

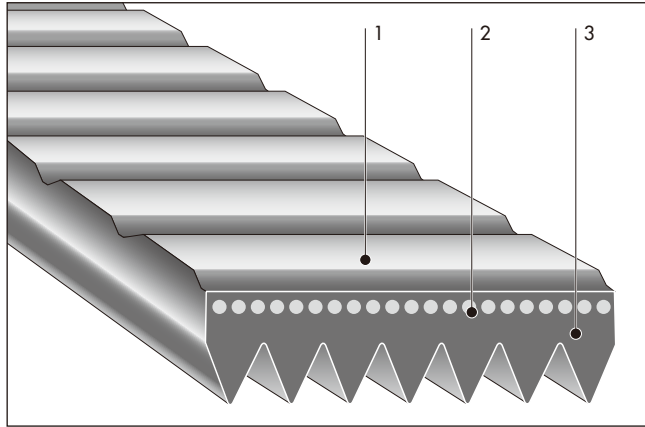
Bancollan Polybanrope

1. Product Introduction

Bancollan Polybanrope is a polyurethane light-duty belt that combines the flexibility of flat belts and the high power transmission capability of V-belts. Many light-duty machines are generally assembled in a line and require simple belt installation and a high transmission capacity.

Bancollan Polybanrope is an easily installable and tough belt that exactly meets these requirements.

Structure and Features



1. Tension rubber (polyurethane rubber)

2. Cord (polyamide cord)

3. V-rib (polyurethane rubber)

Bancollan Polybanrope provides the following features due to its unique structure.

■ Installable with a fixed center distance

It uses polyamide cords, and the belt has appropriate elasticity. When this elasticity is used, the belt can be installed with the pulleys fixed to the center distance in accordance with the initial stretch rate (normally 1.3%). Because pulley relocation and tension adjustment are unnecessary, the installation cost can be reduced.

■ Shock resistance

The polyamide cords have instantaneous elasticity, which has an effect of absorbing shock loads.

■ Clean transmission

The use of abrasion-resistant polyurethane rubber in the V-ribs prevents most of rubber dropping. Therefore, the transmission system and its peripheral areas can be kept clean.

■ High speed ratio

Because Type H can be used with a small pulley outside diameter of 13 mm and Type J can be used with a small pulley diameter of 23 mm, a high speed ratio is available within a fixed space.

■ High transmission capacity

The large friction surface and the uniform arrangement of the cords in the upper section of the V-ribs provide a high transmission capacity.

■ Excellent high-speed revolution

The light belt and the uniform arrangement of the cords allow smooth transmission even with $\phi 23 / 14000$ rpm (Type J) $\phi 13 / 16000$ rpm (Type H).

Major applications

Electric tools

Electric planes, compact grinders, belt sanders, groove-cutting machines

Office machines and automatization equipment

Blowers for computers, vending machines, automatic ticket gate, financial system terminal machines, line printers, typewriters, card-making machines, bill-processing machines, paper-cutting machines

Fiber machines

Temporary twisting machines, high-speed winders, spinning machines

Rotary electric equipment

Electric rice-cake-making machines, noodle-making machines, juicers/mixers, electric cooking apparatuses, electric grass cutters, electric massage machines, hemming machines, industrial sawing machines, projectors

Compact machine tools

Desktop lathes, riveters, punching machines, marking presses, mini drill presses, spindle units

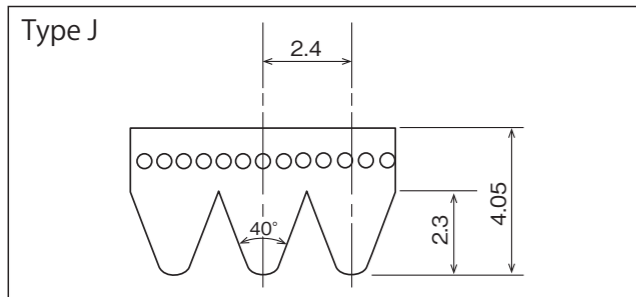
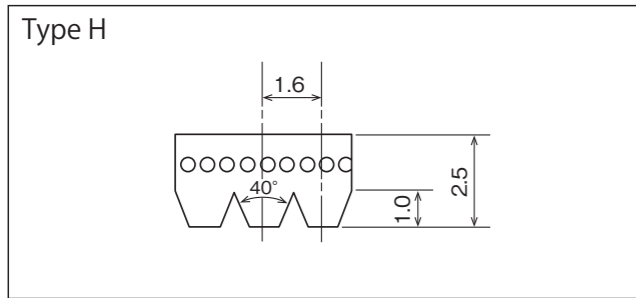
Others

Food cutters (ham/bread slicers), compact winding machines, wrapping machines

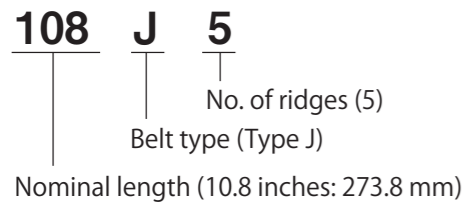
Belt Dimensions

Please use Bancollan Polybanrope of sizes indicated in **Table 1** if possible.

Cross-sectional dimensions



Belt size indication example



Dimensional Tolerance

Thickness

Type	Thickness (Unit: mm)
Type H	2.5±0.2
Type J	4.05±0.2

Pulley groove dimensions

Please use Bancollan Polybanrope with pulleys having the following groove dimensions.

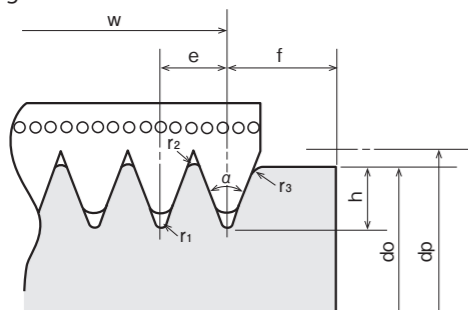


Table 1 Table of belt sizes

Type H		Type J	
Nominal length	Pitch length (mm)	Nominal length	Pitch length (mm)
63H	160.0	81J	205.3
71H	180.3	82J	209.1
80H	203.2	85J	215.9
85H	215.9	90J	228.6
90H	228.6	95J	241.3
95H	241.3	97J	247.3
100H	254.0	99J	251.3
106H	269.2	103J	261.6
112H	284.5	108J	273.8
118H	299.7	116J	293.5
125H	317.5	117J	297.0
132H	335.3	122J	310.9
136H	345.6	125J	317.5
140H	355.6	130J	330.0
147H	373.4	135J	343.8
150H	381.0	139J	351.5
160H	406.4	142J	363.3
170H	431.8	145J	368.3
180H	457.2	153J	389.3
190H	482.6	160J	406.4
200H	508.0	171J	431.3
214H	543.2	175J	442.3
215H	547.0	180J	457.2
221H	562.0	189J	480.2
230H	584.2	194J	492.8
235H	596.9	201J	510.5
304H	772.2	234J	594.0
		236J	599.4
		250J	630.8
		260J	660.4
		264J	670.0
		280J	711.2
		300J	762.0
		312J	792.5
		318J	807.7
		323J	819.3

Please note that some sizes have a different pitch length from the value obtained by converting the nominal length into millimeters.

Outside length

Outside length (Unit: mm)	Tolerance
270 or less	+1 -2
Over 270 to 500 or less	+1 -3
Over 500 to 700 or less	+1 -4
Over 700 to 850 or less	+2 -4

Note) The outside length tolerance is based on our measurement method.

We also manufacture pulleys for Bancollan Polybanrope; please contact us.

Table 2 Pulley groove dimensions

Pulley type	e ±0.05	f	h ±0.1	α ±30' (°)	r1 ±0.05	r2	r3	W ±0.1	(dp-do)
H	1.6	3	1.5	40	0.21	0.15	0.2	(N-1) × 1.6	0.58
J	2.4	4	2.3	40	0.34	0.18	0.2	(N-1) × 2.4	0.70

2. How to Design

Step 1. Determining conditions required for the design

- Machine type
- Transmission power, or rated power of the driving machine
- Degree of load fluctuation
- Daily operating hours
- Speed ratio
$$\left(\frac{\text{Pinion revolution}}{\text{Revolution of large pulley}} \right)$$
- Temporary center distance
- Pulley diameter restriction
- Operating environment (high temperature, low temperature, oil, water, dirt, acid, alkali)

Step 2. Calculating the design power

Correct the driven load with the degree of overload of the machine and obtain the design power.

$$Pd = Pt \times Ko$$

Pd : Design power (W)
Pt : Transmission power (driven load or motor rating) (W)
Ko : Load correction factor

Select the load correction factor from **Table 3** in accordance with the load characteristics and operating time of the machine.

Table 3 Load correction factors Ko

Overload	Machinery name	Operating time		
		Intermittent use 3 to 4 hrs/day	Normal use 8 to 10 hrs/day	Continuous use 16 to 24 hrs/day
Small	Office machinery (paper feed), compact fans, liquid stirring machines	1.0	1.2	1.4
Medium	Office machinery (for driving), sawing machines, vacuum cleaners, juicers/mixers, cooking apparatuses, projectors, blowers, fiber machines	1.2	1.4	1.6
Large	Electric planes, grinders, grass cutters, compact machine tools, cutting machines	1.5	1.6	1.7

Step 3. Determining the transmission capacity

Correct the basic power rating of the belt (→ P. 277 to P. 278) with the angle of contact and obtain the corrected power rating.

$$Pc = Pr \times K\theta_1$$

Pc : Corrected power rating per ridge (W)
Pr : Basic power rating per ridge (W)
Kθ₁ : Pinion contact angle correction factor (**Table 4**)

Table 4 Pinion contact angle correction factors Kθ₁

Equation for contact angle calculation	$\theta_1 = 180 - \frac{57.3(Dp - dp)}{C}$								
	(Dp-dp)/C	0.0	0.2	0.4	0.6	0.8	1.0	1.2	1.4
θ ₁	180	169	157	145	133	120	106	91	
Kθ ₁	1.00	0.97	0.94	0.91	0.87	0.82	0.77	0.70	

Step 4. Determining the number of ridges of the belt

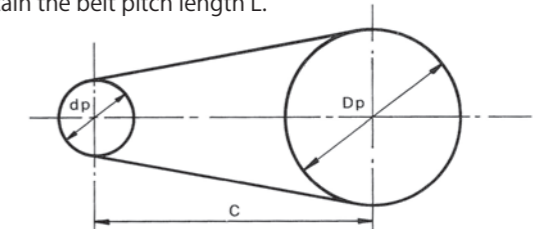
$$N = Pd / Pc$$

N : No. of ridges of belt (three or a larger integer)

The minimum number of ridges is three. Round up the figures after the decimal point for three or more ridges to an integer. (Max. 13 ridges/Type H, 23 ridges/Type J)

Step 5. Selecting an effective length

Obtain the pitch length L' after belt installation in the desired conditions and, taking the initial stretch rate (normally 1.3%), obtain the belt pitch length L.



$$L' = 2C' + 1.57(Dp + dp) + \frac{(Dp - dp)^2}{4C'}$$

L=L'/1.013
L' : Pitch length after belt installation (mm)
L : Belt pitch length (mm)
C' : Center distance (mm)
Dp : Large pulley pitch diameter (mm)
dp : Pinion pitch diameter (mm)
(Type H: Outside diameter + 0.58)
(Type J: Outside diameter + 0.70)

Select the belt size with the pitch length that is closest to the calculated belt pitch length L from **Table 1** (→ P. 275).

Step 6. Setting the center distance

Set the center distance for the belt selected from **Table 1** (→ P. 275) with the following equation.

$$C = \frac{B + \sqrt{B^2 - 2(Dp - dp)^2}}{4}$$

$$B = 1.013 \times L - 1.57(Dp + dp)$$

L : Pitch length of standard belt (Table 1) (mm)
Dp : Large pulley pitch diameter (mm)
dp : Pinion pitch diameter (mm)
C : Center distance (mm)

Table of basic power ratings for Type H (per ridge)

(Unit: W)

Pinion revolution (rpm)	Pinion pitch diameter (mm)								
	14	16	18	20	24	28	32	36	40
100	0.5	0.5	0.6	0.7	0.8	0.9	1.1	1.2	1.3
200	0.9	1.1	1.2	1.3	1.6	1.8	2.1	2.4	2.6
300	1.4	1.6	1.8	2.0	2.4	2.8	3.2	3.5	3.9
400	1.8	2.1	2.4	2.6	3.2	3.7	4.2	4.7	5.3
500	2.3	2.6	3.0	3.3	3.9	4.6	5.3	5.9	6.6
600	2.8	3.2	3.5	3.9	4.7	5.5	6.3	7.1	7.9
700	3.2	3.7	4.1	4.6	5.5	6.4	7.4	8.3	9.2
800	3.7	4.2	4.7	5.3	6.3	7.4	8.4	9.5	10.5
900	4.1	4.7	5.3	5.9	7.1	8.3	9.5	10.6	11.8
1000	4.6	5.3	5.9	6.6	7.9	9.2	10.5	11.8	13.1
1200	5.5	6.3	7.1	7.9	9.5	11.0	12.6	14.2	15.7
1400	6.4	7.4	8.3	9.2	11.0	12.9	14.7	16.5	18.3
1600	7.4	8.4	9.5	10.5	12.6	14.7	16.8	18.9	20.9
1800	8.3	9.5	10.6	11.8	14.2	16.5	18.9	21.2	23.5
2000	9.2	10.5	11.8	13.1	15.7	18.3	20.9	23.5	26.1
2500	11.5	13.1	14.8	16.4	19.6	22.9	26.1	29.3	32.5
3000	13.8	15.7	17.7	19.6	23.5	27.4	31.2	35.0	38.8
3500	16.1	18.3	20.6	22.9	27.4	31.8	36.3	40.7	45.0
4000	18.3	20.9	23.5	26.1	31.2	36.3	41.3	46.2	51.0
4500	20.6	23.5	26.4	29.3	35.0	40.7	46.2	51.6	56.9
5000	22.9	26.1	29.3	32.5	38.8	45.0	51.0	56.9	62.7
5500	25.1	28.7	32.2	35.6	42.5	49.2	55.8	62.1	68.3
6000	27.4	31.2	35.0	38.8	46.2	53.4	60.4	67.2	73.6
6500	29.6	33.8	37.8	41.9	49.8	57.5	64.9	72.0	78.8
7000	31.8	36.3	40.7	45.0	53.4	61.6	69.4	76.7	83.7
7500	34.1	38.8	43.4	48.0	56.9	65.5	73.6	81.3	88.4
8000	36.3	41.3	46.2	51.0	60.4	69.4	77.8	85.6	92.7
8500	38.5	43.7	48.9	54.0	63.8	73.1	81.8	89.7	96.8
9000	40.7	46.2	51.6	56.9	67.2	76.7	85.6	93.6	100.6
9500	42.8	48.6	54.3	59.8	70.4	80.3	89.3	97.2	104.1
10000	45.0	51.0	56.9	62.7	73.6	83.7	92.7	100.6	
11000	49.2	55.8	62.1	68.3	79.8	90.1	99.1		
12000	53.4	60.4	67.2	73.6	85.6	96.0			
13000	57.5	64.9	72.0	78.8	91.0	101.3			
14000	61.6	69.4	76.7	83.7	96.0				
15000	65.5	73.6	81.3	88.4	100.6				
16000	69.4	77.8	85.6	92.7					

Table of basic power ratings for Type J (per ridge)

(Unit: W)

Pinion revolution (rpm)	Pinion pitch diameter (mm)								
	24	26	28	30	32	36	40	45	50
100	1.5	1.6	1.7	1.8	2.0	2.2	2.5	2.8	3.1
200	3.0	3.2	3.5	3.7	3.9	4.4	4.9	5.5	6.2
300	4.4	4.8	5.2	5.5	5.9	6.7	7.4	8.3	9.2
400	5.9	6.4	6.9	7.4	7.9	8.9	9.9	11.1	12.3
500	7.4	8.0	8.6	9.2	9.9	11.1	12.3	13.9	15.4
600	8.9	9.6	10.3	11.1	11.8	13.3	14.8	16.6	18.5
700	10.3	11.2	12.1	12.9	13.8	15.5	17.2	19.4	21.5
800	11.8	12.8	13.8	14.8	15.8	17.7	19.7	22.1	24.6
900	13.3	14.4	15.5	16.6	17.7	19.9	22.1	24.9	27.6
1000	14.8	16.0	17.2	18.5	19.7	22.1	24.6	27.6	30.7
1200	17.7	19.2	20.7	22.1	23.6	26.5	29.5	33.1	36.8
1400	20.7	22.4	24.1	25.8	27.5	30.9	34.3	38.6	42.8
1600	23.6	25.6	27.5	29.5	31.4	35.3	39.2	44.0	48.8
1800	26.5	28.7	30.9	33.1	35.3	39.7	44.0	49.4	54.8
2000	29.5	31.9	34.3	36.8	39.2	44.0	48.8	54.8	60.7
2500	36.8	39.8	42.8	45.8	48.8	54.8	60.7	68.0	75.2
3000	44.0	47.6	51.2	54.8	58.3	65.4	72.4	80.9	89.3
3500	51.2	55.4	59.5	63.6	67.7	75.8	83.7	93.5	102.9
4000	58.3	63.1	67.7	72.4	76.9	86.0	94.8	105.6	115.9
4500	65.4	70.6	75.8	80.9	86.0	95.9	105.6	117.1	128.2
5000	72.4	78.1	83.7	89.3	94.8	105.6	115.9	128.2	139.7
5500	79.2	85.4	91.5	97.5	103.4	114.9	125.8	138.6	150.3
6000	86.0	92.6	99.2	105.6	111.8	123.8	135.2	148.3	160.0
6500	92.6	99.7	106.6	113.3	119.9	132.4	144.1	157.2	168.7
7000	99.2	106.6	113.9	120.9	127.7	140.6	152.4	165.4	176.3
7500	105.6	113.3	120.9	128.2	135.2	148.3	160.0	172.6	182.6
8000	111.8	119.9	127.7	135.2	142.3	155.5	167.1	178.9	
8500	117.9	126.3	134.3	141.9	149.1	162.2	173.4		
9000	123.8	132.4	140.6	148.3	155.5	168.4	178.9		
9500	129.6	138.3	146.6	154.3	161.5	174.0	183.7		
10000	135.2	144.1	152.4	160.0	167.1	178.9			
11000	145.8	154.7	162.9	170.3	176.8				
12000	155.5	164.3	172.2	178.9					
13000	164.3	172.8	180.0						
14000	172.2	180.0							