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Synchronous belt drives — Automotive belts and pulleys

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Foreword

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

This document was prepared by Technical Committee ISO/TC 41, *Pulleys and belts (including vee belts)*, Subcommittee SC 4, *Synchronous belt drives*.

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

This first edition of ISO 21342 cancels and replaces ISO 9010:1997 and ISO 9011:1997.

Synchronous belt drives — Automotive belts and pulleys

1 Scope

This document specifies the characteristics of synchronous endless belts and their related pulleys for use in automotive applications such as engine camshaft drives.

The characteristics include:

— belt pitch spacing;

— belt nominal tooth dimensions;

— belt width and width tolerance;

— belt pitch length and pitch length tolerance;

— pulley groove dimensions and tolerances;

— pulley tolerances and quality specifications.

Test methods for measuring belt pitch length and lateral runout are also included.

2 Normative reference

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. 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 Terms and definitions

No terms and definitions are listed in this document.

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

— ISO Online browsing platform: available at https://www.iso.org/obp.

— IEC Electropedia: available at http://www.electropedia.org/

4 Profiles

The following profiles for synchronous drives for automotive applications are standardized:

— type ZA: trapezoidal tooth;

— type ZB: trapezoidal tooth;

— type ZH: curvilinear tooth, "H" system;

— type YH: curvilinear tooth, "H" system;

— type ZR: curvilinear tooth, "R" system;

— type YR: curvilinear tooth, "R" system;

— type ZS: curvilinear tooth, "S" system;

— type YS: curvilinear tooth, "S" system.

5 Belt designation

A belt is designated by a series of numbers and letters as follows:

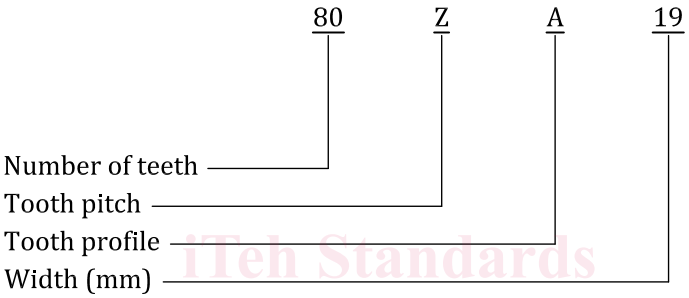
a) the first set of numbers indicates the number of teeth;

b) the first letter indicates tooth pitch;

c) the second letter indicates tooth profile;

d) The second set of numbers indicates the width in millimetres.

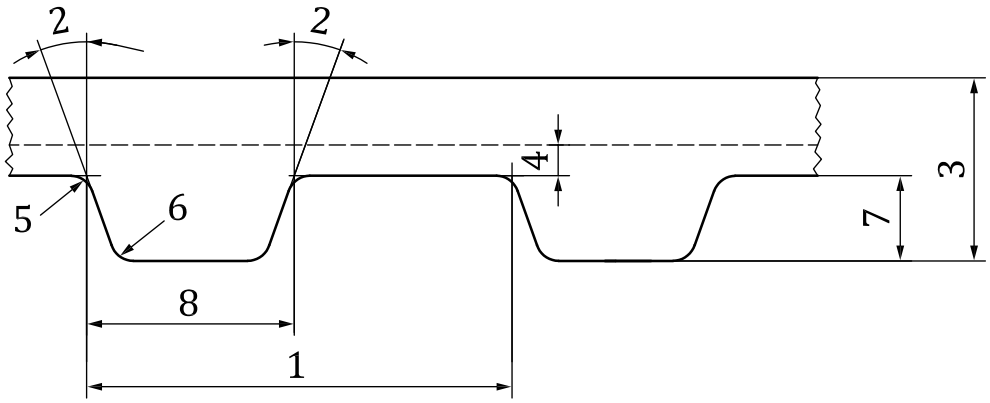
EXAMPLE



6 Belt dimensions and tolerances

6.1 Belt tooth dimensions — Trapezoidal tooth belts of types ZA and ZB

The nominal belt tooth dimensions for trapezoidal tooth belts of types ZA and ZB are shown in Figure 1 and given in Table 1.



Key

1 tooth pitch (p_b)
2 tooth angle (2β)
3 height (h_s)
4 pitch line differential (a)
5 root radius (r_r)
6 tip radius (r_a)
7 tooth height (h_t)
8 tooth width (S)

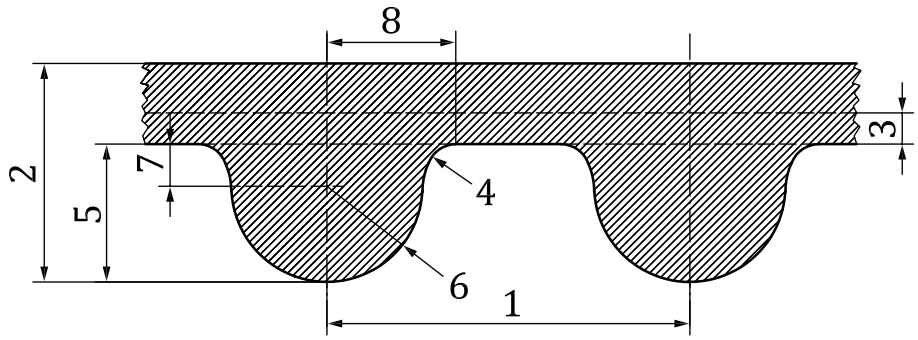
Figure 1 — Nominal tooth dimensions (profile) for types ZA and ZB

Table 1 — Nominal tooth dimensions for types ZA and ZB

Key number	Symbol	Nominal profile	
		Type ZA	Type ZB
1	p_b	9,525	9,525
2	2β	40	40
3	h_s	4,1	4,5
4	a	0,686	0,686
5	r_r	0,51	1,02
6	r_a	0,51	1,02
7	h_t	1,91	2,29
8	S	4,65	6,12

6.2 Belt tooth dimensions — Curvilinear tooth belts of types ZH and YH

The nominal belt tooth dimensions for curvilinear tooth belts of types ZH and YH are shown in Figure 2 and given in Table 2.



Key

1 tooth pitch (p_b)
2 height (h_s)
3 pitch line differential (a)
4 root radius (r_r)
5 tooth height (h_t)
6 tooth radius (R)
7 vertical offset (Y)
8 root radius distance (S_r)

Figure 2 — Nominal tooth dimensions (profile) for types ZH and YH

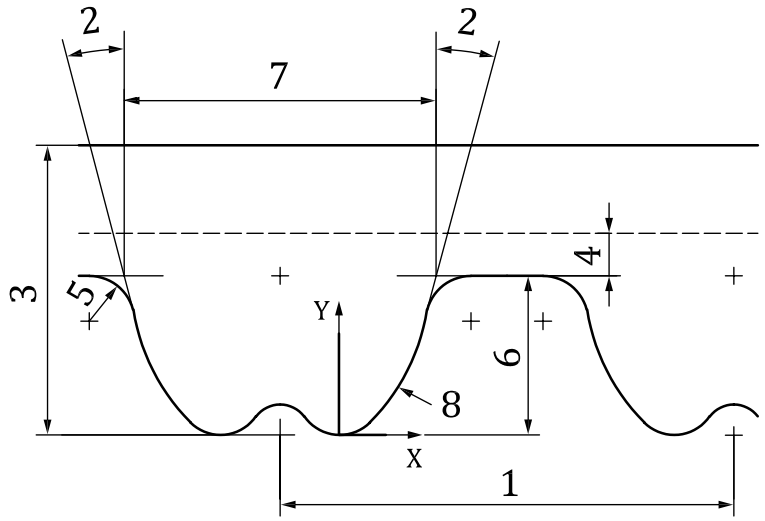
Table 2 — Nominal tooth dimensions for types YH and ZH

Dimensions in millimetres
Angles in degrees

Key number	Symbol	Nominal profile	
		Type YH	Type ZH
1	p_b	8	9,525
2	h_s	5,2	5,5
3	a	0,686	0,686
4	r_r	0,64	0,76
5	h_t	3,04	3,5
6	R	2,11	2,45
7	Y	0,93	1,05
8	S_r	2,84	3,27

6.3 Belt tooth dimensions — Curvilinear tooth belts of types YR and ZR

The nominal tooth dimensions for curvilinear tooth belts of types YR and ZR are shown in Figure 3 and given in Table 3.



Key

1 tooth pitch (p_b)
2 tooth angle (2β)
3 height (h_s)
4 pitch line differential (a)
5 root radius (r_r)
6 tooth height (h_t)
7 tooth width (S)
8 $Y = kX^2$

Figure 3 — Nominal tooth dimensions (profile) for YR and ZR

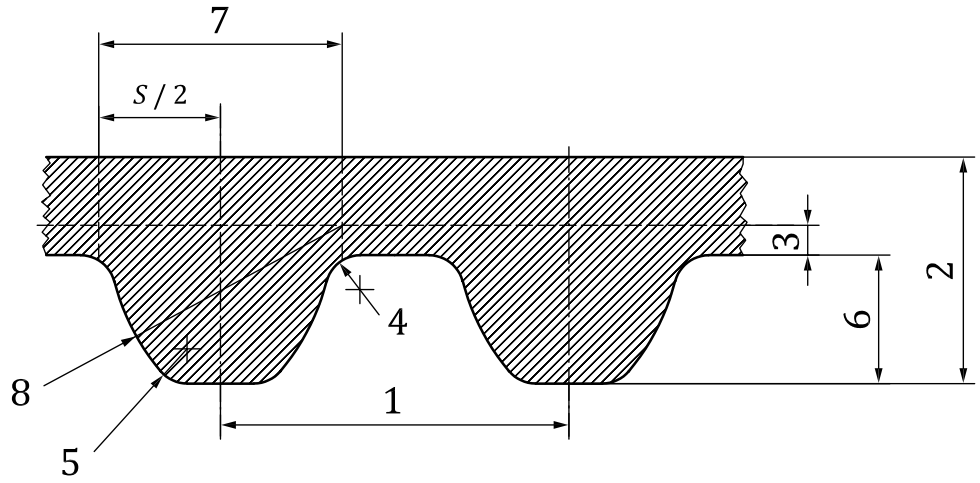
Table 3 — Nominal tooth dimensions for types YR and ZR

Dimensions in millimetres
Angles in degrees

Key number	Symbol	Nominal profile	
		Type YR	Type ZR
1	p_b	8	9,525
2	2β	30	32
3	h_s	5,1	5,4
4	a	0,75	0,75
5	r_r	0,8	1,00
6	h_t	2,8	3,2
7	S	5,3	5,5
Tooth form parameter	k	1,692	1,228

6.4 Belt tooth dimensions — Curvilinear tooth belts of types YS and ZS

The nominal tooth dimensions for curvilinear tooth belts of types YS and ZS are shown in Figure 4 and given in Table 4.



Key

1 tooth pitch (p_b)
2 height (h_s)
3 pitch line differential (a)
4 root radius (r_r)
5 tip radius (r_a)
6 tooth height (h_t)
7 tooth width (S)
8 tooth radius (R)

Figure 4 — Nominal tooth dimensions (profile) for types YS and ZS

Table 4 — Nominal tooth dimensions for types YS and ZS

Dimensions in millimetres
Angles in degrees

Key number	Symbol	Nominal profile	
		Type YS	Type ZS
1	p_b	8	9,525
2	h_s	5,2	5,7
3	a	0,686	0,686
4	r_r	0,8	0,95
5	r_a	0,8	0,95
6	h_t	2,95	3,53
7	S	5,2	6,19
8	R	5,2	6,19

6.5 Belt pitch length and tolerances

Belt pitch length is defined by the number of teeth multiplied by tooth pitch, p_b. The belt pitch length, L_p, shall be agreed between the parties concerned. Pitch length tolerances are given in Table 5.