

JIS

JAPANESE INDUSTRIAL STANDARD

**Synchronous Belts for Light
Duty Power Transmission**

JIS K 6373—1989

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In the event of any doubt arising,
the original Standard in Japanese is to be final authority.

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Synchronous Belts for Light Duty
Power Transmission

K 6373-1989

1. Scope

This Japanese Industrial Standard specifies synchronous belts of ring shape without joint for light duty power transmission, hereinafter referred to as the "belt".

Remark: The units and numerical values given in { } in this Standard are based on the traditional units and are currently the criteria in force.

2. Classification

Belts shall be classified according to tool-profile dimensions shown in Fig. 1 into two classes of MXL and XXL.

3. Quality

3.1 Appearance The appearance of belt shall have trapezoidal teeth of symmetry in right and left at equal interval in flat belt, and, free from twisting, flaws and other defects harmful to use.

3.2 Performance The performance of belts, when tested according to 7.3, shall comply with Table 1.

Table 1. Performance

Classifi- cation	Test item		Width mm		
			3.2	4.8	6.4
MXL	Tensile test	Tensile strength per one unit N {kgf}	118 min. { 12 }	196 min. { 20 }	275 min. { 28 }
XXL		Elongation ⁽¹⁾ %	4.0 max.	4.0 max.	4.0 max.

Note ⁽¹⁾ The elongation shall be the elongation at loading shown in Table 4 of 7.

Applicable Standard and Reference Standards: See page 7.

4. Structure

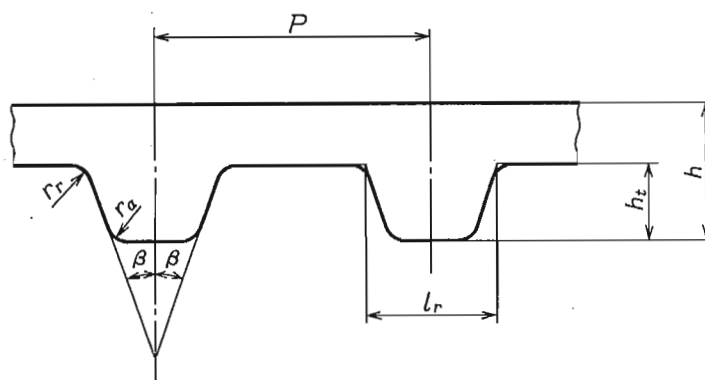
The structure of belt shall be such that the materials of 6. are used, placed with its core wire at the position of pitch line ⁽²⁾, and the teeth are covered with cloth coated with rubber, or its teeth are constituted of only rubber.

Note ⁽²⁾ The pitch line means the line which is generated by the fact that the not-elongatable nor shrinkable surface (pitch surface) intersects with the side face of belt (Refer to Fig. 2).

5. Dimensions

5.1 Shape and Reference Dimensions of Tooth Profile The shape and reference dimensions of tooth profile of belt shall be in accordance with Fig. 1 and, comply with pulley for synchronous belt drive, hereinafter referred to as the "pulley", specified in 7.1.

Fig. 1. Shape and Reference Dimensions of Tooth Profile



Unit: mm

Classi- fication	Reference dimensions						
	P	2β	l_r	h_t	h	r_r	r_a
MXL	2.032	40°	1.14	0.51	1.14	0.13	0.13
XXL	3.175	50°	1.73	0.76	1.52	0.20	0.30

5.2 Length of Belt and Number of Teeth The length of belt shall be expressed by the length of belt along the pitch line, hereinafter referred to as the "length", and measured according to 7.1. The length of belt, its permissible deviation and number of teeth shall be in accordance with Table 2.

Table 2. Length of Belt, Its Permissible Deviation and Number of Teeth

Length mm	Number of teeth		Permissible deviation on length mm
	MXL	XXL	
91.44	45	—	±0.41
101.60	50	—	
111.76	55	—	
121.92	60	—	
127.00	—	40	
142.24	70	—	
152.40	75	48	
162.56	80	—	
177.80	—	56	
182.88	90	—	
203.20	100	64	
223.52	110	—	
228.60	—	72	
254.00	125	80	
279.40	—	88	±0.46
284.48	140	—	
304.80	—	96	
314.96	155	—	
330.20	—	104	
355.60	175	112	
381.00	—	120	
406.40	200	128	±0.51
457.20	225	144	
508.00	250	160	
558.00	—	176	±0.61

5.3 Width The width of belt shall be measured according to 7.2, and its permissible deviation, in accordance with Table 3.

Table 3. Width and Its Permissible Deviation Unit: mm

Classification	Width	Permissible deviation on width
MXL XXL	3.2	+ 0.5 - 0.8
	4.8	
	6.4	

6. Materials

6.1 Rubber The rubber so compounded as to comply with all using purposes shall be used.

6.2 Cloth The cloth made of synthetic fibres as basic material and complied with the using purpose shall be used.

6.3 Core Lines For core lines, steel wires, glass fibres, synthetic fibres and others satisfying the using purpose shall be used.

7. Test Methods

7.1 Measurement of Length Measure the length of belt according to the apparatus as shown in Fig. 2.

Apply the belt on two pulleys for measurement for length shown in Fig. 3, after apply the specified force shown in Fig. 2, turn the belt at least twice or more to measure the axial distance of pulleys, and calculate the length of belt according to the following formula (1):

$$L_p = 2C + \pi d_p \quad \dots\dots\dots (1)$$

where L_p : length of belt (mm)

C : axial distance (mm)

d_p : pitch circle diameter ⁽³⁾ of pulley (mm)

Note ⁽³⁾ The pitch circle diameter is expressed by the following formula:

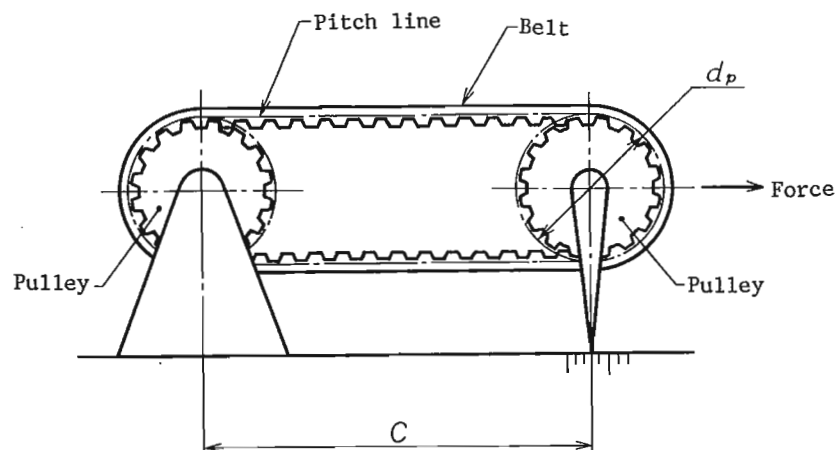
$$d_p = \frac{P \cdot n}{\pi}$$

where d_p : pitch circle diameter of pulley

P : tooth pitch (See Fig. 1)

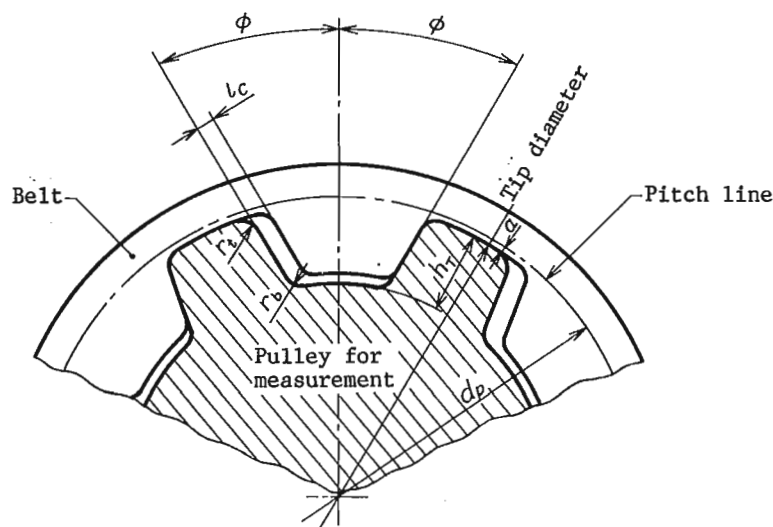
n : tooth number of pulley

Fig. 2. An Example of Length Measuring Apparatus



Width mm	Force N {kgf}	
	MXL	XXL
3.2	13 {1.3}	14 {1.4}
4.8	20 {2.0}	22 {2.2}
6.4	27 {2.8}	31 {3.2}

Fig. 3. Pulley for Measurement of Length



Classi- fication	Number of teeth	πd_p mm	Tip diameter mm	Permissible deviation on run out TIR ($^{\circ}$)		Minimum back- lash l_c mm	h_r mm	r_b mm	r_i mm	ϕ ($^{\circ}$)	$2a$ mm
				Tip cir- cumference mm	Side face mm						
MXL	20	40.64	12.428 ± 0.013	0.013	0.025	0.30	0.65 ± 0.10	0.25 ± 0.05	0.13 ± 0.05	20 ± 1.5	0.508
XXL	16	50.80	15.662 ± 0.013	0.013	0.025	0.30	0.89 ± 0.10	0.55 ± 0.05	0.23 ± 0.05	25 ± 1.5	0.508

Note (4) TIR is the abbreviation of Total Indicator Reading, and means the difference between the maximum and minimum values of readings in measuring of run out.

7.2 Measurement of Width Measure the width of belt at three arbitrary places of belt by using a vernier calipers specified in JIS B 7507 or that having accuracy equivalent or superior thereto and calculate the average value.

7.3 Tensile Test For tensile test of belt, take three test pieces of 250 mm or more in length ⁽⁵⁾ from two or more samples of the same lot as they are of the original shape, measure the tensile strength and elongation when the force shown in Table 4 is applied at $23 \pm 3^{\circ}\text{C}$ by using a tensile testing machine, and calculate the elongation according to the following formula (2). In this case, let the tensile speed be 25 to 50 mm per minute, in case when it is broken at the gripping part, add test piece to conduct retest, take average value of three measured values and round off to integer place. Conduct the measurement of elongation, as a rule, on gauge length of 100 mm. Grips of such structure that it is able to grip completely shall be used.

Note (5) In the case where the length is not more than 250 mm, conduct with the length as it is.

Table 4. Forces to Be Applied at Measuring of Elongation

Unit: N {kgf}

Width mm Classi- fication	3.2	4.8	6.4
MXL	98 {10}	157 {16}	216 {22}
XXL			

$$\varepsilon = \frac{\Delta l}{l} \times 100 \dots\dots\dots (2)$$

where ε : elongation (%)

l : gauge length (mm)

Δl : elongation of gauge length (mm)

8. Designation of Products

Products shall be designated by the order of name, abbreviated mark of belt of metric series, number of teeth, class and width.

Example: Belt B 100 MXL 4.8

Width
Class
Number of teeth
Abbreviated mark of belt of metric series
Name