

Specification for

Endless V-belt drives for agricultural purposes

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- Agricultural Engineers' Association Ltd.
- British Rubber Manufacturers' Association Ltd.
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- Individual manufacturer

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Foreword

This British Standard was prepared under the authority of the Mechanical Engineering Industry Standards Committee.

Its object is to provide standard dimensions for endless V-belts, double V-belts, variable speed V-belts and pulleys for agricultural machines, implements and trailers based on the practical experience of belt and pulley manufacturers, agricultural machinery manufacturers and users.

This edition in metric units is the result of a comprehensive review of BS 3733:1964 and in particular introduces new methods for the pitch length designation and power design calculation of double V-belts. The latter information is under discussion within ISO/TC 41.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 34, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 General

1.1 Scope

This British Standard specifies requirements for endless V-belts and V-grooved pulleys for agricultural purposes, including pulleys with movable flanges for variable speed drives

Other drives are specified in the following British Standards, BS 1440, BS 3790, and BS AU 150.

NOTE The titles of the British Standards referred in this standard are listed on the inside back cover.

1.2 Definitions

For the purposes of this British Standard the following definitions apply:

1.2.1

V-belt drive

a drive which consists of one or more V-belts mounted on grooved pulleys. The profiles of the belts and of the pulley grooves are such that the belts come into contact with the sides of the pulley grooves only and not with the base of the grooves

1.2.2

V-belt

a belt in which the outline formed by the base, sides and top of the belt approximates to a trapezium, but which differs from a wedge belt in having a smaller ratio of height to pitch width

1.2.3

double V-belt

a belt whose form of cross section is that of two V-belts joined at the long side of the trapezium, and which therefore, being symmetrical, can be mounted in the pulley groove in two senses

1.2.4

angle of a V-belt (A)

the included angle obtained by extending the sides of the V-belt

1.2.5

groove angle of a pulley (a)

the included angle obtained by extending the sides of the pulley groove

1.2.6

pitch width of a V-belt (l_p)

the pitch width is the basic dimension of standardization for the belt and for the corresponding pulley groove, considered as a whole

1.2.7

pitch length of a V-belt (L_p)

the circumferential length of a V-belt at the pitch width, determined as specified in 2.3

1.2.8

pulley groove pitch width (l_p)

the pitch width of the belt associated with the pulley

1.2.9

pulley pitch diameter (d_p)

the diameter of the pulley measured at the groove pitch width

1.2.10

V-flat drive

a V-belt drive using both a grooved pulley and a flat pulley

1.2.11

quarter-turn drive

a belt drive in which the pulley axes are at right angles to each other

1.2.12

variable speed drive

a belt drive employing pulleys with movable flanges to permit varying speed ratios between shafts

2 V-belts

2.1 Materials and workmanship

The V-belts shall consist of a suitable combination of fabric and/or cord and elastomeric compounds, the whole being bonded together in a uniform manner and shape in accordance with best manufacturing practice. The V-belts shall be suitable for operating at ambient temperatures between -18°C and 60°C and shall not be adversely affected under normal operating conditions within this temperature range.

2.2 Cross section dimensions

Nominal cross section dimensions and the nominal included angle of V-belts shall be as shown in Table 1, Table 2 and Table 3. The V-belts shall fit pulley grooves within the limits given in Table 4, Table 5 and Table 6 when mounted on two measuring pulleys made as specified in Table 7.

2.3 Determination of belt pitch length

The pitch length of a standard V-belt, double V-belt or variable speed V-belt shall be determined when the belt is mounted on a groove measuring fixture having groove dimensions as given in Table 7 with total forces applied and with the belt positioned in the grooves in accordance with Table 4, Table 5 and Table 6 as applicable to the belt section. The total forces shown shall be equally divided between the two strands of the belt and the pulleys shall be rotated at least two revolutions to seat the belt properly. The pitch length shall be calculated by adding the pitch circumference of one of the two equal pulleys to twice the measured centre distance.

The length thus determined shall be as given in the appropriate Table and within the limits of variation set out, see Table 8, Table 9 and Table 10.

2.4 Matched belts

In order to avoid uneven distribution of load, belts running on a multi-belt drive shall be matched sets, and shall be within the tolerances on pitch lengths shown in columns 2 and 3 of Table 8, Table 9 and Table 10.

NOTE 1 Age and storage conditions may alter a belt length.

NOTE 2 It is recommended that belts from different manufacturers should not be mixed on the same drive.

2.5 Marking

2.5.1 Mandatory marking. All V-belts manufactured in accordance with this British Standard shall be marked legibly and durably by vulcanizing or printing on the outer non-working face with a symbol indicating the belt cross section and nominal pitch length as given in Table 8, Table 9 and Table 10.

2.5.2 Recommended marking. It is recommended that where manufacturers mark their belts to indicate pitch length for the purpose of matched belt drives, they should adopt the following system of marking.

When the measured pitch length coincides with the nominal pitch length: stamp length code 50 on the belt.

Each 2 mm deviation from the nominal pitch length is by definition represented by 1 unit, for example:

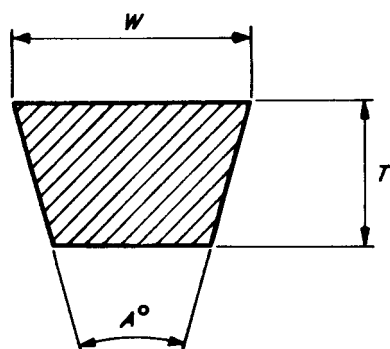
B1760 belt stamped B1760–50 has a pitch length of 1 760 mm.

If it is stamped B1760–48 it has a pitch length of 1 756 mm.

If it is stamped B1760–52 it has a pitch length of 1 764 mm.

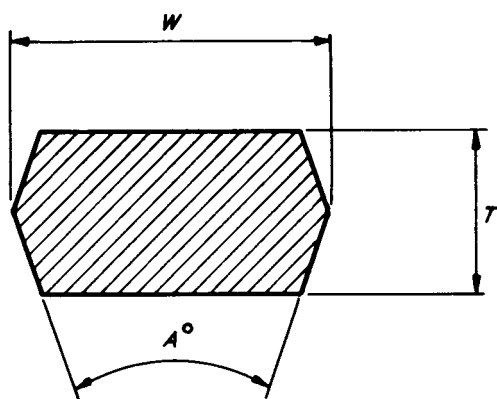
This marking shall appear adjacent to the marking specified in 2.5.1.

Table 1 — Cross section dimensions of standard V-belts



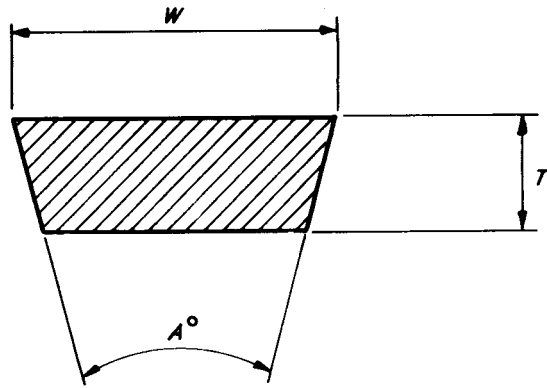
Cross section symbol	Top width, W	Height, T	Included belt angle, A	Pitch width, l_p
	mm	mm	degrees	mm
A	13	8	40	11.0
B	17	11	40	14.0
C	22	14	40	19.0
D	32	19	40	27.0

Table 2 — Cross section dimensions of double V-belts



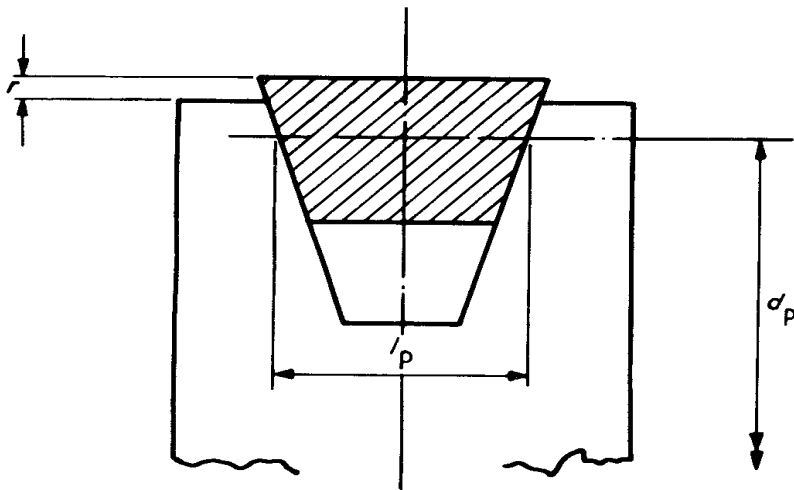
Cross section symbol	Width, W	Height, T	Included belt angle, A
	mm	mm	degrees
AA	13	10	40
BB	17	14	40
CC	22	17	40

Table 3 — Cross section dimensions of variable speed V-belts



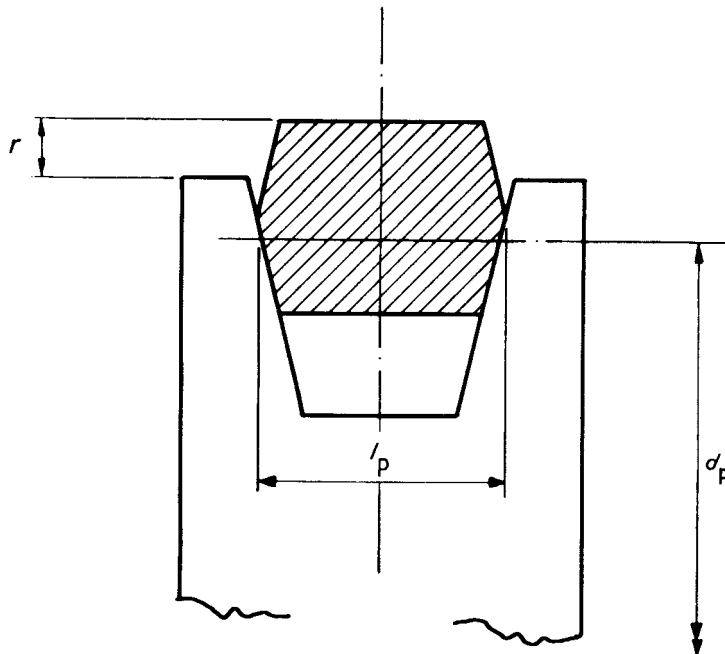
Cross section symbol	Top width, <i>W</i>	Height, <i>T</i>	Included belt angle, <i>A</i>	Pitch width, <i>l_p</i>
	mm	mm	degrees	mm
HI	25	13	30	23.6
HJ	32	15	30	29.6
HK	38	18	30	35.5
HL	45	20	30	41.4
HM	51	22	30	47.3

Table 4 — Tolerance and force requirements when measuring new standard V-belts (see 2.3)



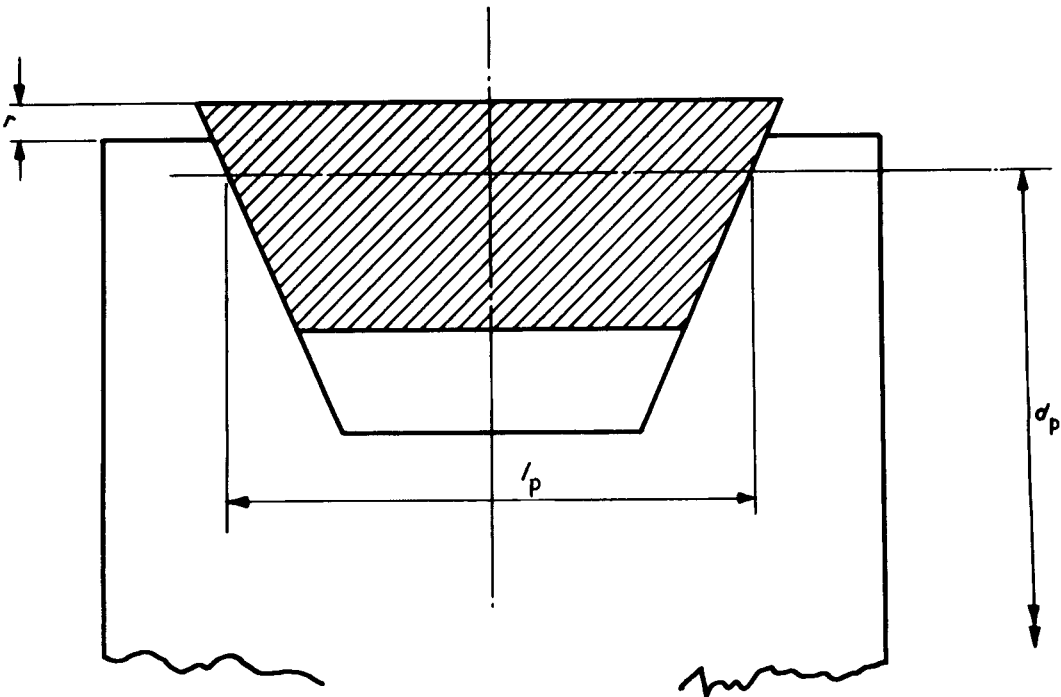
Groove section symbol	Total force applied to belt	Position of top face of belt with respect to top of pulley groove, <i>r</i>	
	N	mm	
A	200	+ 1.6	– 1.6
B	300	+ 1.6	– 1.6
C	750	+ 1.2	– 2.0
D	1 400	+ 0.8	– 3.2

Table 5 — Tolerance and force requirements when measuring new double V-belts (see 2.3)



Groove section symbol	Total force applied to belt	Position of top surface with respect to top of pulley groove, r
	N	mm
AA	224	5 ± 1.6
BB	335	7 ± 1.6
CC	850	8.5 ± 1.6

Table 6 — Tolerance and force requirements when measuring new variable speed V-belts (see 2.3)



Groove section symbol	Total force applied to belt	Position of top surface of belt with respect to top of pulley groove, <i>r</i>
	N	mm
HI	500	+ 3.2 − 1.6
HJ	700	+ 3.2 − 1.6
HK	1 000	+ 3.2 − 1.6
HL	1 400	+ 3.2 − 1.6
HM	1 800	+ 3.2 − 1.6

Table 7 — Dimensions of pulleys for measuring new V-belts

Cross section symbol			Pitch diameter, d_p	Circumference at pitch diameter	Distance down from outside diameter to pitch diameter, b	Outside diameter	Top width of groove, g	Groove depth, d	Groove angle, a	Pitch width, l_p
Standard V-belts	Double V-belts	Variable speed V-belts								
A	AA	—	mm 95.54	mm 300	mm 3.3	mm 102.14 + 0.06 – 0	mm 13.00 + 0.05 – 0	mm 12.0 + 0.8 – 0	degrees 34 ± 0.25	mm 11.0
B	BB	—	127.39	400	4.2	135.79 + 0.06 – 0	16.55 + 0.07 – 0	15.0 + 0.8 – 0	34 ± 0.25	14.0
C	CC	—	222.93	700	5.7	234.33 + 0.10 – 0	22.68 + 0.09 – 0	20.0 + 1.2 – 0	34 ± 0.25	19.0
D	—	—	318.47	1 000	8.1	334.67 + 0.16 – 0	32.23 + 0.13 – 0	28.0 + 1.6 – 0	36 ± 0.25	27.0
—	—	HI	mm 127.39	mm 400	mm 3.8	mm 134.99 + 0.06 – 0	mm 25.34 + 0.03 – 0	mm 17.0 + 0.8 – 0	degrees 26 ± 0.25	mm 23.6
—	—	HJ	159.23	500	4.8	168.83 + 0.08 – 0	31.79 + 0.05 – 0	21.0 + 1.2 – 0	26 ± 0.25	29.6
—	—	HK	191.07	600	5.7	202.47 + 0.10 – 0	38.11 + 0.05 – 0	25.0 + 1.3 – 0	26 ± 0.25	35.5
—	—	HL	222.93	700	6.6	236.13 + 0.10 – 0	44.42 + 0.06 – 0	29.0 + 1.6 – 0	26 ± 0.25	41.4
—	—	HM	254.78	800	7.6	269.98 + 0.13 – 0	50.77 + 0.07 – 0	33.0 + 1.6 – 0	26 ± 0.25	47.3