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Agricultural machinery -- Endless hexagonal belts and groove sections of corresponding pulleys

Machines agricoles -- Courroies hexagonales sans fin et profils de gorges des poulies correspondantes

Ta slovenski standard je istoveten z: **ISO 5289:1992**

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65.060.01	Kmetijski stroji in oprema na splošno	Agricultural machines and equipment in general

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INTERNATIONAL STANDARD

ISO 5289

Second edition
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Agricultural machinery — Endless hexagonal belts and groove sections of corresponding pulleys

Machines agricoles — Courroies hexagonales sans fin et profils de gorges des poulies correspondantes

Reference number
ISO 5289:1992(E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 5289 was prepared by Technical Committee ISO/TC 41, *Pulleys and belts (including veebelts)*, Sub-Committee SC 1, *Veebelts and grooved pulleys*.

This second edition cancels and replaces the first edition (ISO 5289:1978), which has been technically revised.

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Agricultural machinery — Endless hexagonal belts and groove sections of corresponding pulleys

1 Scope

This International Standard specifies the main dimensions of endless hexagonal belts intended for use on agricultural machinery (and, in particular, harvester-thresher machines), together with the groove section of the corresponding fixed-diameter pulleys.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 3:1973, *Preferred numbers — Series of preferred numbers.*

ISO 1081:1980, *Drives using V-belts and grooved pulleys — Terminology.*

ISO 4183:1989, *Belt drives — Classical and narrow V-belts — Grooved pulleys (system based on datum width).*

ISO 5291:1987, *Belt drives — Grooved pulleys for joined classical V-belts — Groove sections AJ, BJ, CJ and DJ (effective system).*

3 Definitions

For the purposes of this International Standard, the definitions (terms and symbols) relating to drives using V-belts (i.e. belts and grooved pulleys) given in ISO 1081 apply.

4 Dimensions and tolerances

4.1 Belts

4.1.1 General

An endless hexagonal belt on agricultural machinery transmits a high degree of force per unit of section; when it approaches a groove pulley, its cross-section undergoes appreciable deformations. For this reason, the various dimensions which are specified in this International Standard are to be taken as being those of the belt placed on the device used for the measurement of its length, and subjected to the force F. The dimensions w and T are those relating to the parts of the belt when in contact with the measuring pulleys.

4.1.2 Cross-sections (see figure 1)

The theoretical profile of these belts is a hexagon consisting of two equal isosceles trapezia joined at their wider base; the neutral axis, coinciding in practice with the transverse diagonal of this hexagon, is located therefore at half the height of the section.

The dimensions of these cross-sections are given in table 1.

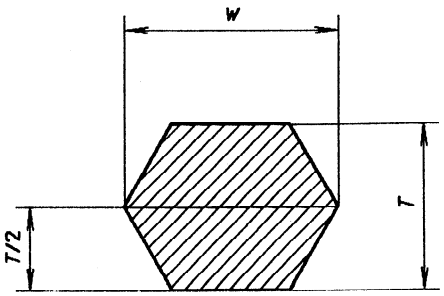


Figure 1 — Cross-section of a belt

Table 1 — Cross-section nominal dimensions

Dimensions in millimetres

Dimension	Symbol	Profiles			
		HAA	HBB	HCC	HDD
Nominal width	w	13	17	22	32
Nominal height	T	10	13	17	25

4.1.3 Lengths

The range of effective lengths is that of the R 40 series of preferred numbers (see ISO 3) from 1 250 mm to 10 000 mm (see table 2).

4.1.4 Tolerance on length

The length of the belts is affected by the maximum admissible deviations of $^{+p/2}_{-p}$, where p is calculated, with a certain amount of approximation, using the formula

$$p = 0{,}8\ \sqrt[3]{L} + 0{,}006L$$

where L is the preferred number from the R 10 series equal to or immediately greater than the effective length, expressed in millimetres.

Table 2 — Belt lengths

Dimensions in millimetres

Effective length, L_e			Profiles			
	tol.					
nom.	$+p/2$	$-p$	HAA	HBB	HCC	HDD
1 250	8	16	+			
1 320	9	18	+			
1 400	9	18	+			
1 500	9	18	+			
1 600	9	18	+			
1 700	11	22	+			
1 800	11	22	+			
1 900	11	22	+			
2 000	11	22	+	+		
2 120	13	26	+	+		
2 240	13	26	+	+	+	
2 360	13	26	+	+	+	
2 500	13	26	+	+	+	
2 650	15	30	+	+	+	
2 800	15	30	+	+	+	
3 000	15	30	+	+	+	
3 150	15	30	+	+	+	
3 350	18	36	+	+	+	
3 550	18	36	+	+	+	
3 750	18	36		+	+	
4 000	18	36		+	+	+
4 250	22	44		+	+	+
4 500	22	44		+	+	+
4 750	22	44		+	+	+
5 000	22	44		+	+	+
5 300	26	52			+	+
5 600	26	52			+	+
6 000	26	52			+	+
6 300	26	52			+	+
6 700	32	64			+	+
7 100	32	64			+	+
7 500	32	64			+	+
8 000	32	64			+	+
8 500	39	78				+
9 000	39	78				+
9 500	39	78				+
10 000	39	78				+

NOTE — Reduced tolerances on length may be used in national standards or by agreement between the manufacturer and user.

4.2 Grooved pulleys

4.2.1 Pulleys having parallel axes of rotation

The hexagonal belts can be used with pulley groove profiles for classical belt sections in accordance with ISO 4183 or ISO 5291 (see table 3).

Table 3 — Groove profiles used for a belt profile

Hexagonal belt profile	Groove profiles	
	ISO 4183	ISO 5291
HAA	A	AJ
HBB	B	BJ
HCC	C	CJ
HDD	D	DJ

4.2.2 Pulleys having axes of rotation which are not parallel

In such cases, it is often necessary to increase the outside diameter of the pulley in relation to the effective diameter, and sometimes the angle of the groove, in order to allow the belts to approach and leave the grooves without friction occurring at their edges.

It is not possible to determine an outline of groove which would suit all cases of transmission between shafts that are not parallel. However, certain national specifications define the geometrical characteristics that govern transmission between orthogonal shafts (known as quarter-turn drives) and particularly the special groove profile (known as a "deep groove") to be used in this case.

5 Measurement of lengths of belts

5.1 Measuring device

The device recommended, shown in sketch form in figure 2, consists essentially of two grooved pulleys of similar functional dimensions, one of which is movable in the same plane as the belt by the measuring force F (see table 4).

5.2 Procedure

Rotate the belt to make at least two complete revolutions of the belt, then measure the distance E between the centres of the two pulleys.

The effective length of the belt, i.e. the length measured at the level where its width is equal to the effective width of the cross-section, w_e, is obtained from the formula

$$L_e = 2E + C_e$$

where

E is the distance between axes, measured in accordance with 5.1;

C_e is the effective circumference of the measuring pulleys (see table 4).

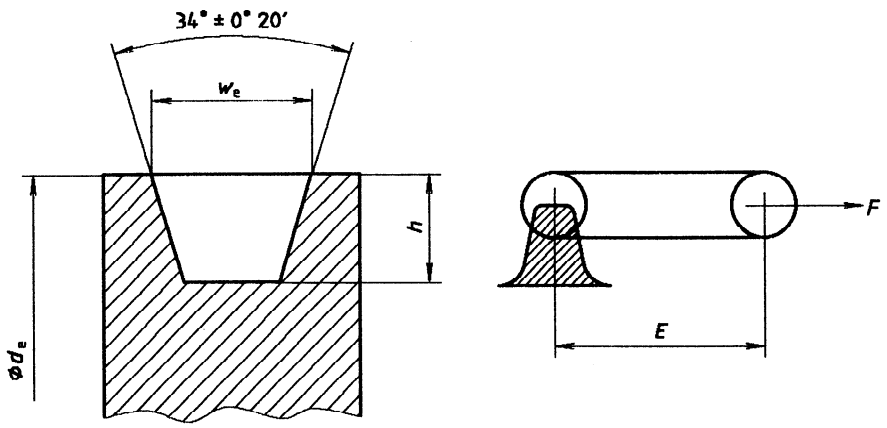


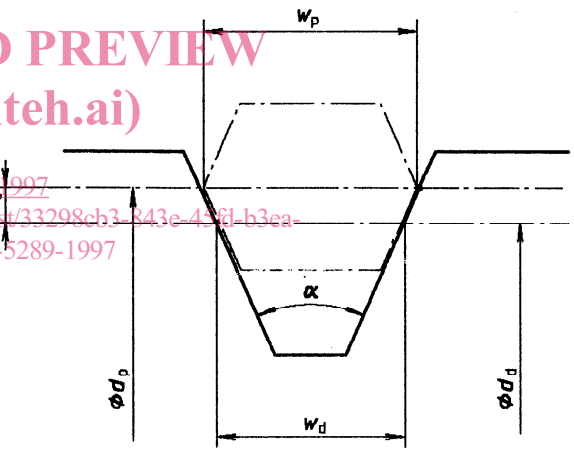
Figure 2 — Measuring device

Table 4 — Dimensions of measuring pulleys and measuring forces

Dimension	Symbol	Unit	Profiles			
			HAA	HBB	HCC	HDD
Effective width	w_e	mm	13	16,5	22,4	32,8
Minimum groove depth (approximate expression: $0{,}6w_e$)	h	mm	8	10	14	20
Effective diameter	d_e	mm	95,49	127,32	190,99	286,48
Effective circumference	C_e	mm	300	400	600	900
Measuring force	F	N	300	450	850	1 400
Groove angle	α	degree	34	34	34	36

5.3 Groove section of measuring pulleys

Only the values of w_e, of C_e and of the angle of the groove, α, are of importance; the depth h given in table 4 is for information only.



w_d = datum width of the pulley groove
w_p = pitch width of the belt

Figure 3 — Pulley diameters

6 Calculation of speed ratio, R

For calculations of the speed ratio, R, knowledge of the pitch diameters, d_p, of the two pulleys in the drive is necessary. For approximative calculations the following procedure may be used.

6.1 Correction factor for the datum diameter, d_d, for pulley grooves according to ISO 4183 (datum system)

If hexagonal belts are used in pulleys with a datum diameter, d_d, as defined in ISO 4183, a correction factor must be used to obtain the pitch diameter, d_p, for this unique belt section. See figure 3.

The correction factor b_d (the datum line differential as defined in ISO 1081) is used in the following equation to obtain the pitch diameter d_p:

$$d_p = d_d + 2b_d$$

The values of $2b_d$ are given in table 5.