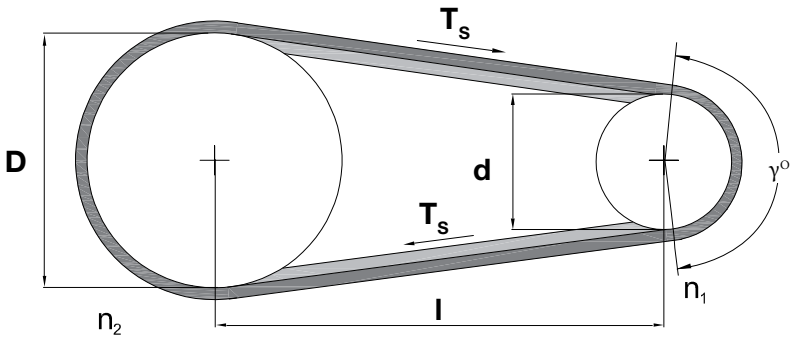
ACCU-LINK®

Technical calculation

MEGADYNE

TECHNICAL CALCULATION

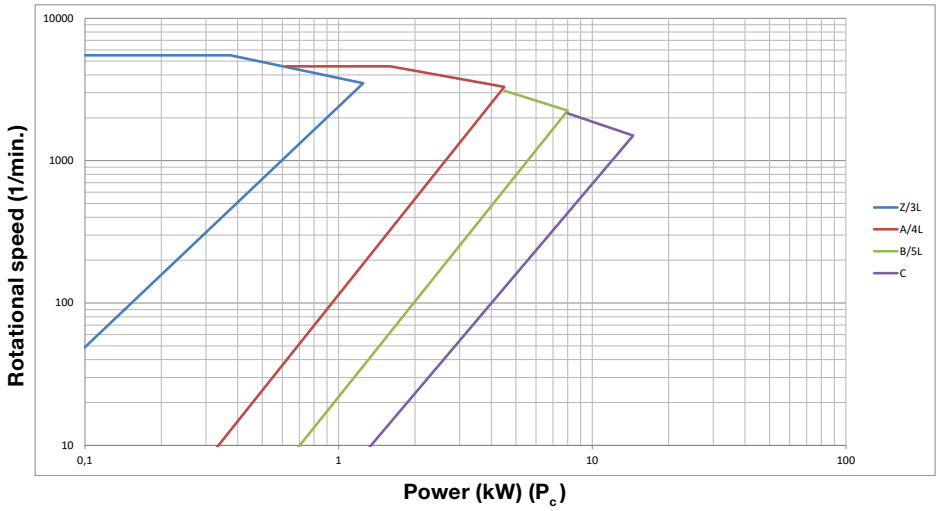


SYMBOL	UNIT	DEFINITION	SYMBOL
Cγ		correction factor	
n$_1$	(RPM)	speed of smaller pulley (faster)	
d	(mm)	pitch diameter of smaller pulley	
D	(mm)	pitch diameter of bigger pulley	
l	(mm)	center distance	
i		transmission ratio	
T$_s$	(N)	static belt tension	
γ	(°)	arc of contact	
n$_2$	(RPM)	speed of bigger pulley (slower)	
P	(kW)	power to be transmitted	
P$_c$	(kW)	corrected power	
P$_b$	(kW)	basic performance of a single belt	
P$_a$	(kW)	actual belt power	
Q		number of belts	
v	(m/s)	peripheral belt speed	
F$_s$		service factor	

CHOICE OF BELT SECTION

To choose between the sections, to find out the corrected power (P_c) it is first necessary to calculate: $P_c = P \times F_s$

Table 1: belt section selection



DETERMINATION OF ACTUAL POWER RATING

The actual power rating P_a is given by the drive working conditions: $P_a = P_b \times C_\gamma$
where P_b is the power base of the belt and C_γ is the arc of contact correction factor as per following table.

Table 2: arc of contact correction factor Cγ

The arc of contact is calculated as follows: $\gamma = 180 - (57 \times [(D-d):l])$

Arc of contact γ	180°	175°	170°	165°	160°	155°	150°	145°	140°	135°	130°	125°	120°	115°	110°	105°	100°
C_γ	1,00	0,99	0,98	0,96	0,95	0,93	0,92	0,90	0,89	0,87	0,86	0,84	0,82	0,80	0,78	0,76	0,74

Table 3: service factor F_s

DRIVES	
(1) AC electric motors: high slip, squirrel cage, synchronous DC electric motors: parallel excitation Multi-cylinder internal combustion engines Gas or steam turbines	(2) AC electric motors: high torque, high slip, single phase, wound rotor, commutator DC electric motors> series and compound excitation Single-cylinder internal combustion engines with direct coupling or with countershaft Steam engines

Applications	Daily operating hours					
	0-8 (1)	8-16 (1)	16-24 (1)	0-8 (2)	8-16 (2)	16-24 (2)
Light use Classical industrial drives up to 5 kW Fans, pumps, compressors Light conveyors	1,0	1,1	1,2	1,1	1,2	1,3
Normal use Drives up to 15 kW Fans, pumps, compressors, line shafts, machine tools, punches, generators Heavy conveyors	1,1	1,2	1,3	1,2	1,3	1,4
Heavy use Textile machines saw mills, woodworking machines, brick machines, piston compressors, paper mills, positive blowers	1,2	1,3	1,4	1,4	1,5	1,6

DETERMINATION OF NUMBER OF BELTS

The number of belts comes from the following formula:

$$Q = P_c : P_a$$

The final number of belts is given by rounding up Q to the next higher integer number.

TRASMITTABLE POWER

Table 4 - Z/3L profile

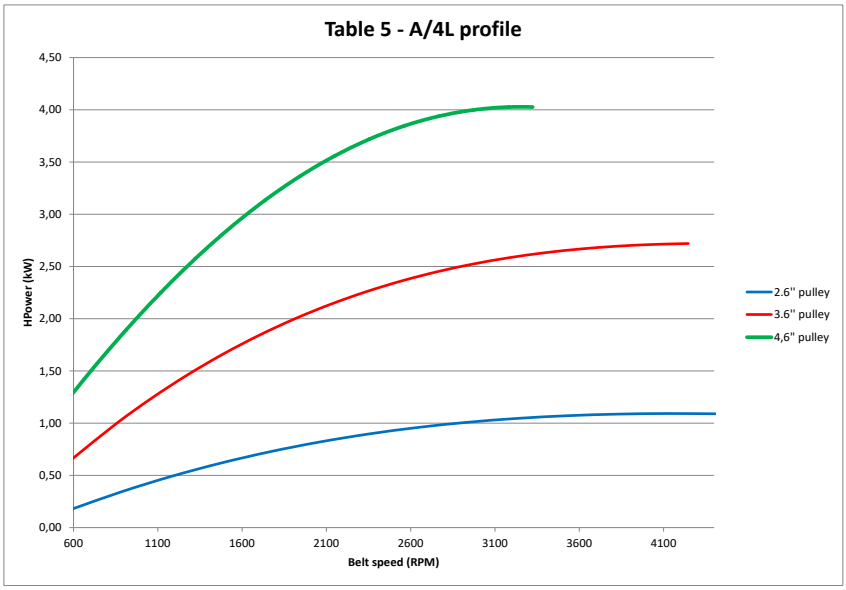


Table 5 - A/4L profile
HPower (kW)
4,50
4,00
3,50
3,00
2,50
2,00
1,50
1,00
0,50
0,00
600
1100
1600
2100
2600
3100
3600
4100
Belt speed (RPM)
2.6'' pulley
3.6'' pulley
4,6'' pulley

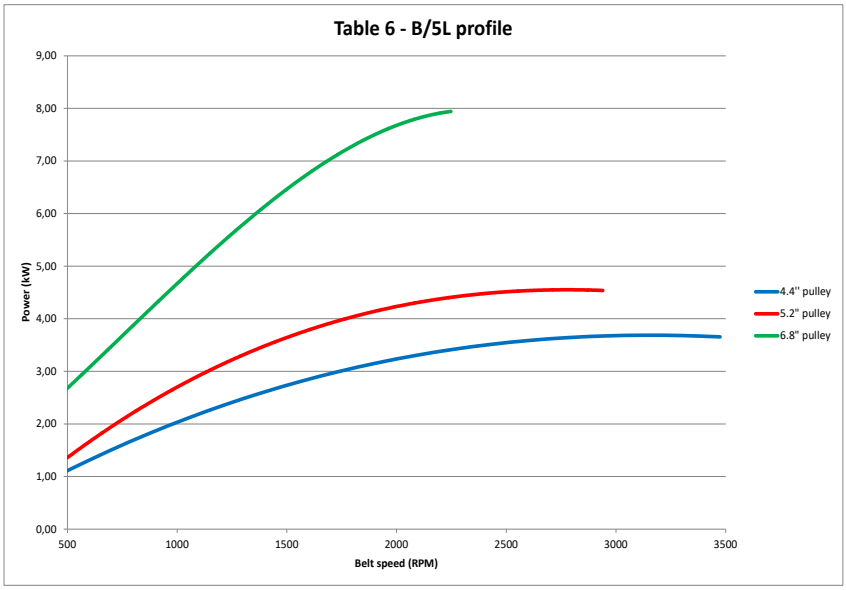


Table 6 - B/5L profile
Power (kW)
9,00
8,00
7,00
6,00
5,00
4,00
3,00
2,00
1,00
0,00
500
1000
1500
2000
2500
3000
3500
Belt speed (RPM)
4.4'' pulley
5.2'' pulley
6.8'' pulley

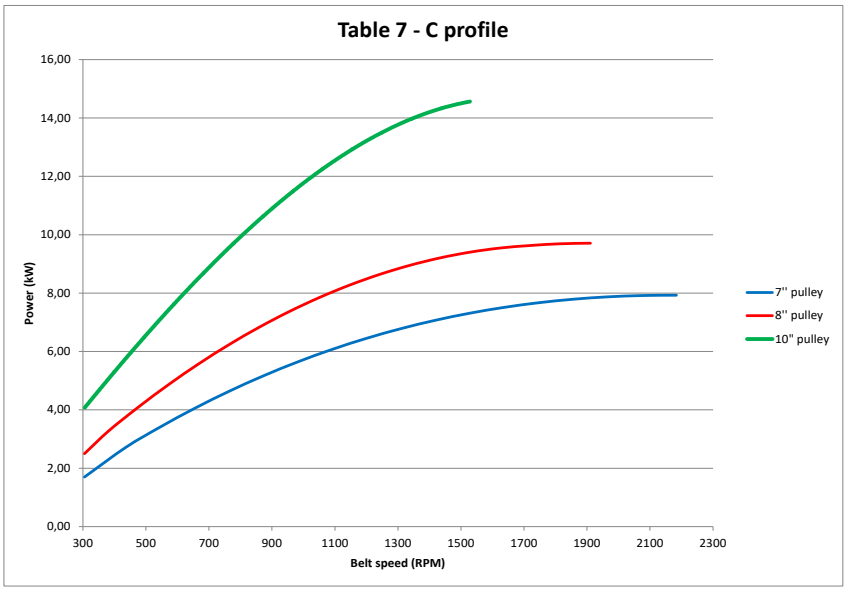
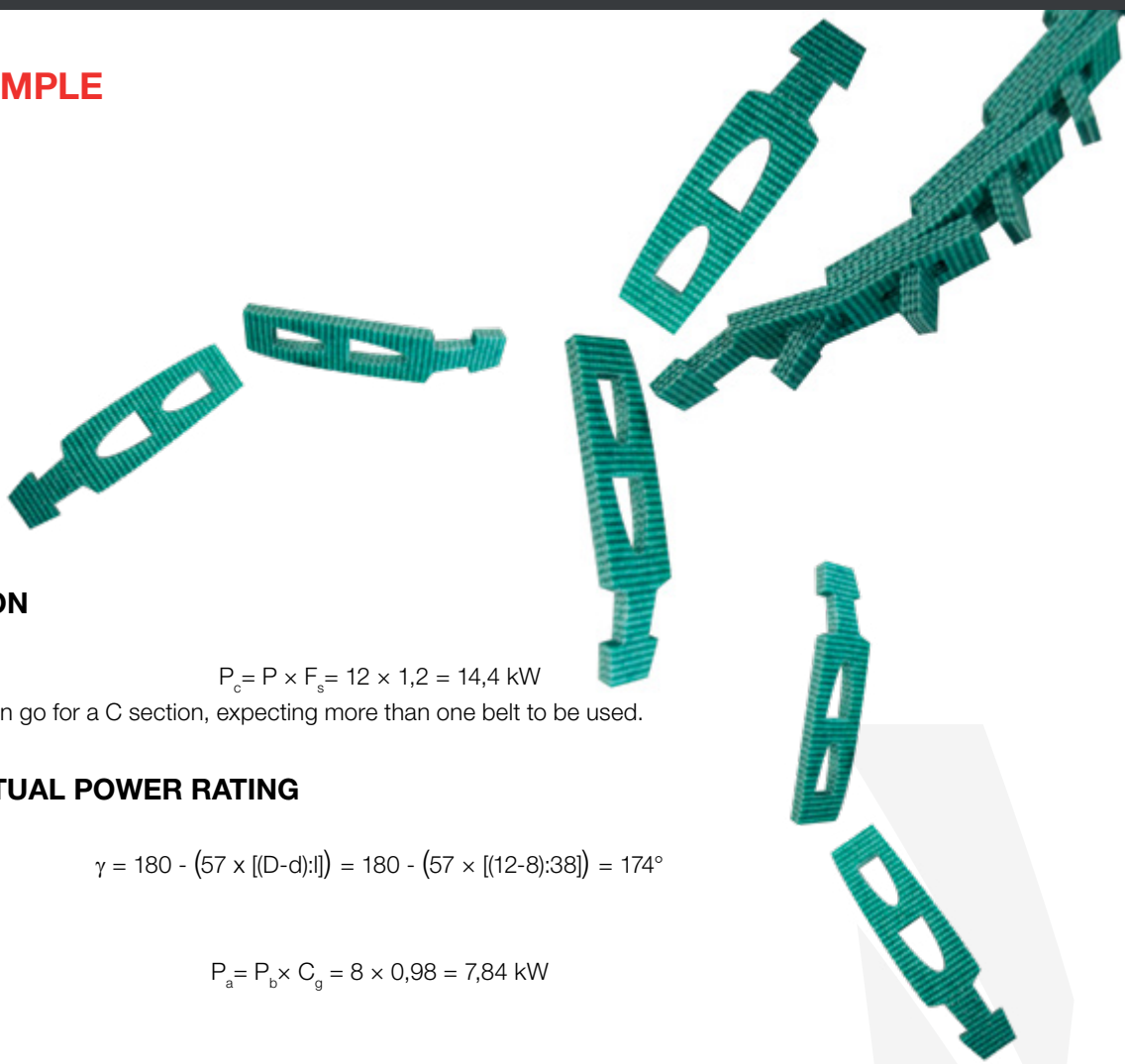


Table 7 - C profile
Power (kW)
16,00
14,00
12,00
10,00
8,00
6,00
4,00
2,00
0,00
300
500
700
900
1100
1300
1500
1700
1900
2100
2300
Belt speed (RPM)
7'' pulley
8'' pulley
10'' pulley

CALCULATION EXAMPLE



MACHINE DATA

P = 12 kW
Speed: 1100 rpm
Drive sheave: 8”
Driven sheave: 12”
Center distance: 38”

Application: compressor
Type of engine: 1
Working hours: 8-16 per day
F_s will be 1,2

CHOICE OF BELT SECTION

The corrected power P_c is

$$P_c = P \times F_s = 12 \times 1,2 = 14,4 \text{ kW}$$

Because of the high power, we can go for a C section, expecting more than one belt to be used.

DETERMINATION OF ACTUAL POWER RATING

Arc of contact γ

$$\gamma = 180 - (57 \times [(D-d):I]) = 180 - (57 \times [(12-8):38]) = 174°$$

This means that $C\gamma$ is 0.98.
The belt power rating P_a is

$$P_a = P_b \times C_g = 8 \times 0,98 = 7,84 \text{ kW}$$

where P_b comes from table 7.

DETERMINATION OF NUMBER OF BELTS

The final number of belts is:

$$Q = P_c : P_a = 14,4 : 7,84 = 1,84$$

This means that the actual number of needed belts is 2.

RANGE

ACCU-LINK® belts are available in Z/3L, A/4L, B/5L and C sections. ACCU-LINK® can work on standard pulleys for V-belts. Megadyne can supply open end ACCU-LINK® in carton boxes or endless belts in light carton sleeves.

	Z/3L	A/4L	B/5L	C
Belt weight g/m (+/-1,5)	43,0	76,5	117,5	178,5
Min pulley diameter (mm)	45	80	140	225
Service temperature range	-25 °C / +80 °C (-13 °F / 176 °F)			
Standard roll lengths (ft)	25-100	25-100	25-100	25-50
Standard sleeve lengths (ft)	5	5-6	6	5

About Megadyne

Founded in 1957 in Mathi, Italy, Megadyne is a leading global manufacturer and fabricator of power transmission, product handling, materials handling and linear positioning belts, and metal products.

With manufacturing operations in Europe, Middle East and Africa (EMEA), Asia Pacific (APAC) and the Americas, Megadyne is well poised to be your partner. From a broad selection of materials and processes, we service over 20 major industries offering high quality product, outstanding service, technical support and state of the art logistics to ensure we develop the right product for your application and have it at the right location when you need it.

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