International Standard





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Synchronous belt drives — Pulleys

Transmissions synchrones par courroles - Poulies

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iTeh STANDARD PREVIEW (standards.iteh.ai)

<u>ISO 5294:1979</u> https://standards.iteh.ai/catalog/standards/sist/358ede4c-2bc0-4557-9a64-8e77c4045572/iso-5294-1979

Descriptors : belt drives, pulleys, dimensions, dimensional tolerances.

ISO 5294-1979 (E)

Foreword

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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 5294 was developed by Technical Committee ISO/TC 41, IEW Pulleys and belts (including veebelts), and was circulated to the member bodies in February 1978 February 1978.

It has been approved by the member bodies of the following countries 1979

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8e77c40\$5572/iso-5294-1979 Sweden United Kingdom USA USSR Romania South Africa, Rep. of

No member body expressed disapproval of the document.

Attention is called to the fact that the synchronous pulleys specified in this International Standard are subject to patent rights held by Uniroyal, Inc.

The patent holder in authorizing the inclusion of the details of this patented item in this International Standard has given the assurance that it would be willing to negociate licenses under patent and like rights with applicants throughout the world on reasonable terms and conditions.

C International Organization for Standardization, 1979

Synchronous belt drives — Pulleys

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1 Scope and field of application

3 Standard tooth dimensions

3.1 Involute teeth

This International Standard, specifies the principal **3.1** characteristics of synchronous pulleys for use in synchronous endless belt drives¹⁾ for mechanical power transmission and where positive indexing or synchronization may be required. The principal characteristics include : tooth dimensions and tolerances; standard pulley dimensions and tolerances, and quality specification. **3.1**

2 Reference

 $\rm ISO/R$ 254, Quality, machining and balancing of transmission pulleys.^2)

3.1.1 The involute tooth profile results in different dimensions for each pulley diameter. Therefore, to specify the involute tooth dimensions would require a very voluminous table. For this reason, as well as because of the difficulty in specifying the curved sides of an involute tooth, dimensions are specified for the rack generating tool required to produce the involute tooth.

3.1.2 Dimensions and tolerances for the rack generating tool for synchronous pulleys with involute teeth are given in table 1 and figure 1.

¹⁾ These drives have been known by various titles in the past, for example : timing belt drives, positive belt drives, gear belt drives.

²⁾ Under revision.



Figure 1 - Generating tool rack for pulleys with involute teeth

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ISO 5294:1979 https://standards.iteh.ai/catalog/standards/sist/358ede4c-2bc0-4557-9a64-8e77c4045572/iso-5294-1979 Table 1 — Dimensions and tolerances for generating tool rack for pulleys with involute teeth

	Number of	,	o _b			h _r		b _g		r ₁		r ₂	2	а
Pitch code	teeth in pulley	mm ± 0,003	in ± 0.000 1	degrees ± 0,12	mm + 0,05 0	in + 0.002 0	mm + 0,05 0	in + 0.002 0	mm ± 0,03	in ± 0.001	mm ± 0,03	in ± 0.001	mm	in
XL	10 and over	5,080	0.200 0	25	1,40	0.055	1,27	0.050	0,61	0.024	0,61	0.024	0,508	0.020
L	10 and over	9,525	0.375 0	20	2,13	0.084	3,10	0.122	0,86	0.034	0,53	0.021	0,762	0.030
н	14 to and including 19 over 19	12,700	0.500 0	20	2,59	0.102	4,24	0.167	1,47	0.058	1,04 1,42	0.041 0.056	1,372	0,054
хн	18 and over	22,225	0.875 0	20	6,88	0.271	7,59	0.299	2,01	0.079	1,93	0.076	2,794	0.110
ххн	18 and over	31,750	1.250 0	20	10,29	0.405	11,61	0.457	2,69	0.106	2,82	0.111	3,048	0.120

2

3.2 Straight-sided teeth

3.2.2 Dimensions and tolerances for straight-sided teeth (see figure 2) are given in table 2.

3.2.1 Involute teeth are normally recommended for synchronous belt drives. Since straight-sided teeth are in use, their specifications are also included.



<u>ISO 5294:1979</u> https://standards.iteh.ai/catalog/standards/sist/358ede4c-2bc0-4557-9a64-8e77c4045572/iso-5294-1979

Pitch	t	w		h _g	φ	r _b	max.		r _t	2	а
code	mm	in	mm	in	± 1,5°	mm	in	mm	in	mm	in
XL	1,32 ± 0,05	0.052 ± 0.002	1,65 0 0,08	0.065 _ 0 _ 0.003	25	0,41	0.016	0,64 ^{+ 0,05} 0	0.025 ^{+ 0.002} 0	0,508	0.020
L	3,05 ± 0,10	0.120 ± 0.004	2,67 0 0,10	0.105 _ 0 _ 0.004	20	1,19	0.047	1,17 ^{+ 0,13} 0	0.046 ^{+ 0.005} 0	0,762	0.030
н	4,19 ± 0,13	0.165 ± 0.005	3,05 0 - 0,13	0.120 _ 0 _ 0.005	20	1,60	0.063	1,60 ^{+ 0,13} 0	0.063 ^{+ 0.005} 0	1,372	0.054
хн	7,90 ± 0,15	0.311 ± 0.006	7,14 0 - 0,13	0.281 _ 0 _ 0.005	20	1,98	0.078	2,39 ^{+ 0,13} 0	0.094 ^{+ 0.005} 0	2,794	0.110
ххн	12,17 ± 0,18	0.479 ± 0.007	10,31 0 - 0,13	0.406 0 0.005	20	3,96	0.156	3,18 ^{+ 0,13} 0	0.125 ⁺ 0.005 0	3,048	0.120

Table 2 - Dimensions and tolerances for pulleys with straight-sided teeth

3.3 Pitch-to-pitch tolerances

Tolerances on the amount of deviation of belt pitch between adjacent teeth, and on the summation of deviations within 90°

arc of a pulley, are given in table 3. This tolerance applies to the distance between the same point on either the right or left corresponding flanks of adjacent teeth.

Outside d	diameter o	Allo Between adjacen	wable dev any two it teeth	viation of p Summati a 90	itch on within ʾarc
mm	in	mm	in	mm	in
Up to and including 25,40	Up to and including 1.000	0,03	0.001	0,05	0.002
Over 25,40 up to and including 50,80	Over 1.000 up to and including 2.000	0,03	0.001	0,08	0.003
Over 50,80 up to and including 101,60	Over 2.000 up to and including 4.000	0,03	0.001	0,10	0.004
Over 101,60 up to and including 177,80	Over 4.000 up to and including 7.000	0,03 9 <u>79</u>	0.001	0,13	0.005
Overpr77,80 darts.its and including 304,80	h. zóveta) 000 apdrods/ and incluid 49 1 2.000-	sist/358ed 5294-197	e4c-2bc(9 ^{0.001}	-4557-9a 0.15	64- 0.006
Over 304,80 up to and including 508,00	Over 12.000 up to and including 20.000	0,03	0.001	0,18	0.007
Over 508,00	Over 20.000	0,03	0.001	0,20	800.0

Table 3 - Pitch-to-pitch tolerances

4 Standard pulley dimensions

4.1 Pulley widths

The standard pulley width designation, the nominal pulley width, and the minimum actual pulley width required, $b_{\rm f}$ for flanged pulleys, $b_{\rm f'}$ for unflanged pulleys (see figure 3), are given in table 4.

Users are advised that the values given for $b_{\rm f}$ apply also to pulleys with only one flange.

4.2 Pulley diameters

4.2.1 Standard pulley diameters are given in table 5.

Pitch code	Standard pulley width	Nomina wid	l pulley ith	Minimum pulley b	n flanged width f	Minimum u pulley b _i	unflanged width '
	designation	mm	in	mm	in	mm	in
	025	6,4	0.25	7,1	0.28	8,9	0.35
XL	031	7,9	0.31	8,6	0.34	10,4	0.41
	037	9,5	0.37	10,4	0.41	12,2	0.48
	050	12,7	0.50	14,0	0.55	17,0	0.67
L	075	CT19A N	0,75	20,3	0.80	23,3	0.92
	100	25,4	1.00	26,7	1.05	29,7	1.17
	075	(stan		iteh.a	0.80	24,8	0.98
	100	25,4	1.00	26,7	1.05	31,2	1.23
н	150	38,1	ISO 5094:1	9 <u>79</u> 39,4	1.55	43,9	1.73
ht	ps:// 200 dard	s.iteh50/8atalo	g/st 2n00 rds/	sist/3 52681e4 0	-2b (2)08 557-	9a6457,3	2.26
	300	7 6;2 7c4	045 3.00 /iso-	5294799079	3.11	83,5	3.29
	200	50,8	2.00	56,6	2.23	62,6	2.46
хн	300	76,2	3.00	83,8	3.30	89,8	3.54
	400	101,6	4.00	110,7	4.36	116,7	4.59
	200	50,8	2.00	56,6	2.23	64,1	2.52
VVU	300	76,2	3.00	83,8	3.30	91,3	3.59
	400	101,6	4.00	110,7	4.36	118,2	4.65
	500	127,0	5.00	137,7	5.42	145,2	5.72

Table 4 – Standard pulley widths

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



Figure 3 - Minimum pulley width

diameters
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Table

										Standa	ırd diame	iters								
Number		Pitch co	de XL	<u>.</u>		Pitch co	ode L			Pitch co	de H		-	⁹ itch coc	le XH	<u> </u>		Pitch cod	le XXH	
of teeth	Pit diam	tch Teter	Outs diame	ide eter	Pitc diame	h ter	Outsic diame	de ter	Pitch diame	ter	Outsid diamet	le er	Pitc diame	h eter	Outsi diame	de ter	Pitch diame	ter	Outsi diame	de ter
	u u	in	E E	. <u>e</u>	шш	. <u>e</u>	E E	. <u>e</u>	E	. <u>c</u>	E	. <u>E</u>	E E	Ē	E E	Ē	u E	.⊑	e E	. <u>c</u>
10	16,17	0.637	15,66	0.617																
11	17,79	0.700	17,28	0.680																
12	19,40	0.764	18,90	0.744	36,38	1.432	35,62	1.402		http										
13	21,02	0.828	20,51	0.808	39,41	1.552	38,65	1.522		ps:/		ľ								
14	22,64	0.891	22,13	0.871	42,45	1.671	41,68	1.641		/stai		Fe								
15	24,26	0.955	23,75	0.935	45,48	1.790	44,72	1.760		idar		h								
16	25,87	1.019	25,36	0.999	48,51	1.910	47,75	1.880	64,68	2.546	63,31	2.492								
17	27,49	1.082	26,98	1.062	51,54	2.029	50,78	1.999	68,72	2.706	67,35	2.652								
18	29,11	1.146	28,60	1.126	54,57	2.149	53,81	2.119	72,77	2,866	71,39	2.811.1	27,34	5.013	124,55	4.903				
19	30,72	1.210	30,22	1.190	57,61	2.268	56,84	2.238	76,81	atal 7800	75,44	2.970 1	34,41	5.292	131,62	5.182				
20	32,34	1.273	31,83	1.253	60,64	2.387	59,88	2.357	80,85	0.000 4000 4000	79,48	3.129 1	41,49	5.570	138,69	5.460				
(21)	33,96	1.337	33,45	1.317	63,67	2.507	62,91	2.477	84,89		83,52	3.288 1	48,56	5.849	145,77	5.739				
22	35,57	1,401	35,07	1.381	66,70	2.626	65,94	2.596	88,94		87,56	3.447 1	55,64	6.127	152,84	6.017	222,34	8.754	219,29	8.634
(23)	37,19	1.464	36,68	1.444	69,73	2.745	68,97	2.715	92,98	3,667	<u>9</u> 1,61	3.607	62,71	6.406	159,92	6.296	232,45	9.151	229,40	9.031
(24)	38,81	1.528	38,30	1.508	72,77	2.865	72,00	2.835	97,02	3.820	95,65	3.766 1	69,79	6.685	166,99	6.575	242,55	9.549	239,50	9.429
25	40,43	1.592	39,92	1.572	75,80	2.984	75,04	2.954	101,06	5 <u>6</u> 0 1-69	69,69	3.925 1	76,86	6.963	174,07	6.853	252,66	9.947	249,61	9.827
(36)	42,04	1.655	41,53	1.635	78,83	3.104	78,07	3.074	105,11	433	03,73	4.084	83,94	7.242	181,14	7.132	262,76	10.345	259,72	10.225
(27)	43,66	1.719	43,15	1.699	81,86	3.223	81,10	3.193	109,15	4.297	07,78	4.243	91,01	7.520	188,22	7.410	272,87	10.743	269,82	10.623
28	45,28	1.783	44,77	1.763	84,89	3.342	84,13	3.312	113,19	4.456	11,82	4.402	98,08	7.799	195,29	7.689	282,98	11.141	279,93	11.021
(30)	48,51	1.910	48,00	1.890	96'06	3.581	90,20	3.551	121,28	4.775	19,90	4.7212	12,23	8.356	209,44	8.246	303,19	11.937	300,14	11.817
32	51,74	2.037	51,24	2.017	97,02	3.820	96,26	3.790	129,36	5.093 1	27,99	5.039 2	26,38	8.913	223,59	8.803	323,40	12.732	320,35	12.612
36	58,21	2.292	57,70	2.272	109,15	4.297	108,39	4.267	145,53	5.730 1	44,16	5.676 2	54,68	0.027	251,89	9.917	363,83	14.324	360,78	14.204
40	64,68	2.546	64,17	2.526	121,28	4.775	120,51	4.745	161,70	6.366 1	60,33	6.312 2	82,98	1.141	280,18	1.031	404,25	15.915	401,21	15.795
48	77,62	3.056	77,11	3.036	145,53	5.730	144,77	5.700	194,04	7.639 1	92,67	7.585 3	39,57	3.369	336,78	13.259	485,10	19.099	482,06	18.979
60	97,02	3.820	96,51	3.800	181,91	7.162	181,15	7.132	242,55	9.549 2	41,18	9.495 4	24,47	16.711	421,67	16.601	606,38	23.873	603,33	23.753
72	116,43	4.584	115,92	4.564	218,30	8.594	217,53	8.564	291,06 1	1.459 2	89,69 1	1.405 5	09,36	20.054	506,57	9.944	727,66	28.648	724,61	28.528
84					254,68	10.027	253,92	9.997	339,57 1	3.369 3	38,20 1	3.315 5	94,25	33.396	591,46	23.286	848,93	33.423	845,88	33.303
96					291,06	11.459	290,30	11.429	388,08 1	5.279 3	86,71 1	5.225 6	79,15	56.738	576,35	26.628	970,21	38.197	967,16	38.077
120					363,83	14.324	363,07	14.294	485,10 1	9.099 4	83,73 1	9.045 8	48,93	33.423	346,14	33.313	1 212,76	47.746	1 209,71	47.626
961									0.30,04	4.828	2 07'67	4.1.14								

Values for number of teeth in brackets are listed for information only and should be regarded as non-preferred sizes.

4.2.2 Tolerances on pulley diameters are given in table 6.

4.3 Flange dimensions

The pulley flange dimensions are given in table 7 and figure 4.

Table 7 – Minimum flange height

Outside o	diameter	Toler	ances	l	Diash anda	
mm	in	mm	in		Fitch code	
Up to and including 25,40	Up to and including 1.000	+ 0,05 0	+ 0.002 0		XL L	
Over 25,40 up to and including 50,80	Over 1.000 up to and including 2.000	+ 0,08 0	+ 0.003 0		н хн	
Over 50,80 up to and including 101,60	Over 2.000 up to and including 4.000	+ 0,10 0	+ 0.004 0		ххн	
Over 101,60 up to and including 177,80	Over 4.000 up to and including 7.000	+ 0,13	+ 0.005 0			
Over 177,80 up to and including 304,80	Over 7.000 up to and including 12.000	+ 0,15 0	+ 0.006 0			
Over 304,80 up to and including 508,00	Over 12.000 up to and including 20.000	+ 0,18 0	+ 0,007 D	RD	PREVIE	CW
Over 508,00	Over 20.000	(S 0201		ds.i	teh.ai)	

Table 6 – Tolerances on diameter

	Minimum flange height							
Pitch code	mm	in						
XL	1,0	0.04						
L	1,5	0.06						
н	2,0	0.08						
хн	4,8	0.19						
ххн	6,1	0.24						

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