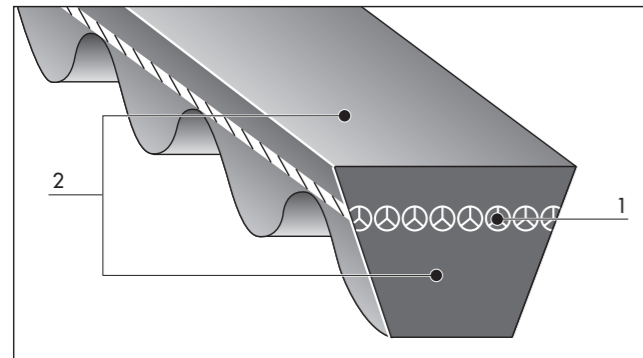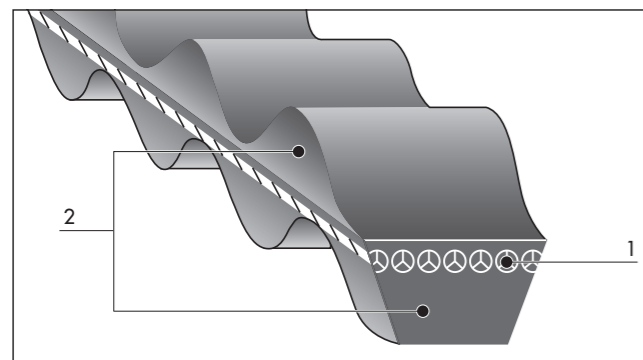# Bancollan V-Belt (VC/DC)

1. Product Introduction

The Bancollan V-Belt is highly evaluated by users as an optimum belt for light-duty equipment. Recently it is widely used even in general industry and is called a standard V-belt in the light-duty field.

(1) Structure and Features

■ VC (cogged on the inner surface)

2
1

The Bancollan V-Belt provides the following features.

■ Economical power transmission

Because it has a large friction factor and uses flexible polyurethane, it has little transmission loss and consumes less power.

■ Compact design

The cog effect and the highly flexible polyurethane provide fine fitting with pulleys, allowing use in a small space.

■ Clean power transmission

As it uses polyurethane, which has excellent abrasion resistance, it is rarely abraded, making it most suitable for use in a transmission system that should avoid dirt.

■ Re-tensioning unnecessary

As it uses polyester cords that have high strength, elongate little, and have little flex fatigue, the belt elongates little due to running and rarely requires re-tensioning.

■ DC (cogged on both sides)

2
1

1. **Cord** (Polyester cord)

2. **Tension rubber/Base rubber** (polyurethane rubber)

(2) Major Applications

Household electric equipment
Sewing machines, pencil sharpeners, vacuum cleaners, dish-washing machines

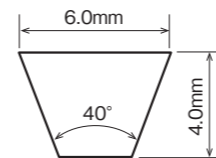**Office machinery, optical machines**
Typewriters, terminal devices, Blowers for computers, projectors

Compact machine tools, electric tools
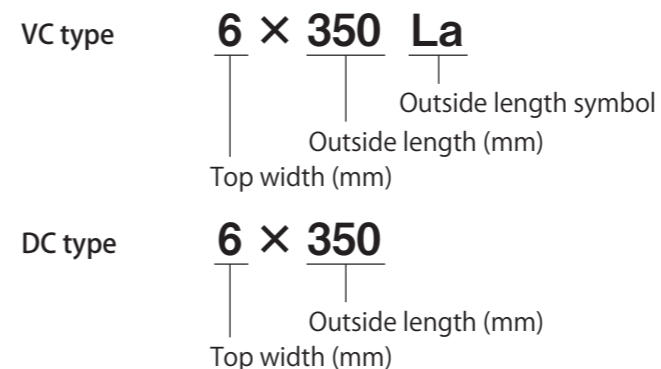Lathes, drill presses, grinders, electric planes

Labor-saving equipment
Automatic packaging machines, vending machines, automatic doors, bill and coin calculators, automatic shoe polishers, ticket vending machines

Chemical equipment
Stirring machines, sizing machines, winding machines, centrifugal separators

Others
Massage machines, radio-controlled gadgets (vehicles, helicopters), conveyance equipment (coins, cards)

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(3) Belt Dimensions

■ Cross-sectional dimensions

6.0mm
40°
4.0mm

The same dimensions for the VC type and the DC type.

■ Belt size indication example

VC type

$$6 \times 350 \quad La$$

Outside length symbol
Outside length (mm)
Top width (mm)

DC type

$$6 \times 350$$

Outside length (mm)
Top width (mm)

The VC type has a size indication on the back face of the belt; however, the DC type does not have the indication.

(4) Pulley Groove Dimensions

As pulleys for the Bancollan V-Belt, please use pulleys with the following dimensions.

Groove dimensions

(Unit: mm)

Pulley outside diameter do	α (°) ± 30	W ± 0.05	h	f
Over 16 to 20 or less	36			
Over 20 to 50 or less	37	5.6	5.0	2.0
Over 50	38			

For pulleys for special applications and other belt types than the above, please contact us.
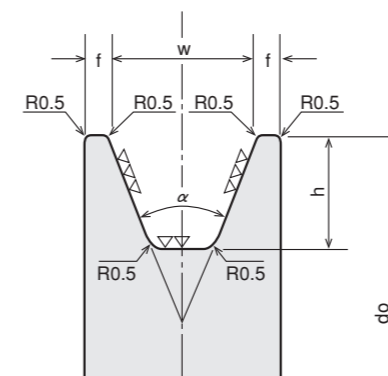

f   w   f
R0.5   R0.5   R0.5   R0.5
α
R0.5   R0.5
h
do

Table 1 Belt sizes

(Unit: mm)

VC type		VC type		DC type	
Nominal size	Outside length (mm)	Nominal size	Outside length (mm)	Nominal size	Outside length (mm)
6×207	207.0	6× 460	460.0	6×200	200.0
6×220	220.0	6× 466	466.0	6×210	210.0
6×232	232.0	6× 470	470.0	6×230	230.0
6×250	250.0	6× 480	480.0	6×240	240.0
6×260	260.0	6× 485	485.0	6×250	250.0
6×261	261.0	6× 490	490.0	6×260	260.0
6×270	270.0	6× 500	500.0	6×270	270.0
6×280	280.0	6× 511	511.0	6×277	277.0
6×289	289.0	6× 520	520.0	6×280	280.0
6×290	290.0	6× 530	530.0	6×290	290.0
6×297	297.0	6× 540	540.0	6×300	300.0
6×300	300.0	6× 550	550.0	6×310	310.0
6×315	315.0	6× 561	561.0	6×315	315.0
6×320	320.0	6× 587	587.0	6×320	320.0
6×330	330.0	6× 600	600.0	6×330	330.0
6×340	340.0	6× 613	613.0	6×340	340.0
6×343	343.0	6× 628	628.0	6×350	350.0
6×345	345.0	6× 650	650.0	6×360	360.0
6×349	349.0	6× 663	663.0	6×365	365.0
6×350	350.0	6× 700	700.0	6×370	370.0
6×360	360.0	6× 713	713.0	6×375	375.0
6×370	370.0	6× 730	730.0	6×380	380.0
6×380	380.0	6× 750	750.0	6×390	390.0
6×381	381.0	6× 760	760.0	6×400	400.0
6×390	390.0	6× 764	764.0	6×450	450.0
6×400	400.0	6× 800	800.0	6×500	500.0
6×407	407.0	6× 821	821.0	6×520	520.0
6×410	410.0	6× 850	850.0	6×540	540.0
6×414	414.0	6× 866	866.0		
6×420	420.0				
6×430	430.0				
6×432	432.0				
6×440	440.0				
6×444	444.0				
6×450	450.0				

Dimensional Tolerance

(Unit: mm)

		VC type	DC type
Top width		6±0.2	6±0.2
Thickness		4±0.2	4±0.2
Length	Less than 400	±2.0	±2.0
	400 to less than 600	±2.0	±2.5
	600 to less than 800	±2.5	—
	800 to less than 850	±3.0	

2. How to Design a Bancollan V-Belt

Step 1. Determining conditions required for the design

① Machine type
② Transmission power, or rated power of the driving machine
③ Degree of load fluctuation
④ Daily operating hours
⑤ Speed ratio

$$\left(\frac{\text{Pinion revolution}}{\text{Revolution of large pulley}} \right)$$

⑥ Temporary center distance
⑦ Pulley diameter restriction
⑧ Operating environment (high temperature, low temperature, oil, water, dirt, acid, alkali)

Step 2. Calculating the design power

Obtain the design power with the following Formula 1.

Formula 1

$$Pd = Pt \times Ko$$

Pd : Design power (W)
Pt : Transmission power (W)
Ko : Load correction factor

Determine the load correction factor from the **following table**.

Driven machine	Load correction factor Ko
Normal use	1.2
Large load fluctuation	1.4

Step 3. Selecting a pulley diameter

Select a pulley with a minimum diameter ϕ of 18 mm or more and obtain a large pulley with the following Formula 2.

Formula 2

$$Do = \frac{n_1}{n_2} \times do$$

do : Pinion outside diameter (mm)
Do : Large-pulley outside diameter (mm)
n_1 : Pinion revolution (rpm)
n_2 : Large pulley revolution (rpm)

Step 4. Selecting an effective length

Formula 3

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

L' : Rough outside length (mm)
C : Center distance (mm)

From **Table 1 (→ P. 294)**, obtain an effective length L that is closest to the rough belt outside length L' obtained with Formula 3.

Step 5. Setting the center distance

Set the center distance for the belt outside length L obtained from Table 1 (→ P. 294) with the following Formula 4.

Formula 4

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

$$B = L - 1.57(Do + do)$$

L : Belt outside length (Table 1) (mm)

Step 6. Determining the number of belts

The number of belts is one in principle, but obtain the number with the following Formula 5.

Formula 5

$$N = \frac{Pd}{Pr \times K\theta_1}$$

N : Number of belts (pcs)
Pd : Design power (W)
Pr : Basic power rating (W/pc) → **P. 296**
$K\theta_1$: Pinion contact angle correction factor → **Table 2**

* For details on design, please contact us.

■ Table 2 Pinion contact angle correction factors

(Do-do)/C	Angle of contact of pinion θ_1(°)	$K\theta_1$
0.00	180	1.00
0.20	169	0.97
0.40	157	0.94
0.60	145	0.91
0.80	133	0.87
1.00	120	0.82
1.20	106	0.77
1.40	91	0.70

Equation for contact angle calculation

$$\theta_1 = 180 - \frac{57.3(Do - do)}{C}$$

Adjustment ranges of the center distance for Bancollan V-Belts

For belt installation and tension adjustment, provide the adjustment range of the center distance shown in the following table at least.

Minimum adjustment ranges of center distance

(Unit: mm)

Belt outside length	Inside △Ci	Outside △Ct
200~400	4.0	4.0
410~600	6.0	6.0
610~850	7.0	7.0

Table of basic power ratings for Bancollan V-Belts

(Unit: W)

Pinion revolution (rpm)	Pinion pitch diameter (mm)											
	16	18	20	22	24	26	28	30	32	34	36	40
500	4.2	6.3	8.4	10.5	12.6	14.6	16.7	18.7	20.7	22.7	24.7	28.6
600	4.7	7.2	9.7	12.1	14.6	17.0	19.4	21.8	24.2	26.5	28.9	33.5
700	5.1	8.0	10.9	13.7	16.5	19.3	22.1	24.8	27.6	30.3	33.0	38.3
800	5.6	8.8	12.1	15.2	18.4	21.6	24.7	27.8	30.9	33.9	37.0	43.0
900	5.9	9.6	13.2	16.7	20.3	23.8	27.2	30.7	34.1	37.5	40.9	47.6
1000	6.3	10.3	14.3	18.2	22.0	25.9	29.7	33.5	37.3	41.0	44.7	52.1
1200	6.9	11.6	16.3	20.9	25.5	30.1	34.6	39.0	43.5	47.9	52.3	61.0
1400	7.5	12.9	18.3	23.6	28.8	34.1	39.2	44.4	49.5	54.5	59.6	69.6
1600	7.9	14.1	20.1	26.1	32.1	37.9	43.8	49.6	55.3	61.0	66.7	77.9
1800	8.3	15.2	21.9	28.6	35.2	41.7	48.2	54.6	61.0	67.4	73.7	86.1
2000	8.7	16.2	23.6	30.9	38.2	45.4	52.5	59.6	66.6	73.5	80.5	94.1
2200	9.0	17.2	25.2	33.2	41.1	49.0	56.7	64.4	72.0	79.6	87.1	101.9
2400	9.2	18.1	26.8	35.4	44.0	52.4	60.8	69.1	77.4	85.5	93.6	109.6
2600	9.4	18.9	28.3	37.6	46.8	55.8	64.8	73.7	82.6	91.3	100.0	117.1
2800	9.6	19.8	29.8	39.7	49.5	59.2	68.8	78.3	87.7	97.0	106.2	124.4
3000	9.7	20.5	31.2	41.7	52.1	62.4	72.6	82.7	92.7	102.5	112.3	131.5
3200	9.8	21.3	32.5	43.7	54.7	65.6	76.4	87.0	97.5	108.0	118.3	138.5
3400	9.9	22.0	33.9	45.6	57.2	68.7	80.0	91.2	102.3	113.3	124.1	145.4
3600	9.9	22.6	35.1	47.5	59.7	71.7	83.6	95.4	107.0	118.5	129.8	152.0
3800	9.9	23.2	36.4	49.3	62.1	74.7	87.2	99.5	111.6	123.6	135.4	158.5
4000	9.8	23.8	37.5	51.1	64.4	77.6	90.6	103.4	116.1	128.5	140.8	164.9
4200	9.8	24.3	38.7	52.8	66.7	80.4	94.0	107.3	120.4	133.4	146.1	171.0
4400	9.7	24.8	39.8	54.5	69.0	83.2	97.3	111.1	124.7	138.1	151.3	177.0
4600	9.6	25.3	40.8	56.1	71.1	85.9	100.5	114.8	128.9	142.7	156.4	182.8
4800	9.4	25.8	41.9	57.7	73.2	88.6	103.6	118.4	133.0	147.2	161.3	188.5
5000	9.2	26.2	42.8	59.2	75.3	91.1	106.7	121.9	136.9	151.6	166.0	
5200	9.0	26.6	43.8	60.7	77.3	93.6	109.7	125.4	140.8	155.9	170.6	
5400	8.8	26.9	44.7	62.1	79.3	96.1	112.6	128.7	144.5	160.0	175.1	
5600	8.5	27.2	45.6	63.5	81.2	98.4	115.4	132.0	148.2	164.0		
5800	8.3	27.5	46.4	64.9	83.0	100.8	118.1	135.1	151.7	167.9		
6000	8.0	27.8	47.2	66.2	84.8	103.0	120.8	138.2	155.1			