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Synchronous belt drives — Imperial pitch trapezoidal profile system — Belts and pulleys

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National foreword

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Synchronous belt drives — Imperial pitch trapezoidal profile system — Belts and pulleys

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trapézoïdal pour pas impérial — Courroies et poulies*



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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).

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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, *Pulleys and belts (including veebelts)*, Subcommittee SC 4, *Synchronous belt drives*.

Synchronous belt drives — Imperial pitch trapezoidal profile system — Belts and pulleys

1 Scope

This International Standard specifies the principal characteristics of synchronous endless belts and pulleys for use in synchronous endless belt drives¹⁾ for mechanical power transmission and where positive indexing or synchronization is required.

The principal characteristics includes the following:

- a) belt nominal tooth dimensions;
- b) belt length and width dimensions and tolerances;
- c) belt length-measurement specifications;
- d) pulley grooves dimensions and tolerances;
- e) pulley dimensions and tolerances;
- f) 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*

ISO 1101, *Geometrical product specification (GPS) — Geometrical tolerancing — Tolerances of form, orientation, location and run-out*

3 Profiles

Seven profiles for synchronous drives are standardized: MXL, XXL, XL, L, H, XH, XXH.

The profiles and the corresponding belt pitches are given in [Table 1](#).

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

Table 1 — Profiles

Profiles	Belt pitch ^a	
	mm	in
MXL	2,032	0,080
XXL	3,175	0,125
XL	5,080	0,200
L	9,525	0,375
H	12,700	0,500
XH	22,225	0,875
XXH	31,750	1,250

^a Carried to third decimal place because belt pitch is a defined value.

4 Belt dimensions and tolerances

4.1 Belt tooth dimensions

The nominal belt tooth dimensions are the same for one-sided and double-sided belts; they are given in [Table 2](#) and are shown in [Figures 1, 2, and 3](#).

Two types of double-sided synchronous belts are standardized. Type A (see [Figure 2](#)) has symmetrical teeth and Type B (see [Figure 3](#)) has staggered teeth.

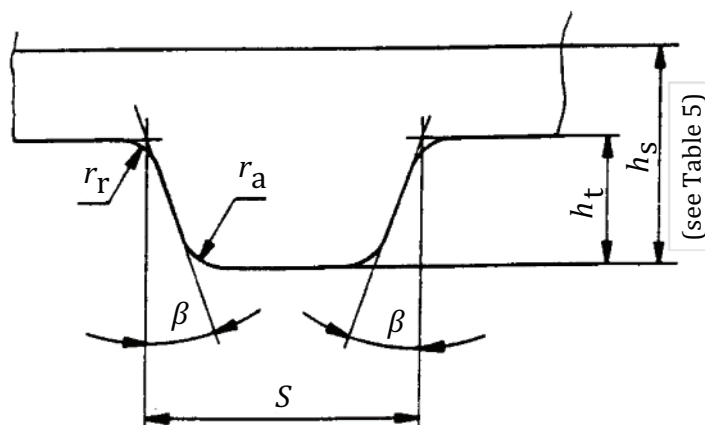


Figure 1 — Tooth profile, one-sided

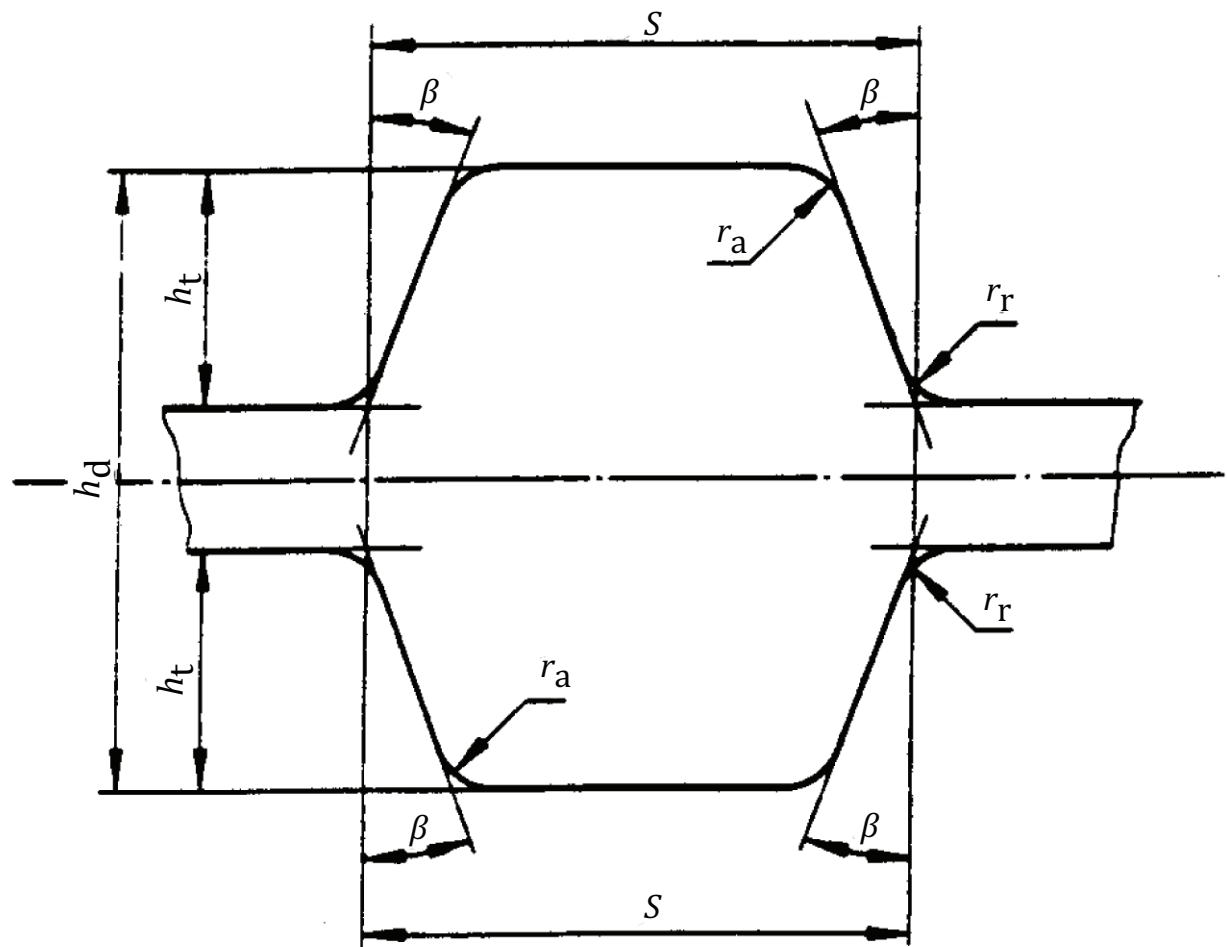


Figure 2 — Tooth profile, double-sided (Type A)

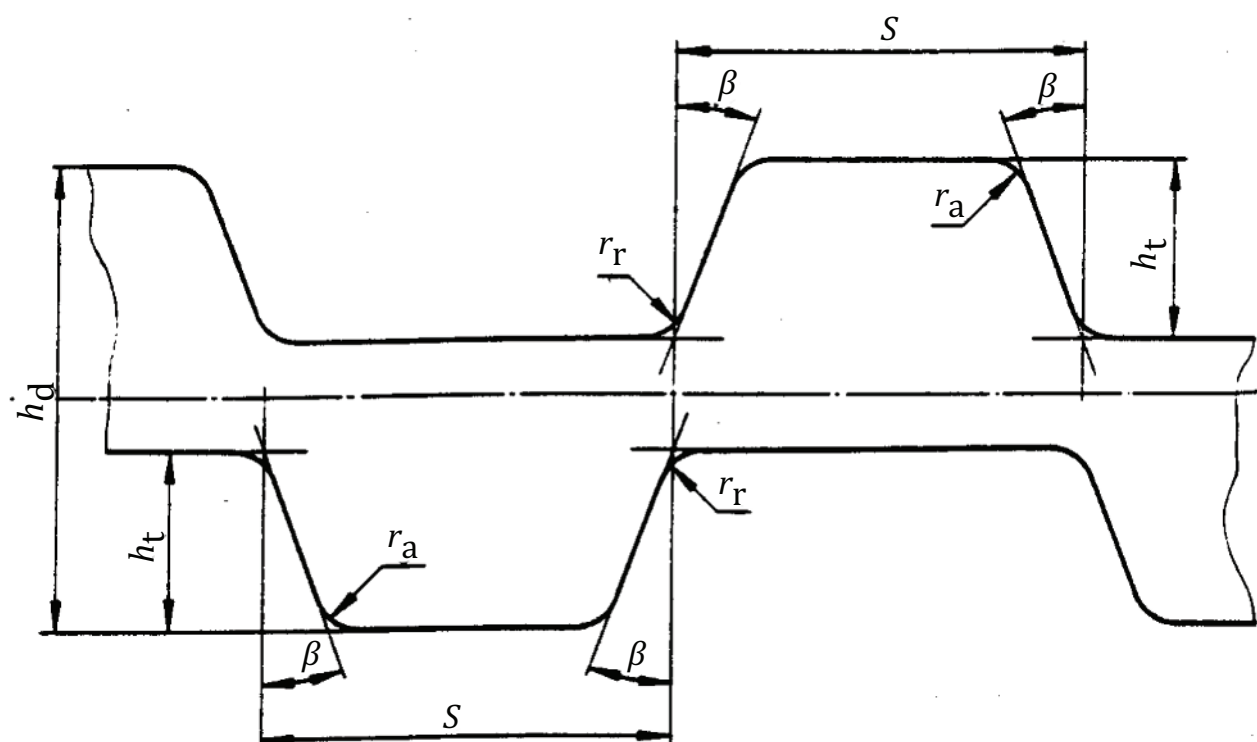


Figure 3 — Tooth profile, double-sided (Type B)

Table 2 — Nominal tooth dimensions

Profiles	2β degrees	S		h _t		r _r		r _a	
		mm	in	mm	in	mm	in	mm	in
MXL	40	1,14	0,045	0,51	0,02	0,13	0,005	0,13	0,005
XXL	50	1,73	0,068	0,76	0,03	0,2	0,008	0,3	0,012
XL	50	2,57	0,101	1,27	0,05	0,38	0,015	0,38	0,015
L	40	4,65	0,183	1,91	0,075	0,51	0,020	0,51	0,02
H	40	6,12	0,241	2,29	0,09	1,02	0,040	1,02	0,04
XH	40	12,57	0,495	6,35	0,25	1,57	0,062	1,19	0,047
XXH	40	19,05	0,750	9,53	0,375	2,29	0,090	1,52	0,06

4.2 Belt pitch lengths and tolerances

4.2.1 Single-sided belts

The belt pitch length and tolerances are given in [Tables 3](#) and [4](#).

Table 3 — Pitch lengths and tolerances — Profiles XL, L, H, XH, XXH

Belt length designation	Pitch length		Tolerance		Number of teeth for standard lengths				
	mm	in	mm	in	XL	L	H	XH	XXH
60	152,40	6,000	±0,41	±0,016	30				
70	177,80	7,000	±0,41	±0,016	35				
80	203,20	8,000	±0,41	±0,016	40				
90	228,60	9,000	±0,41	±0,016	45				
100	254,00	10,000	±0,41	±0,016	50				
110	279,40	11,000	±0,46	±0,018	55				
120	304,80	12,000	±0,46	±0,018	60				
124	314,33	12,375	±0,46	±0,018		33			
130	330,20	13,000	±0,46	±0,018	65				
140	355,60	14,000	±0,46	±0,018	70				
150	381,00	15,000	±0,46	±0,018	75	40			
160	406,40	16,000	±0,51	±0,020	80				
170	431,80	17,000	±0,51	±0,020	85				
180	457,20	18,000	±0,51	±0,020	90				
187	476,25	18,750	±0,51	±0,020		50			
190	482,60	19,000	±0,51	±0,020	95				
200	508,00	20,000	±0,51	±0,020	100	56			
210	533,40	21,000	±0,61	±0,024	105				
220	558,80	22,000	±0,61	±0,024	110	60			
225	571,50	22,500	±0,61	±0,024					
230	584,20	23,000	±0,61	±0,024	115				
240	609,60	24,000	±0,61	±0,024	120	64	48		
250	635,00	25,000	±0,61	±0,024	125				
255	647,70	25,500	±0,61	±0,024		68			
260	660,40	26,000	±0,61	±0,024	130				
270	685,80	27,000	±0,61	±0,024		72	54		
285	723,90	28,500	±0,61	±0,024		76			
300	762,00	30,000	±0,61	±0,024		80	60		
322	819,15	32,250	±0,66	±0,026		86			
330	838,20	33,000	±0,66	±0,026			66		
345	876,30	34,500	±0,66	±0,026		92			
360	914,40	36,000	±0,66	±0,026			72		
367	933,45	36,750	±0,66	±0,026		98			
390	990,60	39,000	±0,66	±0,026		104	78		
420	1 066,80	42,000	±0,76	±0,030		112	84		