



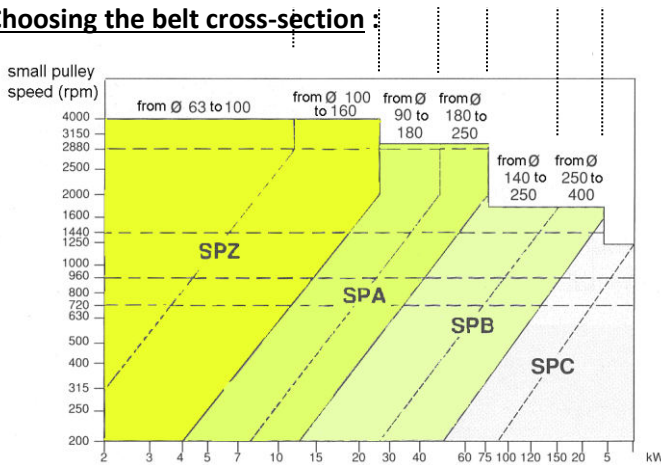
Estimating corrected power :

Use the above correction coefficients on the basis of the operating rating, the type of machine to be driven and the nature of the drive force. The corrected power is : $P_c = \text{Power} \times \text{Power correction}$.

DRIVE POWER	Electric motor with $C_s / C_n \leq 2$ Heat engine with 2 or more cylinders			Electric motor with $C_s / C_n > 2$ Heat engine with 1 cylinder only		
	8 hrs	16 hrs	24 hrs	8 hrs	16 hrs	24 hrs
Power operating machines Rating						
LOW INERTIA : Rotary machine tools, light conveyors, agitators, small fans, centrifugal pumps.	1	1,1	1,2	1,2	1,3	1,4
AVERAGE INERTIA : Alternators, alternate machine tools, large conveyors, fans.	1,1	1,2	1,3	1,3	1,4	1,5
HIGH INERTIA : Hammer mills, mixers, piston pumps, wood cutting machines, paper mill machines.	1,2	1,3	1,4	1,4	1,5	1,6
VERY HIGH INERTIA : Rotary crushers, cylinder crushers, jar mills, roller mills.	1,3	1,4	1,5	1,7	1,8	1,9

Calculation example : electric motor - 50 kW - 2880 rpm - 60 mm Ø shaft. Turbo-fan : 2075 rpm - 60 mm Ø shaft.
Rating : 24 hrs per day. Infrequent start-ups. Distance between axes : 1100 mm.
Power correction : $P_c = 50 \times 1,3 = 65\text{kW}$.

Choosing the belt cross-section :



Using the belt selection charts, draw a vertical line up from the corrected power value, to the intersection with the horizontal line which gives the highest pulley speed. The intersection gives the belt cross-section to use together with the diameter of the smallest transmission pulley.

Calculation example : the recommended cross-section is SPA and the small pulley diameter is 180 mm.

Selecting the pulley diameters :

Choose the pulley diameter keeping in mind that the greater the diameter, the greater the transmitted power. Conversely, do not select a diameter lower than those indicated below :

Section	SPZ	SPA	SPB	SPC
mini Ø	71	90	140	224

Calculation example : driver pulley = Ø 180 - driven pulley = $180 \times 1,39 = \text{Ø } 250$

Calculating the transmission ratio :

Ratio = $\frac{\text{High shaft speed (rpm)}}{\text{Low shaft ratio (rpm)}} = \frac{N}{n}$

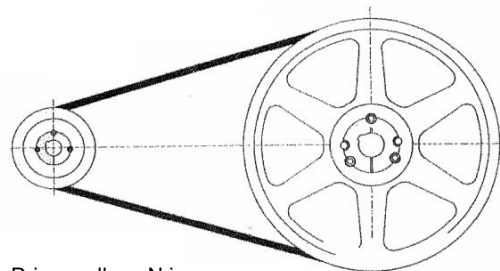
Calculation example : $r = 2880/2075 = 1,39$

Distances between axes :

If the distance between axes E is not given, use as a minimum :

- for a ratio less than 3 : $\frac{D + d}{2} + d$

- for a ratio greater than 3 : $1,2 D$



Driver pulley : N in rpm, working diameter d in mm
 $r = N/n = D/d$

Driven pulley : n in rpm, working diameter D in mm





Determining drive belt length (L) :

The following formula must be used :

$$L_o = 2 E + 3,14 \frac{D + d}{2} + \frac{(D - d)^2}{4 E}$$

Calculation example :

$$L_o = 2 \times 1100 + 3,14 \times (250 + 180) / 2 + (250 - 180)^2 / (4 \times 1100) = 2876 \text{ mm}$$

Selected length L = 2800 mm

Select the standard length L which is the closest to the calculated length

Lo. The new distance between axes thus become :

$$E + \frac{L - L_o}{2} \text{ si } L > L_o \text{ ou } E - \frac{L_o - L}{2} \text{ si } L < L_o$$

$$E = 1100 - (2876 - 2800) / 2 = 1061 \text{ mm}$$

Determining the actual power belt drive :

Use the belt transmissible power tables (see technical data sheet n°10002 - 3, 4, 5 et 6) to find the gross transmissible power as function of the diameter of the small pulley. Correct this power by multiplying it by the length correction coefficient and the correction factor (see technical data sheet n°10002 - 3, 4, 5 et 6). Irrespective of whether a reduction or multiplication transmission is used, always lower these to the values corresponding to the small diameter pulley.

Calculation example : Using the table on sheet 10002 - 4, gross power per belt is 16,9 kW.

Length coefficient : 1

Arc correction factor : $(D - d) / E = (250 - 180) / 1061 = 0,066$, where the arc correction factor equals : 1

Actual transmissible power : $16,9 \text{ kW} \times 1 \times 1 = 16,9 \text{ kW}$.

Number of VECO 200[®] DYNAM[®] system drive belt :

Divide the corrected power by the actual power transmitted by one belt. The result is rounded up to the next whole number

Calculation example : $N_c = 65 / 16,9 = 3,85$ belts, rounded up to 4 belts

Static load on the pulleys :

- Tension per strand T : $45 \times \frac{2,5 - G}{G} + \frac{P_c}{N_c \times V^2}$ (daN)

- Load on bearing R : $2 \times T \times N_c \times \sin(\beta/2)$ (daN)

G : arc correction factor (see table opposite)

Pc : corrected power, kW

Nc : number of belts

V : belt linear speed in m/s :

M : constant (see table below)

$$\frac{d \times N \times}{60}$$

(D - d) / E	β°	Factor G
0,00	180	1,00
0,10	174	0,99
0,20	169	0,97
0,30	163	0,96
0,40	157	0,94
0,50	151	0,92
0,60	145	0,90
0,70	139	0,88
0,80	133	0,87
0,90	127	0,85
1,00	120	0,83
1,10	113	0,80
1,20	106	0,77

Section	SPZ	SPA	SPB	SPC
M	0,006	0,012	0,017	0,032

DYNAM tensioning helps to ensure minimal bearing loads, obtaining effective bearing and roller to race contact, improving the installation overall efficiency.

Calculation example : tension per strand (SPA) = $T = 45 \times (2,5 - 1) / 1 \times 65 / (4 \times 27,13) + (0,012 \times 27,13^2) = 49,3$

Static bearing load : $R = 2 \times 49,3 \times 4 \sin(180^\circ / 2) = 394,6 \text{ daN}$

