	—	—	—
H14M, DH14M	—	—	—	—	—	—	1 350	—	2 130	3 660	5 180	7 960	—	—	—
H20M	—	—	—	—	—	—	—	—	—	—	6 961	10 729	14 839	18 949	22 374

7.2 Pulleys, profile system H

7.2.1 General

See Annex C for tolerances.

The pulley is characterized by a curvilinear groove profile. This groove profile is defined as the profile formed by the generating tool rack form required to machine-finish the curvilinear profile. The profile is different for each pulley diameter, but can be closely approximated by a nominal groove profile over specified ranges of number of grooves.

7.2.2 Generating tool rack

Dimensions and tolerances for the generating tool rack for pulleys with profile system H are given in Table 13 and shown in Figure 10.

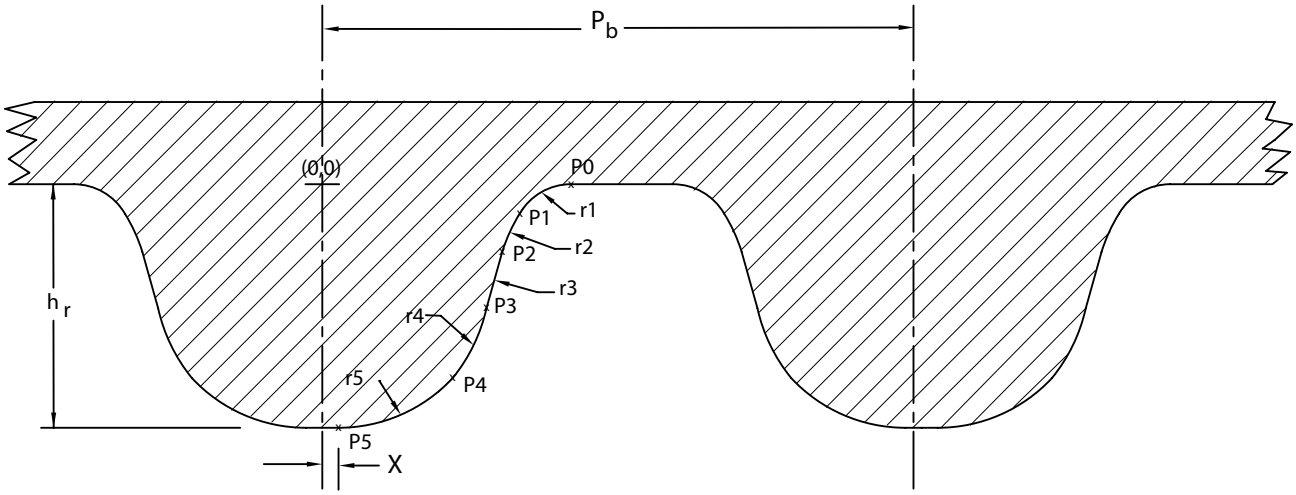


Figure 10 — Pulley generating tool rack form

Table 13 — Pulley generating tool rack dimensions

Profile	Number of grooves	P_b ±0,012	h_r ±0,015	Po (X, Y)	r_1 ±0,012	P_1 (X, Y)	r_2 ±0,012	P_2 (X, Y)	r_3 ±0,012	P_3 (X, Y)	r_4 ±0,012	P_4 (X, Y)	r_5 ±0,012	P_5 (X, Y)	X
H3M	9 to 13	3,000	1,196	1,423 0	0,414	1,061 −0,213	—	—	∞	0,712 −0,840	0,559	0,574 −1,004	0,869	0,029 −1,196	0,029
	14 to 25	3,000	1,173	1,324 0	0,254	1,139 −0,080	0,792	0,992 −0,213	∞	0,747 −0,860	0,254	0,687 −0,944	0,844	0,114 −1,168	0,114
	26 to 80	3,000	1,227	1,223 0	0,262	0,982 −0,159	2,616	0,820 −0,679	—	—	0,493	0,733 -0,877	0,869	0,036 -1,227	0,036
	81 to 200	3,000	1,232	1,333 0	0,358	0,981 −0,290	—	—	∞	0,923 −0,554	—	—	0,866	0,077 -1,232	0,077
H5M	12 to 16	5,000	1,986	2,344 0	0,659	1,739 −0,316	4,475	1,522 −0,720	∞	1,124 −1,560	0,691	0,773 −1,895	1,133	0,328 −1,986	0,328
	17 to 31	5,000	2,024	2,242 0	0,610	1,871 −0,126	1,431	1,540 −0,593	∞	1,163 −1,566	0,612	1,013 −1,789	1,219	0,295 −2,024	0,295
	32 to 79	5,000	2,032	2,073 0	0,493	1,675 −0,203	1,359	1,501 −0,566	∞	1,370 −1,035	1,402	1,088 −1,617	1,300	0,135 −2,032	0,135
	80 to 200	5,000	2,056	2,160 0	0,610	1,564 −0,483	—	—	∞	1,443 −1,050	—	—	1,471	0,043 −2,065	0,043
H8M	22 to 27	8,000	3,289	3,805 0	1,143	2,738 −0,648	—	—	∞	2,322 −1,801	—	—	2,553	0 −3,289	—
	28 to 89	8,000	3,612	3,754 0	1,067	2,748 −0,711	12,903	2,360 −2,024	—	—	0,726	2,283 −2,215	2,744	0 −3,612	—
	90 to 200	8,000	3,632	3,617 0	0,940	2,697 −0,757	—	—	∞	2,459 −1,948	—	—	2,637	0 −3,632	—
H14M	28 to 36	14,000	6,320	6,761 0	1,880	5,037 −1,133	20,828	4,064 −3,904	—	—	1,143	3,909 −4,242	4,717	0 −6,320	—
	37 to 89	14,000	6,223	6,599 0	1,829	4,890 −1,176	15,748	4,204 −3,493	—	—	1,143	4,089 −3,802	4,663	0 −6,223	—
	90 to 216	14,000	6,350	6,546 0	1,905	4,704 −1,425	20,117	4,288 −3,439	—	—	0,254	4,270 −3,498	4,623	0 −6,350	—
H20M	34 to 45	20,000	8,644	9,786 0	2,814	7,105 −1,852	—	—	∞	5,972 −4,947	—	—	5,625	0,753 −8,644	0,753
	46 to 100	20,000	8,591	9,529 0	2,667	7,041 −1,662	20,329	6,015 −5,121	—	—	—	—	5,842	0,711 −8,591	0,711
	101 to 220	20,000	8,690	9,787 0	2,676	7,305 −1,760	—	—	∞	6,165 −4,855	—	—	5,733	0,739 −8,690	0,739

7.2.3 Pulley groove profile dimensions and tolerances

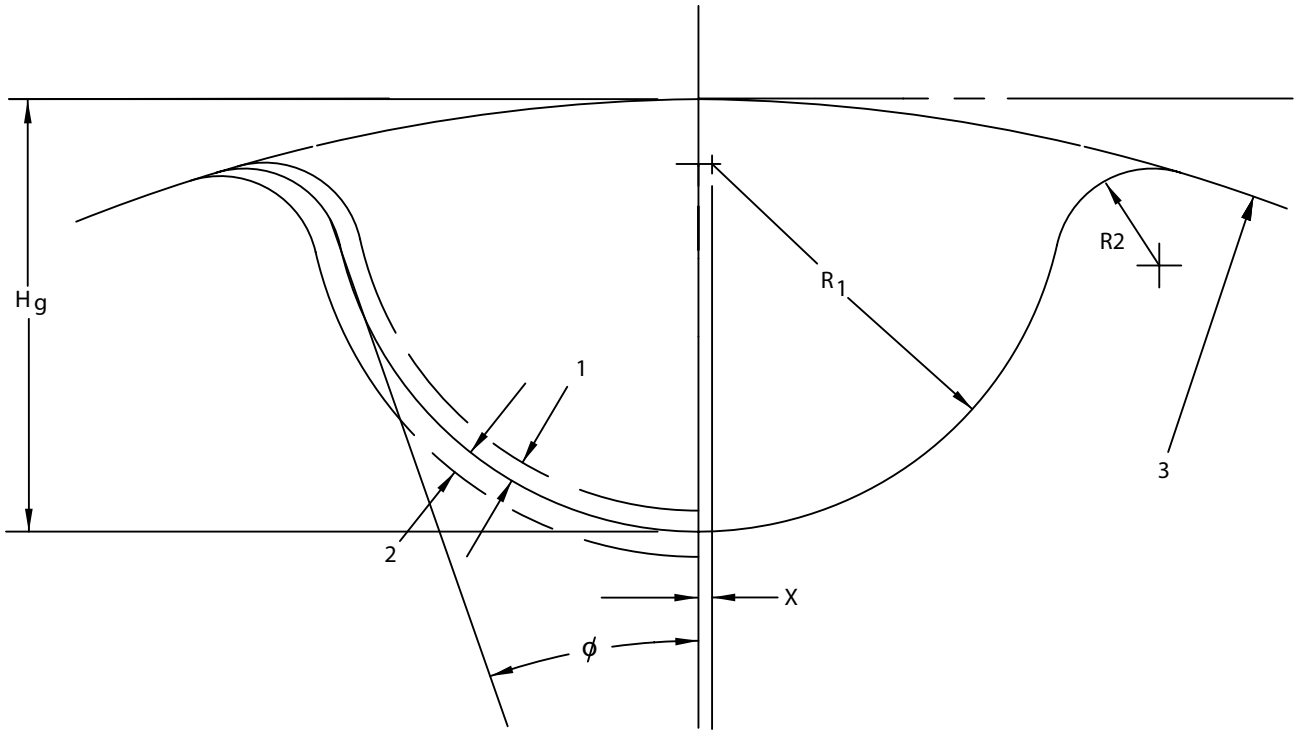
Dimensions and tolerances for the pulley grooves with profile H are given in Table 14 and shown in Figure 11.

Table 14 — Pulley groove profile dimensions

Dimensions in millimetres

Profile	Number of grooves	H_g	X	R_1	ϕ°	R_2	Profile band[a]
H3M	10 to 13	1,190	0,029	0,991	15	0,181	±0,051
	14 to 25	1,179	0,112	0,889	9	0,229	
	26 to 80	1,219	0,028	0,927	8	0,191	
	81 to 200	1,234	0,074	0,925	4	0,301	
H5M	12 to 16	1,989	0,307	1,265	10	0,432	±0,051
	17 to 25	2,009	0,320	1,270	6	0,508	
	26 to 80	2,052	0,081	1,438	2	0,488	
	81 to 200	2,056	0,028	1,552	5	0,569	
H8M	22 to 27	3,295	0,000	2,675	11,3	0,874	+0,090 −0,080
	28 to 89	3,604	0,000	2,629	7	1,024	
	90 to 200	3,630	0,000	2,639	6,6	1,008	
H14M	28 to 32	6,327	0,000	4,859	7,1	1,544	+0,090 −0,080
	33 to 36	6,328	0,000	4,834	5,2	1,613	
	37 to 57	6,198	0,000	4,737	9,3	1,654	
	58 to 89	6,198	0,000	4,669	8,9	1,902	
	90 to 153	6,328	0,000	4,636	6,9	1,704	
	154 to 216	6,327	0,000	4,597	8,6	1,770	
H20M	32 to 45	8,649	0,544	6,185	15	2,184	±0,089
	46 to 100	8,661	0,544	6,185	10	2,540	
	101 to 220	8,700	0,544	6,185	18	2,540	

[a] The profile band tolerance thru R2 blends into the pulley OD tolerance so that the pulley OD and profile band tolerances do not conflict.



Key

1 minimum
2 maximum
3 pulley outside diameter

Figure 11 — Pulley groove profile and tolerance bands

7.2.4 Pulley outside diameters

Pulley outside diameters for the standard pulleys are given in Table 15. The relationship of the pulley outside and pitch diameters is illustrated in Figure 12 and Formulae (5) and (6).

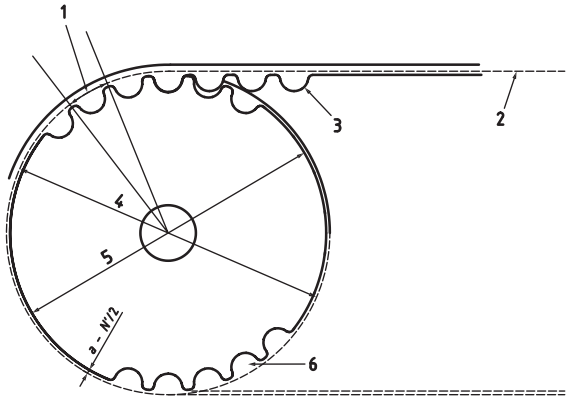
$$\text{Pitch diameter} = \frac{\text{No. of grooves} \times \text{pulley pitch}}{\pi} \quad (5)$$

$$\text{Outside diameter} = \text{Pitch diameter} - 2a + N' \quad (6)$$

where

a is given in Table 9;

N' is given in Table 16.



Key

1 pitch
2 belt pitch line
3 belt tooth
4 pitch diameter
5 outside diameter
6 pulley groove

Figure 12 — Pulley dimensions

Table 15 — Standard pulley sizes

Dimensions in millimetres

Number of grooves	Profile									
	H3M		H5M		H8M		H14M		H20M	
	Pitch diameter	Outside diameter	Pitch diameter	Outside diameter	Pitch diameter	Outside diameter	Pitch diameter	Outside diameter	Pitch diameter	Outside diameter
14	13,37	12,61	22,28	21,14	—	—	—	—	—	—
15	14,32	13,56	23,87	22,73	—	—	—	—	—	—
16	15,28	14,52	25,46	24,32	—	—	—	—	—	—
17	16,23	15,47	27,06	25,91	—	—	—	—	—	—
18	17,19	16,43	28,65	27,50	—	—	—	—	—	—
19	18,14	17,38	30,24	29,10	—	—	—	—	—	—
20	19,10	18,34	31,83	30,69	—	—	—	—	—	—
21	20,05	19,29	33,42	32,28	—	—	—	—	—	—
22	21,01	20,25	35,01	33,87	56,02	54,65	—	—	—	—
24	22,92	22,16	38,20	37,05	61,12	59,74	—	—	—	—
25	—	—	—	—	63,66	62,29	—	—	—	—
26	24,83	24,07	41,38	40,24	66,21	64,84	—	—	—	—
28	26,74	25,98	44,56	43,42	71,30	70,08	124,78	122,12	—	—
29	—	—	—	—	—	—	129,23	126,57	—	—
30	28,65	27,89	47,75	46,60	76,39	75,13	133,69	130,99	—	—
32	30,56	29,80	50,93	49,79	81,49	80,16	142,60	139,88	—	—
34	32,47	31,71	54,11	52,97	86,58	85,21	151,52	148,79	216,45	212,13
36	34,38	33,62	57,30	56,15	91,67	90,30	160,43	157,68	229,18	224,87
38	36,29	35,53	60,48	59,34	96,77	95,39	169,34	166,60	241,92	237,60
40	38,20	37,44	63,66	62,52	101,86	100,49	178,25	175,49	254,65	250,33
43	41,06	40,30	68,44	67,29	—	—	—	—	—	—
44	42,02	41,25	70,03	68,89	112,05	110,67	196,08	193,28	280,11	275,79
46	43,93	43,16	73,21	72,07	—	—	—	—	—	—
48	45,48	45,07	76,39	75,25	122,23	120,86	213,90	211,11	305,58	301,26
49	46,79	46,03	77,99	76,84	—	—	—	—	—	—
50	47,75	46,98	79,58	78,43	—	—	—	—	—	—
52	49,66	48,89	82,76	81,62	—	—	231,73	228,94	331,04	326,72
55	52,52	51,76	87,54	86,39	—	—	—	—	—	—
56	—	—	89,13	87,98	142,60	141,23	249,55	246,76	356,51	325,19
60	57,30	56,53	95,49	94,35	—	—	267,38	264,59	381,97	377,65
62	—	—	98,68	97,53	—	—	—	—	—	—
64	—	—	—	—	162,97	161,60	285,21	282,41	407,44	403,12
65	62,07	61,31	103,45	102,31	—	—	—	—	—	—
68	—	—	—	—	—	—	303,03	300,24	432,90	428,58
70	66,85	66,08	111,41	110,27	—	—	—	—	—	—
72	68,75	67,99	—	—	183,35	181,97	320,86	318,06	458,37	454,05
75	71,62	70,86	119,37	118,22	—	—	—	—	—	—
78	74,48	73,72	124,14	123,00	—	—	—	—	—	—
80	76,39	75,63	127,32	126,18	203,72	202,35	356,51	353,71	509,30	504,98
90	85,94	85,18	143,24	142,10	229,18	227,81	401,07	398,28	572,96	568,64
100	95,49	94,73	159,15	158,01	—	—	—	—	—	—

Table 15 *(continued)*

Number of grooves	Profile									
	H3M		H5M		H8M		H14M		H20M	
	Pitch diameter	Outside diameter	Pitch diameter	Outside diameter	Pitch diameter	Outside diameter	Pitch diameter	Outside diameter	Pitch diameter	Outside diameter
110	105,04	104,28	175,07	173,93	—	—	—	—	—	—
112	—	—	—	—	285,21	283,83	499,11	496,32	713,01	708,70
120	114,59	113,83	190,99	189,84	—	—	—	—	—	—
130	124,14	123,38	206,90	205,76	—	—	—	—	—	—
140	133,69	132,92	222,82	221,67	—	—	—	—	—	—
144	—	—	—	—	366,69	365,32	641,71	638,92	916,73	912,41
150	143,24	142,48	238,73	237,59	—	—	—	—	—	—
160	152,79	152,03	254,65	235,50	—	—	—	—	—	—
168	—	—	—	—	427,81	426,44	748,66	745,87	1 069,52	1 065,20
192	—	—	—	—	488,92	487,55	855,62	852,82	1 222,31	1 217,99
216	—		—	—	—	—	962,57	959,78	1 375,10	1 370,78

Table 16 — Values of chordal correction factor N'

Dimensions in millimetres

Number of grooves	Profile	
	H8M	H14M
	Value of *N'*	Value of *N'*
28	0,15	0,15
29	0,15	0,13
30	0,10	0,09
31	0,08	0,09
32	0,05	0,08
33	0,03	0,08
34		0,08
35		0,05
36		0,05
37		0,05
38		0,05
39		0,03
40		0,03
NOTE *N'* values for H3M, H5M, and H20M are zero.		

7.2.5 Pulley width

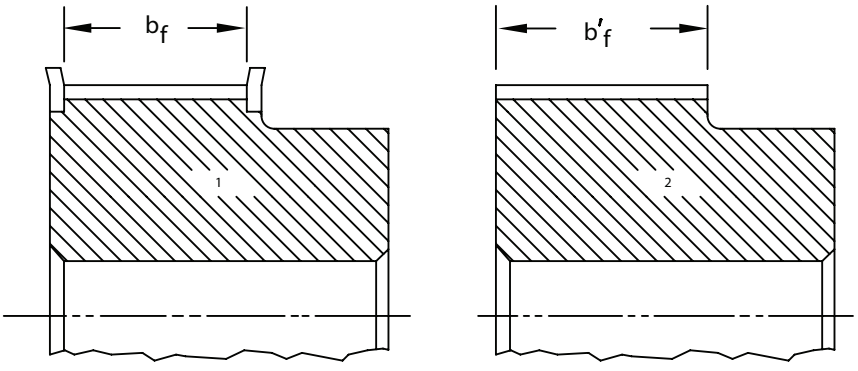
The standard nominal pulley width and the minimum actual pulley width required, b_f for flanged pulleys, b'_f for unflanged pulleys are given in Table 17and shown in Figure 6. Users are advised that the values given for b'_f apply also to pulleys with only one flange (see Annex D).

Table 17 — Standard pulley widths

Dimensions in millimetres

Profile	Standard nominal pulley width	Minimum pulley width	
		Flanged b_f	Unflanged b'_f
H3M	6	8	11
	9	11	14
	15	17	20
H5M	9	11	15
	15	17	21
	25	27	31
H8M	20	22	30
	30	32	40
	50	53	60
	85	89	96
H14M	40	42	55
	55	58	70
	85	89	101
	115	120	131
	170	175	186
H20M	115	120	134
	170	175	189
	230	235	251
	290	300	311
	340	350	361

NOTE The minimum unflanged pulley width can be reduced when the alignment of the drive can be controlled but shall not be less than the minimum flanged pulley width.



Key

1 flanged pulley

2 unflanged pulley

Figure 13 — Minimum pulley width

8 Profile system R

8.1 Belt dimensions and tolerances

8.1.1 Belt tooth dimensions

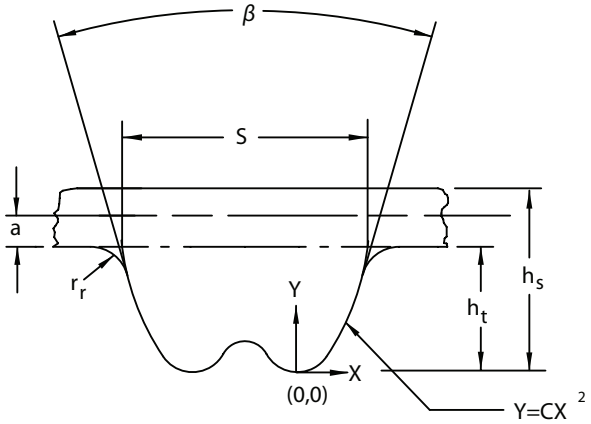
The nominal belt tooth dimensions are the same for single-sided and double-sided belts; they are given in Table 18 and shown in Figure 14.

Table 18 — Nominal tooth dimensions

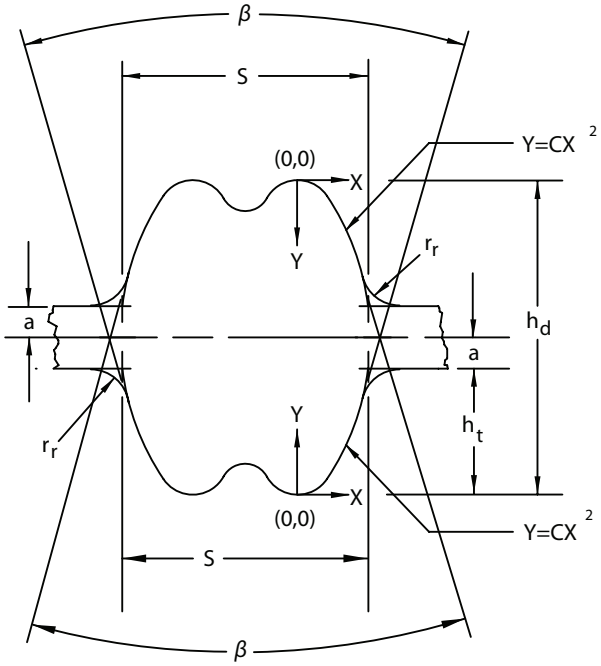
Dimensions in millimetres

Profile	Pitch	β	S	h_s	h_d	h_t	r_r	a^a	C
R3M	3	32°	1,95	2,40	—	1,27	0,380	0,381	3,056 7
DR3M	3	32°	1,95	—	3,30	1,27	0,380	0,381	3,056 7
R5M	5	32°	3,30	3,80	—	2,15	0,630	0,570	1,795 0
DR5M	5	32°	3,30	—	5,44	2,15	0,630	0,570	1,795 0
R8M	8	32°	5,49	5,40	—	3,25	1,00	0,686	1,095 4
DR8M	8	32°	5,49	—	8,37	3,25	1,00	0,686	1,095 4
R14M	14	32°	9,61	9,70	—	6,13	1,75	1,397	0,625 0
DR14M	14	32°	9,61	—	15,05	6,13	1,75	1,397	0,625 0
R20M	20	32°	13,75	14,50	—	8,75	2,50	2,160	0,043 8

[a] a is the belt design pitch differential.



1



2

Key

1 single sided belts

2 double sided belts

Figure 14 — Tooth dimensions — Profile system R

8.1.2 Belt widths and tolerances

Belt widths and tolerances are given in Table 19.

Table 19 — Widths and width tolerances

Dimensions in millimetres

Profile	Nominal belt width	Tolerance on width for belt pitch lengths		
		Up to and including 840 mm	Over 840 mm and up to and including 1 680 mm	Over 1 680 mm
R3M, DR3M	6 9	+0,4 − 0,8	+0,4 −0,8	—
	15	+0,8 −0,8	+0,8 −1,2	+0,8 −1,2
R5M, DR5M	9	+0,4 −0,8	+0,4 −0,8	—
	15 25	+0,8 −0,8	+0,8 −1,2	+0,8 −1,2
R8M, DR8M	20 30	+0,8 −0,8	+0,8 −1,2	+0,8 −1,2
	50	+0,8 −1,2	+1,2 −1,2	+1,2 −1,6
	85	+1,6 −1,6	+1,6 −2,0	+2,0 −2,0
R14M, DR14M	40	+0,8 −1,2	+1,2 −1,2	+1,2 −1,6
	55	+1,2 −1,2	+1,2 −1,6	+1,6 −1,6
	85	+1,6 −1,6	+1,6 −2,0	+2,0 −2,0
	115 170	+2,4 −2,4	+2,4 −2,8	+2,4 −3,2
R20M	115 170	+2,4 −2,4	+2,4 −2,8	+2,4 −3,2
	230 290 340	—	—	+4,8 −6,4

8.1.3 Pitch length measurement

See Annex A for tolerances and Annex B for the relationship between the centre distance and the belt pitch length.

8.1.3.1 Measuring fixture (see Figure 15)

The pitch length of a synchronous belt shall be determined by placing the belt on a measuring fixture composed of the following elements.

8.1.3.1.1 Two pulleys of equal diameter, as specified in Table 20 of the proper belt type and having standard tooth space dimensions. These pulleys should be made to the tolerances shown in Table 20. One pulley shall be free to rotate on a fixed-position shaft, while the other shall be free to rotate on a moveable shaft to permit the centre distance to change.

8.1.3.1.2 Means of applying a total measuring force to the moveable pulley.

8.1.3.1.3 Means of measuring the centre distance between the two pulleys with the necessary degree of accuracy for centre distance measurement.

8.1.3.2 Total measuring force

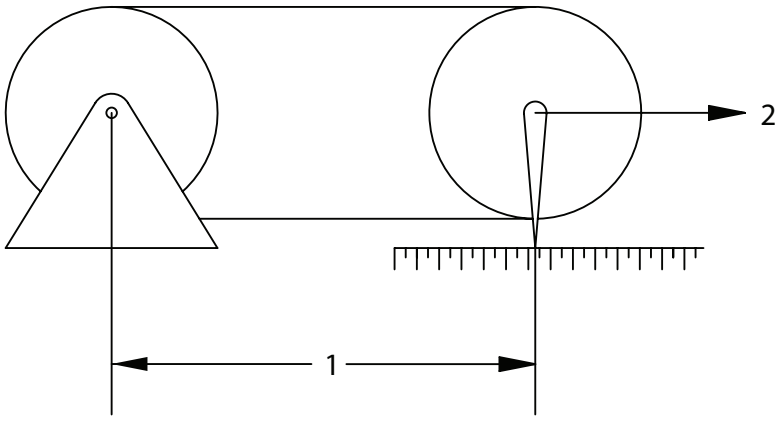
The total measuring force to be applied for measuring belts is given in Table 21.

8.1.3.3 Procedure

In measuring the pitch length of a synchronous belt, the belt should be rotated at least two revolutions to seat it properly and to divide the total force equally between the two lengths of the belt.

The pitch length shall be calculated by adding the pitch circumference of one of the pulleys to twice the measured centre distance.

Check double-sided belts on both tooth faces.



Key

1 centre distance
2 total measuring force

Figure 15 — Diagram of fixture for measuring pitch length

Table 20 — Belt length measuring pulleys

Dimensions in millimetres

Profile	Number of grooves	Pitch circumference	Outside diameter[a]	Radial runout F.I.M.[b]	Axial runout F.I.M.[b]
R3M, DR3M	30	90	27,886 ±0,013	0,013	0,025
R5M, DR5M	20	100	30,687 ±0,013	0,013	0,025
R8M, DR8M	34	272	85,208 ±0,013	0,013	0,025
R14M, DR14M	40	560	175,46 ±0,025	0,013	0,051
R20M	40	800	250,33 ±0,036	0,013	0,076

a For pulleys outside of the diameter tolerance range specified, consult the belt manufacturer.

b Full indicator movement.

NOTE The number of pulley teeth specified in Table 20 determine the recommended sizes for measuring the belt pitch length. Practically, other sizes of pulleys could be used provided they have the same number of teeth, and meet the dimensional requirements of Table 20.

Table 21 — Total measuring force

Forces in newtons

Profile	Belt width (mm)														
	6	9	15	20	25	30	40	50	55	85	115	170	230	290	340
R3M, DR3M	45	76	138	—	—	—	—	—	—	—	—	—	—	—	—
R5M, DR5M	—	111	214	—	376	—	—	—	—	—	—	—	—	—	—
R8M, DR8M	—	—	—	470	—	750	—	1 320	—	2 310	—	—	—	—	—
R14M, DR14M	—	—	—	—	—	—	1 350	—	2 130	3 660	5 180	7 960	—	—	—
R20M	—	—	—	—	—	—	—	—	—	—	6 961	10 729	14 839	18 949	22 374

8.2 Pulleys, profile system R

8.2.1 General

See Annex C for tolerances.

The pulley is characterized by a curvilinear groove profile. This groove profile is defined as the profile formed by the generating tool rack form required to machine-finish the curvilinear profile. The profile is different for each pulley diameter, but can be closely approximated by a nominal groove profile over specified ranges of number of grooves.

8.2.2 Generating tool rack

Dimensions and tolerances for the generating tool rack for R8M and R14M pulleys are given in Table 22 and Figure 16.

Table 22 — Pulley generating tool rack dimensions

Dimensions in millimetres

Profile	Number of grooves	P_b ±0,012	α ± 0,50°	b_t	h_p ref.	h_r	W_p ref.	W_r ref.	W_t	r_2 ±0,025	C
R3M	8 to 15	2,761	32,00	2,06 +0,05 −0,00	0,925	1,15 ±0,025	0,966 0	0,234	0,870 +0,05 −0,00	0,31	3,285 0
R3M	16 to 30	2,867	32,00	2,06 +0,05 −0,00	0,925	1,15 ±0,025	0,966 0	0,340	0,870 +0,05 −0,00	0,31	3,285 0
R3M	31 and over	3,000	32,00	2,00 +0,05 −0,00	0,896	1,20 ±0,025	0,913 0	0,367	0,798 +0,05 −0,00	0,41	3,394 0
R5M	10 to 21	4,761	32,00	3,48 ±0,025	1,604	2,06 +0,05 −0,00	1,609 0	0,332	1,379 ±0,025	0,63	1,896 0
R5M	22 and over	5,000	32,00	3,48 ±0,025	1,604	2,06 +0,05 −0,00	1,609 0	0,571	1,379 ±0,025	0,63	1,896 0
R8M	22 to 27	7,780	36,00	5,900 ±0,025	2,828	3,45 +0 −0,05	2,75	0,577	1,820 ±0,025	0,90	0,837 3
R8M	28 and over	7,890	36,00	5,900 ±0,025	2,794	3,45 +0 −0,05	2,74	0,612	1,840 ±0,025	0,95	0,847 7
R14M	28 and over	13,800	36,00	10,45 +0,05 −0,00	4,930	6,04 +0,05 −0	4,87	1,020	3,320 ±0,025	1,60	0,479 9
R20M	30 and over	19,692	36,00	14,85 +0,05 −0,00	6,703	8,50 +0,05 −0	6,841	1,604	4,970 ±0,025	2,60	0,353 2

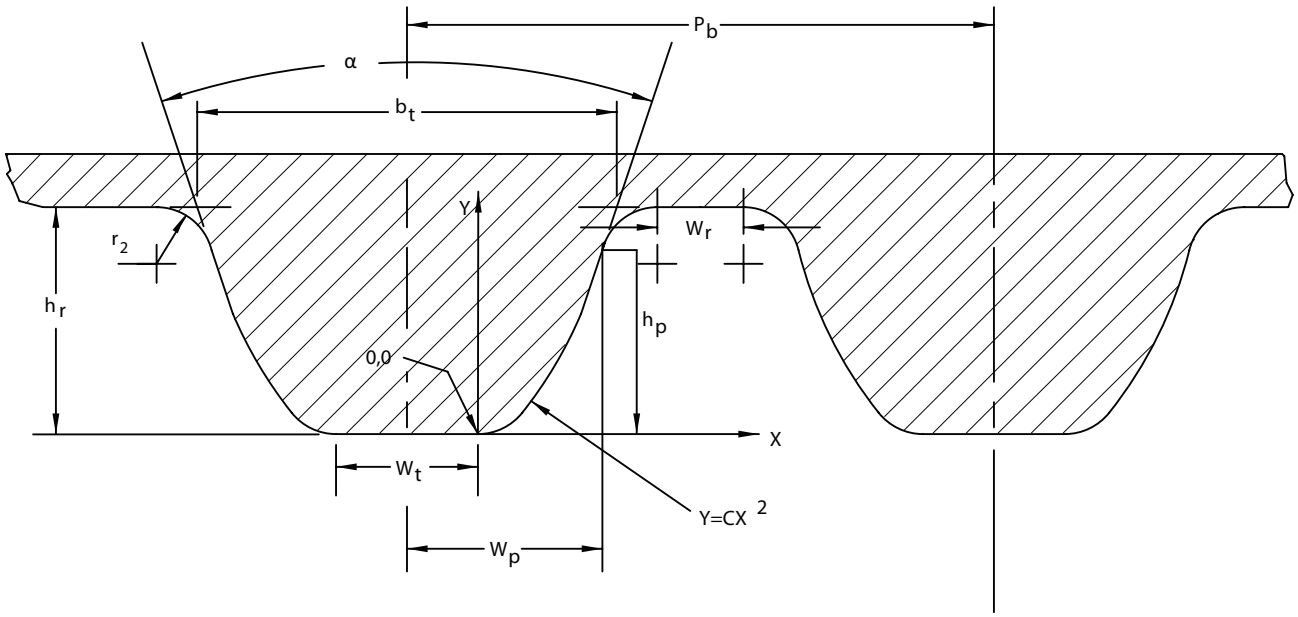


Figure 16 — Pulley generating tool rack form

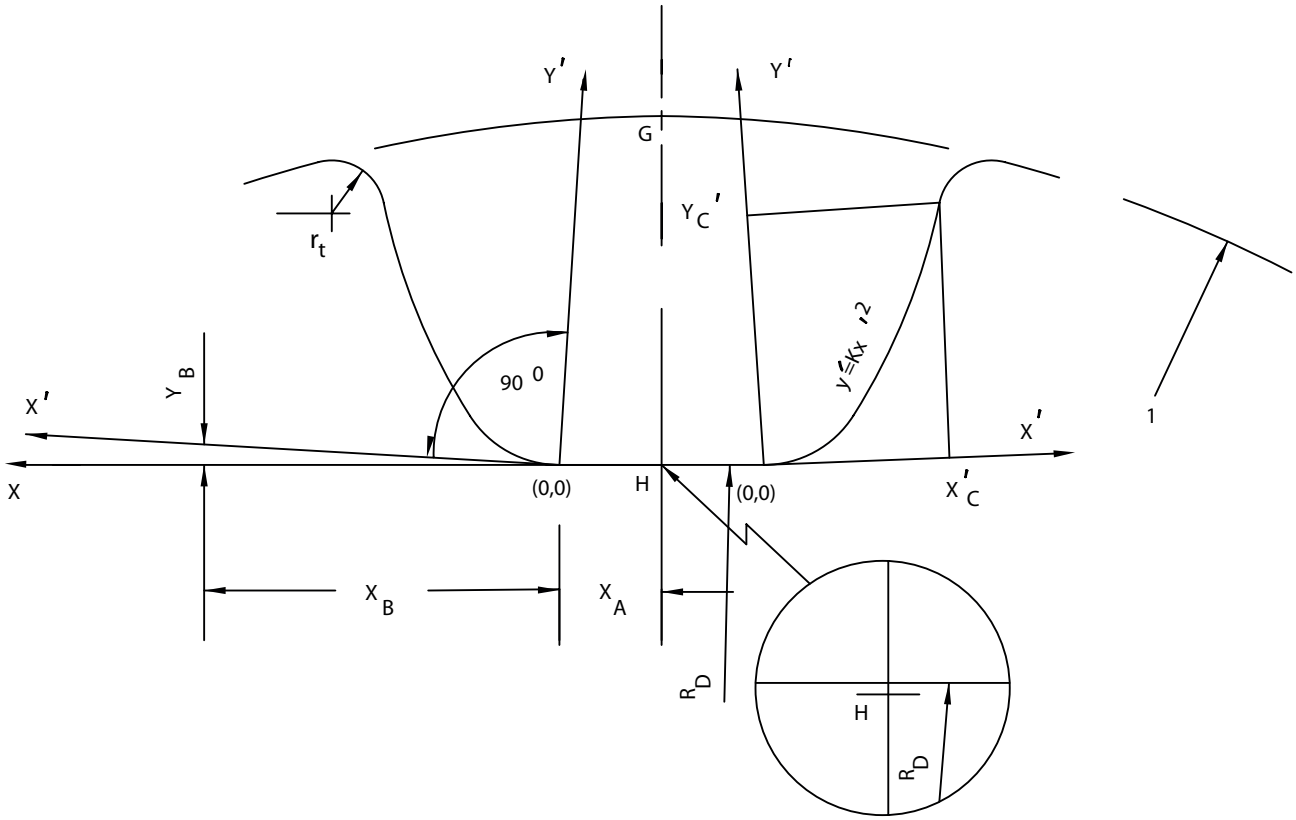
8.2.3 Pulley groove profile dimensions and tolerances

Dimensions and tolerances for the pulley grooves with profile R are given in Table 23 and Table 24 and shown in Figures 17 and 18.

Table 23 — Pulley groove profile dimensions

Dimensions in millimetres

Profile	Number of teeth	GH	X_A	X_B	Y_B	X'_c	Y'_c	K	r_t	R_D
R3M	8 to 15	1,15	0,39	4,00	0,08	0,54	0,94	3,210 0	0,28	4,00
	16 to 30	1,15	0,40	4,00	0,00	0,53	0,93	3,285 0	0,30	13,00
	31 and over	1,20	0,40	4,00	0,00	0,53	0,93	3,394 0	0,40	18,00
R5M	10 to 21	2,06	0,63	4,00	0,06	0,97	1,70	1,790 0	0,63	9,00
	22 and over	2,06	0,70	4,00	0,00	0,95	1,66	1,829 0	0,50	18,00
R8M	22 to 27	3,47	0,92	4,00	0,11	1,75	2,61	0,847 7	0,90	22,00
	28 and over	3,47	0,92	4,00	0,00	1,75	2,61	0,847 7	0,95	22,00
R14M	28 and over	6,04	1,64	4,00	0,00	3,21	4,93	0,479 9	1,60	32,00
R20M	30 and over	8,50	2,50	4,00	0,00	4,40	6,80	0,349 0	2,42	150,00



Key

1 pulley outside diameter

Figure 17 — Pulley groove profile

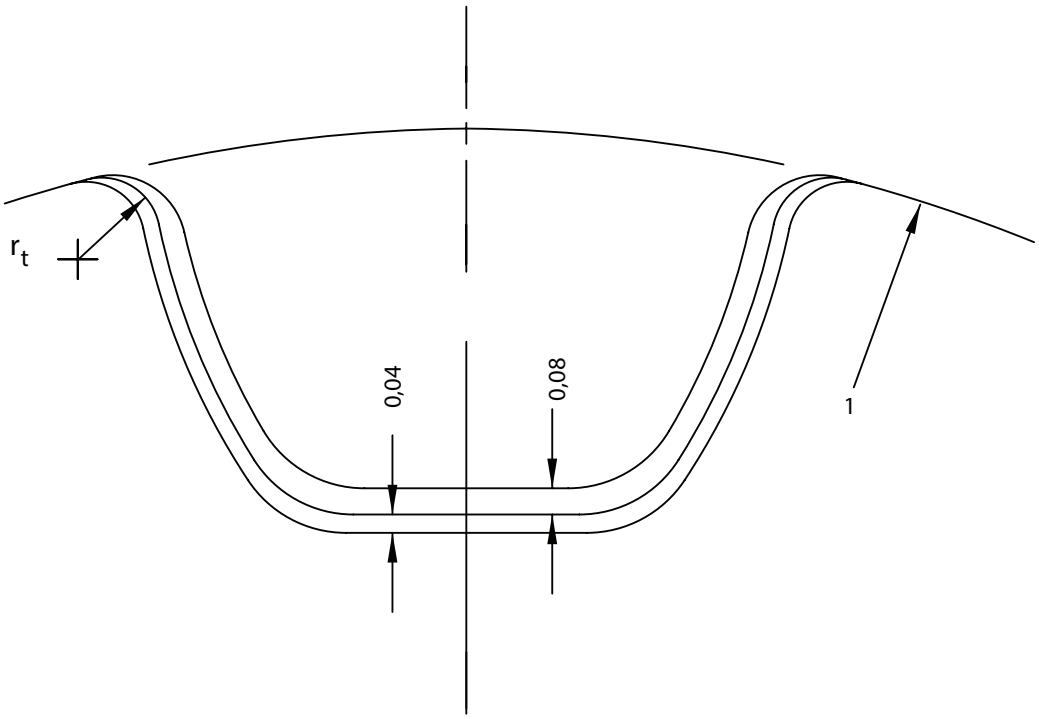
The true profile of the R-type pulley groove can only be produced by plotting the parabolic function associated with the cross section and the number of grooves. Table 24 provides the tip radii dimensions to be used with these generations. Figure 18 illustrates the pulley groove tolerance bands.

Table 24 — Pulley tip radii

Dimensions in millimetres

Profile	Number of grooves	r_t[a]
R3M	8 to 15	0,28
	16 to 30	0,30
	31 and over	0,40
R5M	10 to 21	0,63
	22 and over	0,50
R8M	22 to 27	0,90
	28 and over	0,95
R14M	28 and over	1,60
R20M	30 and over	2,42

[a] The profile band tolerance thru R2 blends into the pulley Outside diameter tolerance so that the pulley Outside diameter and profile band tolerances do not conflict.



Key

1 pulley outside diameter

Figure 18 — Pulley groove tolerance band

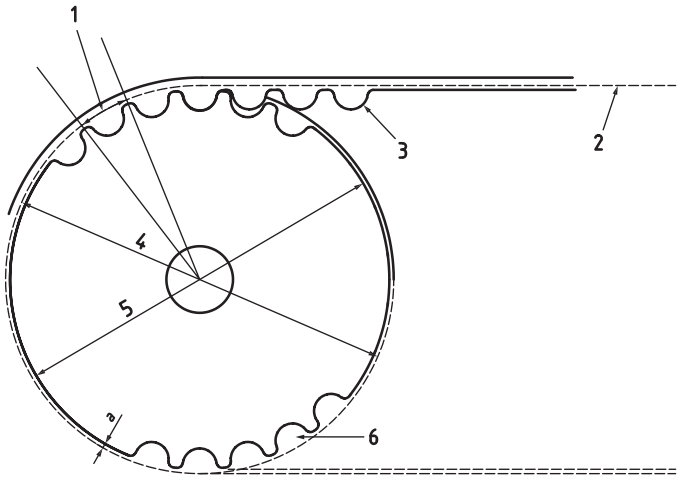
8.2.4 Pulley outside diameters

Pulleys outside diameters for the standard pulleys are given in Table 25. The relationship of the pulley outside and pitch diameters is illustrated in Figure 19 and Formulae (7) and (8).

$$\text{Pitch diameter} = \frac{\text{No. of grooves} \times \text{pulley pitch}}{\pi} \quad (7)$$

$$\text{Outside diameter} = \text{Pitch diameter} - 2a \quad (8)$$

where a is the value given in Table 18.



Key

1 pitch
2 belt pitch line
3 belt tooth
4 pitch diameter
5 outside diameter
6 pulley groove

Figure 19 — Pulley dimensions

Table 25 — Standard pulley sizes

Dimensions in millimetres

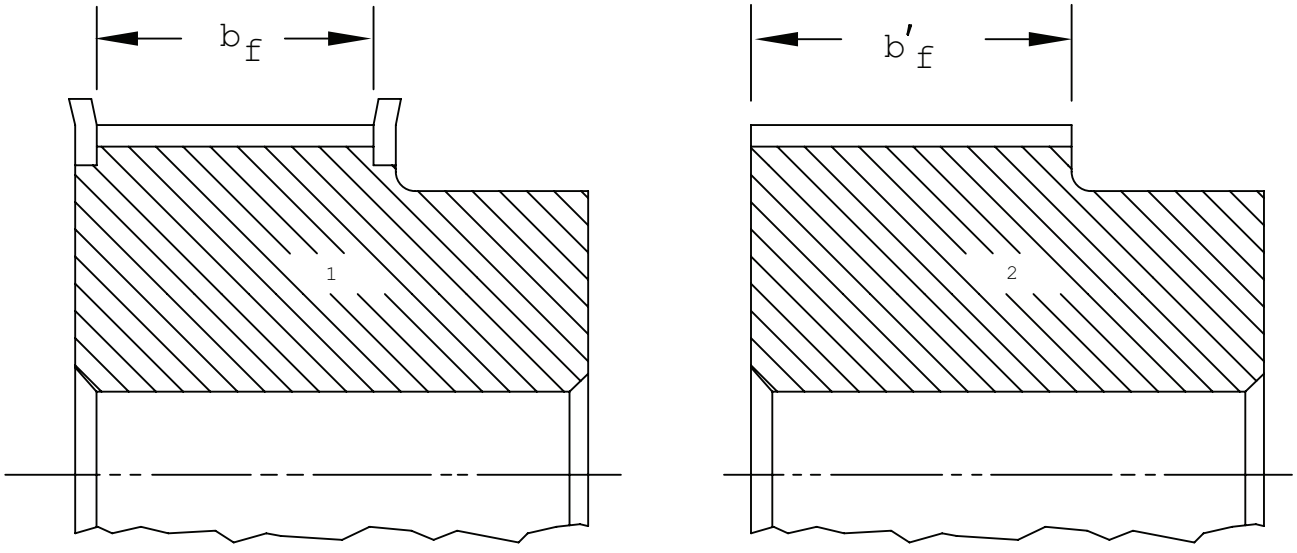
Number of grooves	Profile									
	R3M		R5M		R8M		R14M		R20M	
	Pitch diameter	Outside diameter	Pitch diameter	Outside diameter	Pitch diameter	Outside diameter	Pitch diameter	Outside diameter	Pitch diameter	Outside diameter
14	13,37	12,61	22,28	21,14	—	—	—	—	—	—
15	14,32	13,56	23,87	22,73	—	—	—	—	—	—
16	15,28	14,52	25,46	24,32	—	—	—	—	—	—
17	16,23	15,47	27,06	25,91	—	—	—	—	—	—
18	17,19	16,43	28,65	27,50	—	—	—	—	—	—
19	18,14	17,38	30,24	29,10	—	—	—	—	—	—
20	19,10	18,34	31,83	30,69	—	—	—	—	—	—
21	20,05	19,29	33,42	32,28	—	—	—	—	—	—
22	21,01	20,25	35,01	33,87	56,02	54,65	—	—	—	—
24	22,92	22,16	38,20	37,05	61,12	59,74	—	—	—	—
25	—	—	—	—	63,66	62,29	—	—	—	—
26	24,83	24,07	41,38	40,24	66,21	64,84	—	—	—	—
28	26,74	25,98	44,56	43,42	71,30	70,08	124,78	122,12	—	—
29	—	—	—	—	—	—	129,23	126,57	—	—
30	28,65	27,89	47,75	46,60	76,39	75,13	133,69	130,99	—	—
32	30,56	29,80	50,93	49,79	81,49	80,16	142,60	139,88	—-	—-
34	32,47	31,71	54,11	52,97	86,58	85,21	151,52	148,79	216,45	212,13
36	34,38	33,62	57,30	56,15	91,67	90,30	160,43	157,68	229,18	224,87
38	36,29	35,53	60,48	59,34	96,77	95,39	169,34	166,60	241,92	237,60
40	38,20	37,44	63,66	62,52	101,86	100,49	178,25	175,49	254,65	250,33
43	41,06	40,30	68,44	67,29	—	—	—	—	—	—
44	42,02	41,25	70,03	68,89	112,05	110,67	196,08	193,28	280,11	275,79
46	43,93	43,16	73,21	72,07	—	—	—	—	—	—
48	45,48	45,07	76,39	75,25	122,23	120,86	213,90	211,11	305,58	301,26
49	46,79	46,03	77,99	76,84	—	—	—	—	—	—
50	47,75	46,98	79,58	78,43	—	—	—	—	—	—
52	49,66	48,89	82,76	81,62	—	—	231,73	228,94	331,04	326,72
55	52,52	51,76	87,54	86,39	—	—	—	—	—	—
56	—	—	89,13	87,98	142,60	141,23	249,55	246,76	356,51	325,19
60	57,30	56,53	95,49	94,35	—	—	267,38	264,59	381,97	377,65
62	—	—	98,68	97,53	—	—	—	—	—	—
64	—	—	—	—	162,97	161,60	285,21	282,41	407,44	403,12
65	62,07	61,31	103,45	102,31	—	—	—	—	—	—
68	—	—	—	—	—	—	303,03	300,24	432,90	428,58
70	66,85	66,08	111,41	110,27	—	—	—	—	—	—
72	68,75	67,99	—	—	183,35	181,97	320,86	318,06	458,37	454,05
75	71,62	70,86	119,37	118,22	—	—	—	—	—	—
78	74,48	73,72	124,14	123,00	—	—	—	—	—	—
80	76,39	75,63	127,32	126,18	203,72	202,35	356,51	353,71	509,30	504,98
90	85,94	85,18	143,24	142,10	229,18	227,81	401,07	398,28	572,96	568,64
100	95,49	94,73	159,15	158,01	—	—	—	—	—	—

Table 25 *(continued)*

Number of grooves	Profile									
	R3M		R5M		R8M		R14M		R20M	
	Pitch diameter	Outside diameter	Pitch diameter	Outside diameter	Pitch diameter	Outside diameter	Pitch diameter	Outside diameter	Pitch diameter	Outside diameter
110	105,04	104,28	175,07	173,93	—	—	—	—	—	—
112	—	—	—	—	285,21	283,83	499,11	496,32	713,01	708,70
120	114,59	113,83	190,99	189,84	—	—	—	—	—	—
130	124,14	123,38	206,90	205,76	—	—	—	—	—	—
140	133,69	132,92	222,82	221,67	—	—	—	—	—	—
144	—	—	—	—	366,69	365,32	641,71	638,92	916,73	912,41
150	143,24	142,48	238,73	237,59	—	—	—	—	—	—
160	152,79	152,03	254,65	235,50	—	—	—	—	—	—
168	—	—	—	—	427,81	426,44	748,66	745,87	1 069,52	1 065,20
192	—	—	—	—	488,92	487,55	855,62	852,82	1 222,31	1 217,99
216	—	—	—	—	—	—	962,57	959,78	1 375,10	1 370,78

8.2.5 Pulley width

The standard nominal pulley width, and the minimum actual pulley width required, b_f for flanged pulleys, b'_f for unflanged pulleys (see Figure 20), are given in Table 26. Users are advised that the values given for b'_f apply also to pulleys with only one flange (see Annex D).



Key

1 flanged pulley

2 unflanged pulley

Figure 20 — Minimum pulley width

Table 26 — Standard pulley widths

Dimensions in millimetres

Profile	Standard nominal pulley width	Minimum pulley width	
		Flanged b_f	Unflanged b'_f
R3M	6	8	11
	9	11	14
	15	17	20
R5M	9	11	15
	15	17	21
	25	27	31
R8M	20	22	30
	30	32	40
	50	53	60
	85	89	96
R14M	40	42	55
	55	58	70
	85	89	101
	115	120	131
	170	175	186
R20M	115	120	134
	170	175	189
	230	235	251
	290	300	311
	340	350	361
NOTE The minimum unflanged pulley width can be reduced when the alignment of the drive can be controlled, but shall not be less than the minimum flanged pulley width.			

9 Profile system S

9.1 Belt dimensions and tolerances

9.1.1 Belt tooth dimensions

The nominal belt tooth dimensions are the same for single-sided and double-sided belts; they are given in Table 27 and shown in Figure 21.

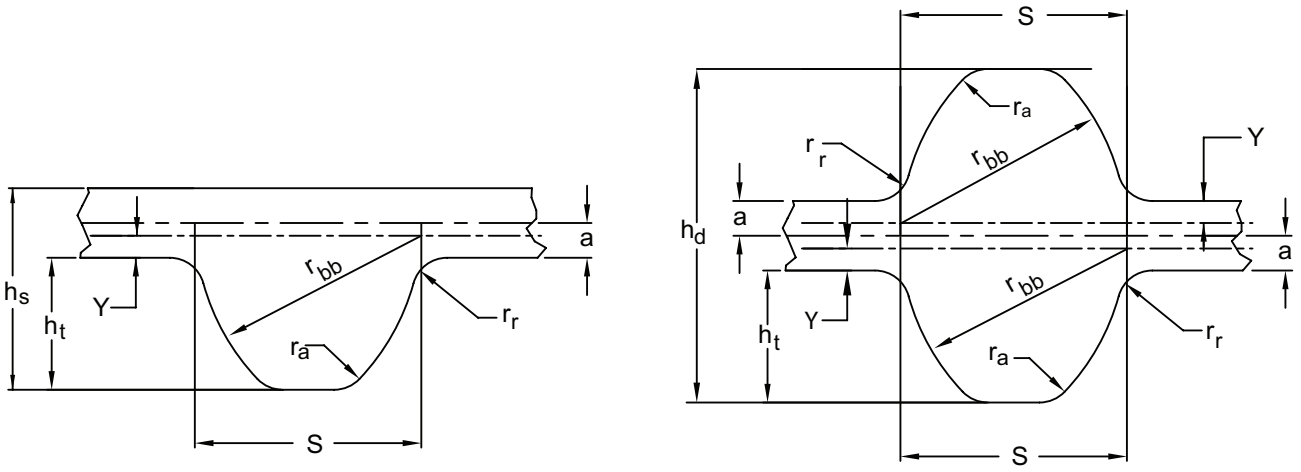
Table 27 — Nominal tooth dimensions

Dimensions in millimetres

Profile	Pitch	h_s	h_d	h_t	S	r_{bb}	r_a	r_r	Y	a[a]
S8M	8	5,3	—	3,05	5,20	5,20	0,80	0,80	0,686	0,686
DS8M	8	—	7,47	3,05	5,20	5,20	0,80	0,80	0,686	0,686
S14M	14	10,2	—	5,30	9,10	9,10	1,40	1,40	1,397	1,397
a a is the belt design pitch differential.										

Table 27 *(continued)*

Profile	Pitch	h_s	h_d	h_t	S	r_{bb}	r_a	r_r	Y	a[a]
DS14M	14	—	13,39	5,30	9,10	9,10	1,40	1,40	1,397	1,397
[a] a is the belt design pitch differential.										



1 2

Key

1 single sided belts

2 double sided belts

Figure 21 — Tooth dimensions – Profile system S

9.1.2 Belt widths and tolerances

Belt widths and tolerances are given in Table 28.

Table 28 — Widths and width tolerances

Dimensions in millimetres

Profile	Nominal belt width	Tolerance on width for belt pitch lengths		
		Up to and including 840 mm	Over 840 mm up to and including 1 680 mm	Over 1 680 mm
S8M DS8M	15 20 25 30	±0,8	+0,8 −1,2	+0,8 −1,2
	40 50	±0,8 −1,2	±1,2	+1,2 −1,6
	60	±1,2	+1,2 −1,6	±1,6
	85	±1,6	+1,6 −2,0	±2,0
S14M DS14M	40	±0,8 −1,2	±1,2	+1,2 −1,6
	55 60	±1,2	+1,2 −1,6	±1,6
	80 85	±1,6	+1,6 −2,0	±2,0
	100	±1,6	+1,6 −2,0	±2,0
	115 120 170	±2,4	+2,4 −2,8	+2,4 −3,2

9.1.3 Pitch length measurement

See Annex A for tolerances and Annex B for the relationship between the centre distance and the belt pitch length.

9.1.3.1 Measuring fixture (see Figure 22)

The pitch length of a synchronous belt shall be determined by placing the belt on a measuring fixture composed of the following elements.

Two pulleys of equal diameter, as specified in Table 29 of the proper belt type and having standard tooth space dimensions. These pulleys should be made to the tolerances shown in Table 29. One pulley shall be free to rotate on a fixed-position shaft, while the other shall be free to rotate on a moveable shaft to permit the centre distance to change.

9.1.3.1.1 **Means of applying a total measuring force** to the moveable pulley.

9.1.3.1.2 Means of measuring the centre distance between the two pulleys with the necessary degree of accuracy for centre distance measurement.

9.1.3.2 Total measuring force

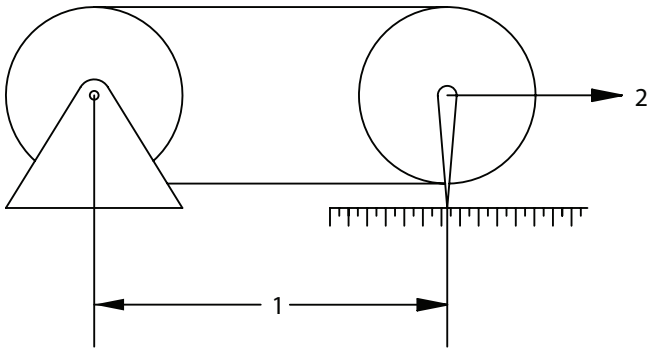
The total measuring force to be applied for measuring belts is given in Table 30.

9.1.3.3 Procedure

In measuring the pitch length of a synchronous belt, the belt should be rotated at least two revolutions to seat it properly and to divide the total force equally between the two lengths of the belt.

The pitch length shall be calculated by adding the pitch circumference of one of the pulleys to twice the measured centre distance.

Check double-sided belts on both tooth faces.



Key

1 centre distance

2 total measuring force

Figure 22 — Diagram of fixture for measuring pitch length

Table 29 — Belt length measuring pulleys

Dimensions in millimetres

Profile	Number of grooves	Pitch circumference	Outside diameter[a]	Radial runout F.I.M.[b]	Axial runout F.I.M.[b]
S8M, DS8M	34	272	85,208 ±0,013	0,013	0,025
S14M, DS14M	40	560	175,460 ±0,025	0,013	0,051

[a] Pulleys outside of the diameter tolerance range specified can be used if the resulting belt length measurements are corrected for the actual pulley diameters.

[b] Full indicator movement.

NOTE The number of pulley teeth specified in Table 29 determines the recommended sizes for measuring the belt pitch length. Practically, other sizes of pulleys could be used provided they each have the same number of teeth, and meet the dimensional requirements of Table 29.

Table 30 — Total measuring force

Forces in newtons

Profile	Total measuring force													
	Belt width mm													
	15	20	25	30	40	50	55	60	80	85	100	115	120	170
S8M, DS8M	570	790	1 020	1 250	1 740	2 240	—	2 770	—	4 120	—	—	—	—
S14M, DS14M	—	—	—	—	2 420	—	3 480	3 840	5 340	5 720	6 880	8 070	8 470	12 600

9.2 Pulleys, profile system S

9.2.1 General

See Annex C for tolerances.

The pulley is characterized by a curvilinear groove profile. This groove profile is defined as the profile formed by the generating tool rack form required to machine-finish the curvilinear profile. The profile is different for each pulley diameter, but can be closely approximated by a nominal groove profile over specified ranges of number of grooves.

9.2.2 Generating tool rack

Dimensions and tolerances for the generating tool rack for pulleys with profile system S are given in Table 31 and Figure 23.

Table 31 — Pulley generating tool rack dimensions

Dimensions in millimetres

Profile	Number of grooves	P_b ±0,012	h_r +0,05 −0,00	b_t +0,05 −0,00	r_1 +0,05 −0,00	r_2 ±0,03	r_3 ±0,03	r_4 ±0,03	r_5 ±0,10	X	W	a	Y
S8M	22 and over	8,000	2,830	5,200	5,300	0,750	2,710	0,400	4,040	5,040	1,130	0,686	0,686
Optional S8M	22 to 26	7,611	2,830	4,220	4,740	0,800	—	0,270	5,680	—	—	—	0,256
	27 to 33	7,689	2,830	4,220	4,740	0,800	—	0,290	5,280	—	—	—	0,279
	34 to 46	7,767	2,830	4,220	4,740	0,800	—	0,320	4,920	—	—	—	0,299
	47 to 74	7,844	2,830	4,220	4,740	0,800	—	0,350	4,590	—	—	—	0,321
	75 to 216	7,928	2,830	4,220	4,740	0,800	—	0,380	4,280	—	—	—	0,342
S14M	28 and over	14,000	4,950	9,100	9,28	1,310	4,800	0,700	7,070	8,840	1,980	1,397	1,397
Optional S14M	28 to 34	13,441	4,950	7,500	8,380	1,360	—	0,520	9,170	—	—	—	0,784
	35 to 47	13,577	4,950	7,500	8,380	1,360	—	0,560	8,570	—	—	—	0,819
	48 to 75	13,716	4,950	7,500	8,380	1,360	—	0,610	8,030	—	—	—	0,856
	76 to 216	13,876	4,950	7,500	8,380	1,360	—	0,660	7,460	—	—	—	0,896

NOTE Optional tool rack dimensions represent a refinement of the original patent holder's design. Selection of standard or optional to be agreed between manufacturer and user.

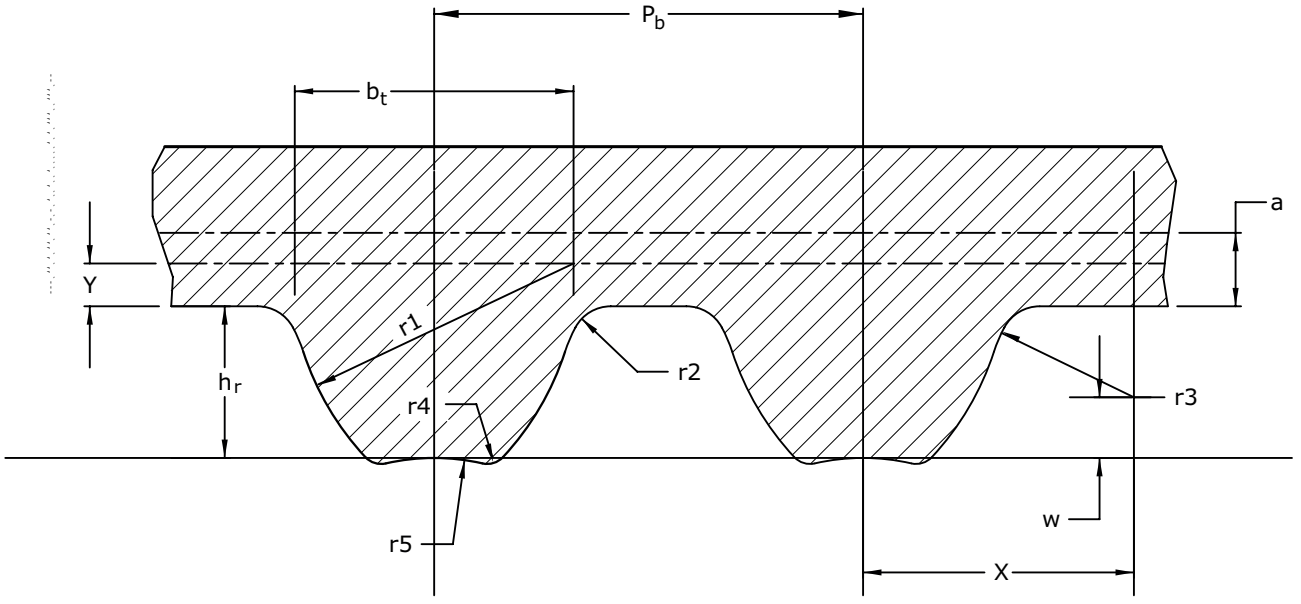


Figure 23 — Pulley generating tool rack form

9.2.3 Pulley groove profile dimensions and tolerances

Dimensions and tolerances for the pulley grooves with profile S are given in Table 32 and shown in Figure 24.

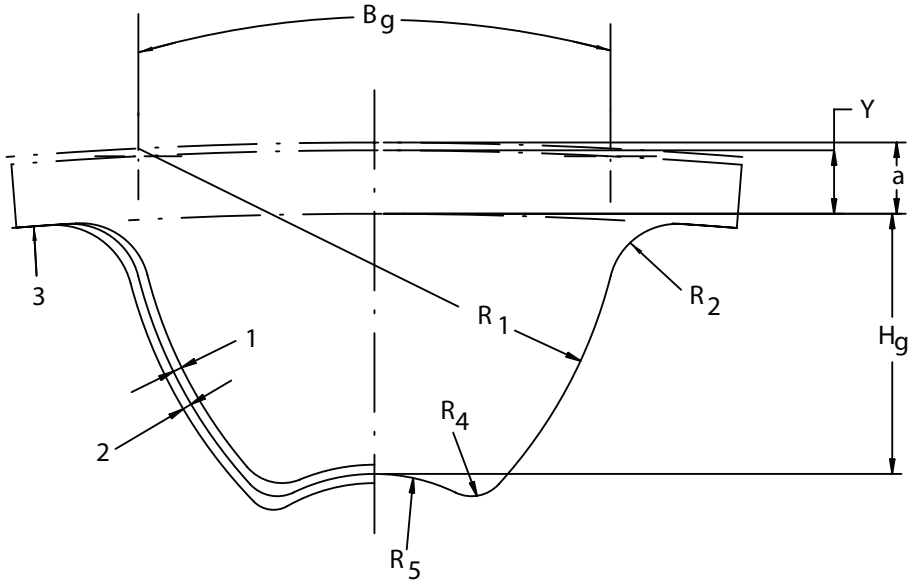
Table 32 — Pulley groove profile dimensions

Dimensions in millimetres

Profile	Number of grooves	B_g[1] +0,10 −0,00	H_g ±0,03	R_5 ±0,01	R_4 ±0,01	R_2 +0,10 −0,00	R_1 +0,10 −0,00	a[a]	Y
S8M	22 and over	5,20	2,83	4,04	0,40	0,75	5,30	0,686	0,686
S14M	28 and over	9,10	4,95	7,07	0,70	1,31	9,28	1,397	1,397

NOTE The B_g dimension is an arc length, not a cord length.

[a] a is the belt design pitch differential.



Key

1 minimum
2 maximum
3 pulley outside diameter

Figure 24 — Pulley groove profile

9.2.4 Pulley outside diameters

Pulley outside diameters for the standard pulleys are given in Table 33. The relationship of the pulley outside and pitch diameters is illustrated in Figure 25 and the following formula.

$$\text{Pitch diameter} = \frac{\text{No. of grooves} \times \text{pulley pitch}}{\pi} \quad (9)$$

$$\text{Outside diameter} = \text{Pitch diameter} - 2a \quad (10)$$

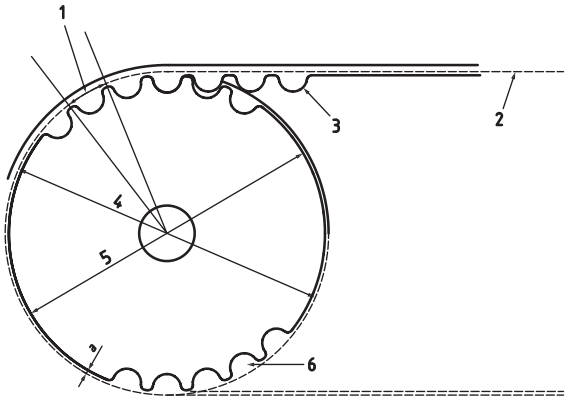
where

a is the value given in Table 27.

Table 33 — Standard pulley sizes

Dimensions in millimetres

Number of grooves	Profile			
	S8M		S14M	
	Pitch diameter	Outside diameter	Pitch diameter	Outside diameter
22	56,02	54,65	—	—
24	61,12	59,74	—	—
26	66,21	64,84	—	—
28	71,30	69,93	124,78	121,98
29	—	—	129,23	126,44
30	76,39	75,02	133,69	130,90
32	81,49	80,12	142,60	139,81
34	86,58	85,21	151,52	148,72
36	91,67	90,30	160,43	157,63
38	96,77	95,39	169,34	166,55
40	101,86	100,49	178,25	175,46
44	112,05	110,67	196,08	193,28
48	122,23	120,86	213,90	211,11
52	—	—	231,73	228,94
56	142,60	141,23	249,55	246,76
60	—	—	267,38	264,59
64	162,97	161,60	285,21	282,41
68	—	—	303,03	300,24
72	183,35	181,97	320,86	318,06
80	203,72	202,35	356,51	353,71
90	229,18	227,81	401,07	398,28
112	285,21	283,83	499,11	496,32
144	366,69	365,32	641,71	638,92
168	—	—	748,66	745,87
192	488,92	487,55	855,62	852,82
216	—	—	962,57	959,78



Key

1 pitch
2 belt pitch line
3 belt tooth
4 pitch diameter
5 outside diameter
6 pulley groove

Figure 25 — Pulley dimensions

9.2.5 Pulley width

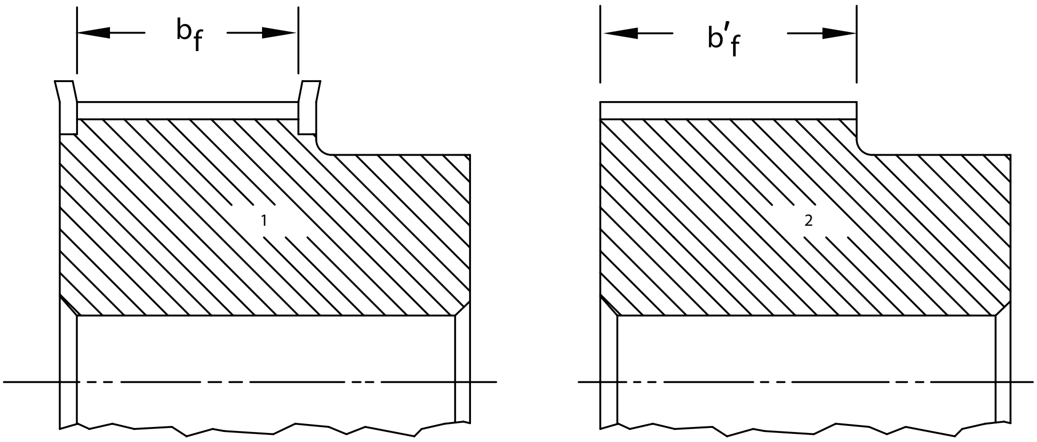
The standard nominal pulley width, and the actual pulley width required, b_f for flanged pulleys, b'_f for unflanged pulleys (see Figure 26), are given in Table 34. Users are advised that the values given for b'_f apply also to pulleys with only one flange (see Annex D).

Table 34 — Standard pulley widths

Dimensions in millimetres

Profile	Standard nominal pulley width	Minimum pulley width	
		Flanged b_f	Unflanged b'_f
S8M	15	18	25
	25	28	35
	40	43	50
	60	63	70
S14M	40	43	55
	60	63	76
	80	84	96
	100	104	116
	120	125	136

NOTE The minimum unflanged pulley width can be reduced when the alignment of the drive can be controlled, but shall not be less than the minimum flanged pulley width.



Key

1 flanged pulley

2 unflanged pulley

Figure 26 — Minimum pulley width

Annex A
(normative)

Belt pitch lengths and tolerances

The belt pitch lengths and tolerances are given in Table A.1.

Table A.1 — Standard pitch lengths and tolerances

Dimensions in millimetres

Belt pitch length		Permissible deviation from standard length	
Over	To	Single sided belts	Double sided belts
127	254	±0,40	+0,80 −0,60
254	381	±0,46	+0,92 −0,69
381	508	±0,50	+1,00 −0,75
508	762	±0,60	+1,20 −0,90
762	1 016	±0,66	+1,32 −0,99
1 016	1 270	±0,72	+1,44 −1,08
1 270	1 524	±0,82	+1,64 −1,23
1 524	1 778	±0,86	+1,74 −1,29
1 778	2 032	±0,92	+1,84 −1,38
2 032	2 286	±0,98	+1,96 −1,47
2 286	2 540	±1,04	+2,08 −1,56
2 540	2 794	±1,08	+2,16 −1,62
2 794	3 048	±1,12	+2,24 −1,68
3 048	3 302	±1,16	+2,32 −1,74
3 302	3 556	±1,20	+2,40 −1,80

NOTE The permissible deviation from the standard length for double-sided belts is 2X the plus tolerance and 1,5X the minus tolerance of the single-sided belt.

Table A.1 *(continued)*

Belt pitch length		Permissible deviation from standard length	
Over	To	Single sided belts	Double sided belts
3 556	3 810	±1,26	+2,52 –1,89
3 810	4 064	±1,32	+2,64 –1,98
4 064	4 318	±1,38	+2,76 –2,07
4 318	4 572	±1,44	+2,88 –2,16
4 572	4 826	±1,50	+3,00 –2,25
4 826	5 080	±1,56	+3,12 –2,34
5 080	5 334	±1,62	+3,24 –2,43
5 334	5 588	±1,68	+3,36 –2,52
5 588	5 842	±1,74	+3,48 –2,61
5 842	6 096	±1,80	+3,60 –2,70
6 096	6 350	±1,86	+3,72 –2,79
6 350	6 604	±1,92	+3,84 –2,88
6 604	6 860	±1,98	+3,96 –2,97
NOTE The permissible deviation from the standard length for double-sided belts is 2X the plus tolerance and 1,5X the minus tolerance of the single-sided belt.			

Annex B
(normative)

Relationship between centre distance and belt pitch length

The relationship between centre distance and belt pitch length is given in Formula (B.1):

$$L_p = 2C\cos\phi + \frac{\pi(D+d)}{2} + \frac{\pi\phi(D-d)}{180} \quad \text{(B.1)}$$

where

L_p is the pitch length of belt, in millimetres;

C is the centre distance, in millimetres;

D is the pitch diameter of large pulley, in millimetres;

d is the pitch diameter of small pulley, in millimetres.

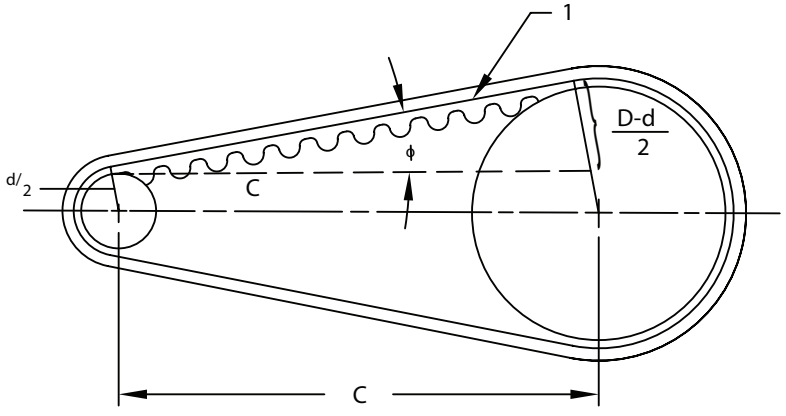
$$\phi = \sin^{-1}\left(\frac{D-d}{2C}\right) \text{ degrees} \quad \text{(B.2)}$$

The approximate centre distance "C" can be found in Formula (B.3):

$$C = \frac{K + \sqrt{K^2 - 32(D-d)^2}}{16} \quad \text{(B.3)}$$

where K is equal to $4\,L_p - 6{,}28\,(D + d)$.

The exact centre distance can then be determined by trial, using the belt pitch length formula, or by using the centre distance tables available from the belt manufacturers.



Key

1 pitch line

Figure B.1

Annex C
(normative)

Pulley tolerances

C.1 Pitch to pitch tolerances

Tolerances on the amount of deviation of pulley pitch between adjacent teeth, and on the cumulative deviation within 90° arc of a pulley, are given in Table C.1. This tolerance applies to the distance between the same point on either the right or left corresponding flanks of adjacent teeth.

Table C.1 — Pitch to pitch tolerance

Dimensions in millimetres

Outside diameter d_o	Allowable deviation of pitch	
	Between any two adjacent teeth	Summation within a 90°arc[a]
$d_o \leq 25{,}4$	0,03	0,05
$25{,}4 < d_o \leq 50{,}8$	0,03	0,08
$50{,}8 < d_o \leq 101{,}6$	0,03	0,11
$101{,}6 < d_o \leq 177{,}8$	0,03	0,13
$177{,}8 < d_o \leq 304{,}8$	0,03	0,15
$304{,}8 < d_o \leq 508{,}0$	0,03	0,18
$508{,}0 < d_o \leq 762{,}00$	0,03	0,20
$762{,}00 < d_o \leq 1\,016{,}00$	0,03	0,23
$d_o > 1\,016{,}00$	0,03	0,25

[a] The allowable deviation of pitch is to include the next full tooth past a 90° arc.

C.2 Diameter tolerances

Table C.2 — Tolerances on outside diameter

Dimensions in millimetres

Outside diameter d_o	Tolerance
$d_o \leq 25{,}4$	+0,05/0
$25{,}4 < d_o \leq 50{,}8$	+0,08/0
$50{,}8 < d_o \leq 101{,}6$	+0,10/0
$101{,}6 < d_o \leq 177{,}8$	+0,13/0
$177{,}8 < d_o \leq 304{,}8$	+0,15/0
$304{,}8 < d_o \leq 508{,}0$	+0,18/0
$508{,}0 < d_o \leq 762{,}0$	+0,20/0
$762{,}0 < d_o \leq 1\,016{,}0$	+0,23/0
$d_o > 1\,016{,}0$	+0,25/0

C.3 Axial circular runout

See Table C.3.

Table C.3 — Axial circular runout

Dimensions in millimetres

Outside diameter range d_o	**F.I.M.**[a] max.
mm	**mm**
$d_o \leq 25{,}4$	0,05
$25{,}4 < d_o \leq 50{,}8$	0,08
$50{,}8 < d_o \leq 101{,}6$	0,10
$101{,}6 < d_o \leq 254{,}0$	0,001 mm per millimetre of outside diameter
$254{,}0 < d_o$	0,25 mm + 0,000 5 mm per millimetre of outside diameter $d_o > 254{,}0$

[a] Full indicator movement.

C.4 Radial circular runout

See Table C.4.

Table C.4 — Radial circular runout

Dimensions in millimetres

Outside diameter range d_o	**F.I.M.**[a] max.
mm	**mm**
$d_o \leq 25{,}4$	0,05
$25{,}4 < d_o \leq 50{,}8$	0,07
$50{,}8 < d_o \leq 101{,}6$	0,10
$101{,}6 < d_o \leq 203{,}2$	0,13
$203{,}2 < d_o$	0,13 mm + 0,000 5 mm per millimetre of outside diameter $d_o > 203{,}2$

[a] Full indicator movement.

C.5 Parallelism

Tolerances on pulley parallelism are given in Table C.5.

Table C.5 — Parallelism

Dimensions in millimetres

Nominal pulley width	**Tolerances**
$b_f \leq 40$	0,03
$40 < b_f \leq 100$	0,04
$100 < b_f \leq 160$	0,05
$160 < b_f \leq 220$	0,06
$220 < b_f \leq 280$	0,07
$280 < b_f \leq 340$	0,08

C.6 Cylindricity

Tolerances on pulley cylindricity are given in Table C.6.

Table C.6 — Cylindricity

Dimensions in millimetres

Nominal pulley width	Tolerances
$b_f \leq 20$	0,02
$20 < b_f \leq 40$	0,04
$40 < b_f \leq 80$	0,08
$80 < b_f \leq 120$	0,12
$120 < b_f \leq 160$	0,16
$160 < b_f \leq 340$	0,16mm +0,001mm per millimetre Of nominal pulley width $b_f > 160$

C.7 Taper

The maximum taper will be 0,001 mm per millimetre of face width provided that the outside diameter remains within the tolerance given in Table C.2.

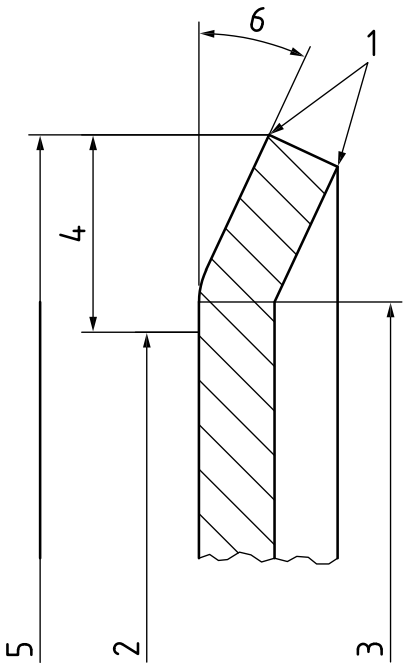
C.8 Quality specifications

The quality, finish, and balance of pulleys shall comply with the requirements specified in ISO 254.

Annex D
(normative)

Flange dimensions

The minimum flange height (h) equals the belt tooth height (h_t) plus the pitch line differential (a) for the respective G, H, R, or S profile systems. The flange dimensions are illustrated in Figure D.1.



Key

1 break sharp corners
2 outside diameter, d_o
3 bend diameter, d_o +0,5 mm min.
4 minimum height of flange, h
5 flange outside diameter, d_o +2h
6 flange angle, 25° (max), 8° (min)

Figure D.1

Bibliography

[1] ISO 1101:1983, *Technical drawings — Geometrical tolerancing — Tolerancing of form, orientation, location and run-out — Generalities, definitions, symbols, indications on drawings*

ICS 21.220.10
Price based on 53 pages