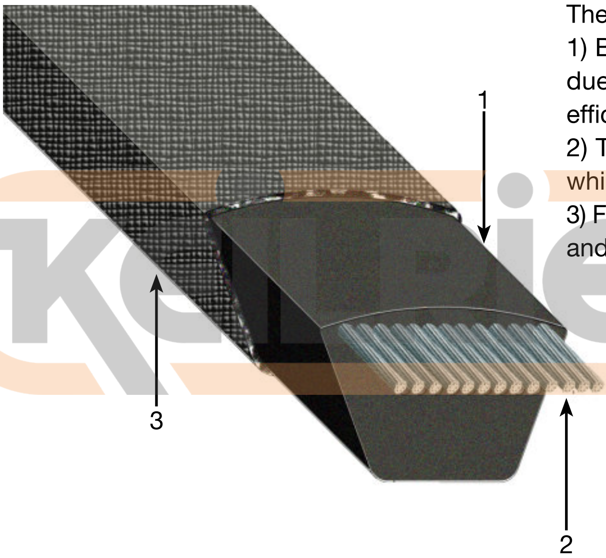
V-BELTS

Rubber V-belts

MEGADYNE

Megadyne V-belts have been used for decades in the most different industries and applications, offering drive solutions to customers all over the world.
Applied technology guarantees such a dimensional precision in V-belts which allows them to be suitable for multiple transmissions. This dimensional stability continues also during belt use.

The variety of belt sizes available allows the application of Megadyne V-belt in a wide range of drive applications, such as:
machine tools
industrial washing machines
textile machines
continuous paper machines
high power mills
stone crushers



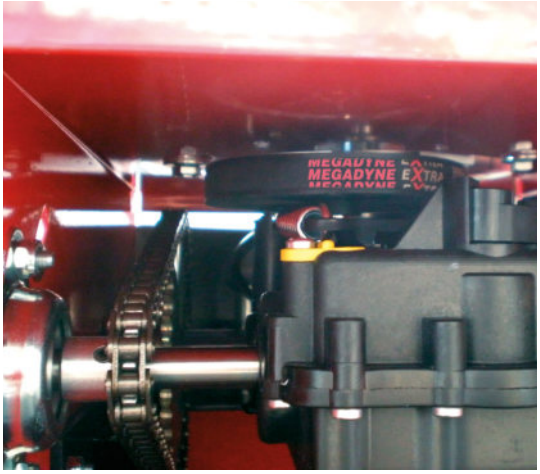
The main V-belt components are:
1) Belt body made of a special rubber compound which provides, due to its excellent mechanical characteristics, high transmission efficiency and assures a minimum rubber wear off;
2) Tensile member consisting in high-strength low-stretch cords, which grant length stability over the belt life time;
3) Fabric jacket or cover made of fabric, protecting the tensile member and permitting the use of back side idler.

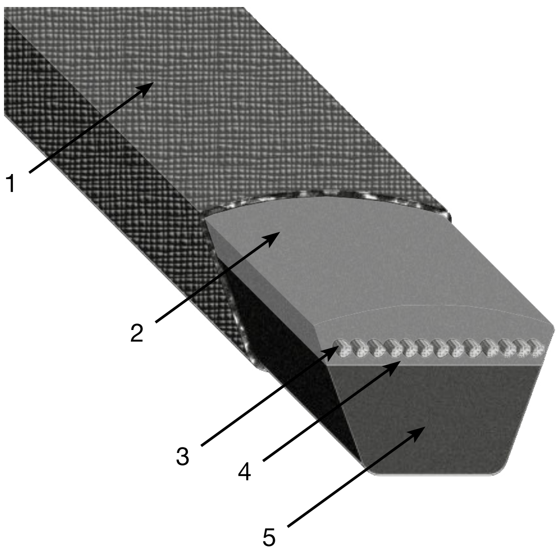
MECHANICAL AND CHEMICAL FEATURES

- smooth starting and running
- wide range of driven speed
- low maintenance
- high efficiency
- extremely wide horsepower ranges
- dampen vibration between driver and driven pulleys
- silent operations
- long life service
- easy installation
- reduction in drive dimension
- working temperature range from -30°C to +80/90°C (see details in family pages)
- oil and heat resistance
- antistatic properties

MEGAMATCH MEGA MATCH
All V-belts carrying the MEGA MATCH logo are made and supplied according to the matching set tolerances and limits indicated by the relevant international standards (ISO,RMA, etc)

INTRODUCTION TO V-BELTS





WRAPPED BELTS

EXTRA

Extra belts were designed to offer durable and reliable performances on light and medium-duty drives. They represent an affordable solution for transmission systems of all industrial sectors.

OLEOSTATIC

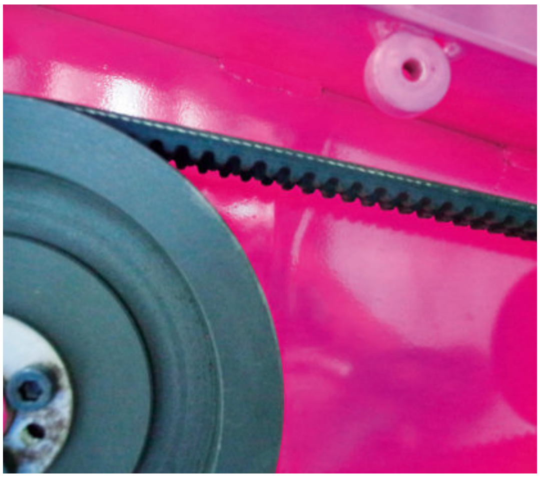
Oleostatic rubber belts are developed with high resistant tensile elements, they are characterised by high performances, length stability during belts life, conductivity, oil and heat resistance. They are particularly suitable for centrifugal pumps, compressor, tool machines, generators, high power mills and stone mills.

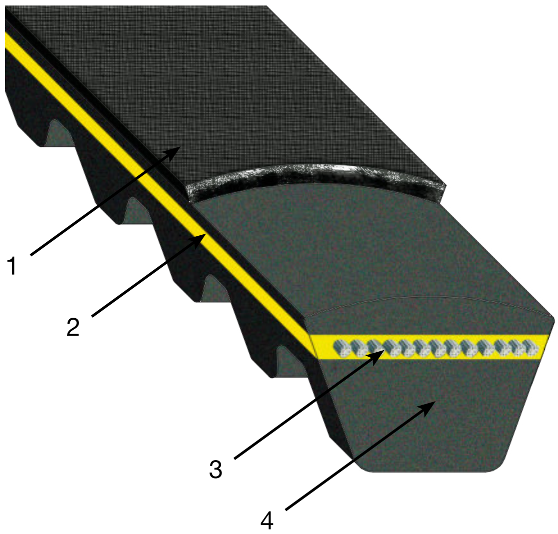
OLEOSTATIC GOLD

Different materials and design features, together with an improved production process, have led to the development of a new class of higher rated wrapped V-belts. The new OLEOSTATIC GOLD V-belts products family can operate in a wide range of industrial applications, within a large spread of load capacities and speeds — offering rated performance from 100 to 8,000 RPM and power capability from 1 to 400 kW, meanwhile granting large cost advantages for the end users.

Oleostatic Gold structure:

1) FABRIC: Double cover ply - CR Dip.
   A reinforced, double fabric cover is plied around the belt to protect it against contamination and moisture. Its increased flexibility allows the belt to bend more easily around the smallest pulleys with far less strain on the fabric, while assuring a smoother running drive.
2) TOP CUSHION: SBR compound + Fibers
3) TENSILE CORD: H.T. Polyester
   The tensile section is made up of a multiple number of high-strength, low elongation polyester cords, completely embedded in the adhesion layers, to enhance resistance to tension and flex-fatigue. Each cord is individually and specially coated to secure a long-lasting bond with the surrounding rubber and to grant a longer operational lifetime. In addition the belt requires significantly less retensioning and take-up due to its cord's consistent length stability. Longer belt life means less frequent replacement, less downtime and lower maintenance costs.
4) BOTTOM CUSHION: SBR compound + Fibers
5) BODY COMPOUND: Polycloroprene (CR) based





RAW EDGE

LINEA-X

These belts have been specifically developed to run where small pulleys diameters and high transmission ratios put a limit to the use of wrapped belts of the same section.

Compared to wrapped belts, the LINEA-X family offers important improvements, like specific compounds and special production technology. In particular the transverse orientation of the fibers improves the cord support capacity of the body section and reinforces its transverse rigidity, while maintaining, (due to the cogged profile and the precision-ground sidewalls) the highest longitudinal flexibility and running stability. These characteristics guarantee an excellent structure with advantages such as: high transmission ratios, improved grip and resistance to continuous bending.

LINEA GOLD

The NEW generation of raw edge belts
New materials, advanced design features and an innovative production process has led MEGADYNE to develop a new generation of raw edge V-belt drives that outperform, in a wide range of industrial applications, all the previous drives equipped with standard raw edge belts, granting large cost advantages for the end users and greater design flexibility for the engineers. The belt has a narrow cross section and a raw edge construction, based on a new EPDM rubber compound which can outstand chemically aggressive environments, ageing, ozone, UV and heat.

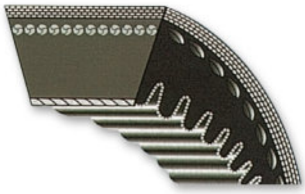
Linea Gold structure:
1) BACKSIDE FABRIC
A textile fabric is plied on the belt backside to protect it against contamination and moisture.
Its flexibility gives the belt excellent reversed bending properties when backside idlers are used and protects the belt against wear.
2) ADHESION LAYERS
An innovative, colored, EPDM compound located immediately above and below the belt cords, guarantees the best possible bonding with the under cord body material.
3) TENSILE CORD
The tensile section is made up of a multiple number of high-strength, low elongation polyester tensile cords which are completely embedded in the adhesion layers and vulcanized as one solid unit to enhance resistance to tensile and flex-fatigue forces. On request, for special extreme requirements, aramid or glassfibre cords are also available.
4) BODY COMPOUND
A newly developed EPDM compound, with high-performance fibers embodied in the rubber matrix, provides to the belt with superior abrasion and wear resistance. The transversal orientation of the fibers improves the cord support capacity of the body section and reinforces its transversal rigidity, while maintaining, in connection with the cogged profile and the precision-ground sidewalls, the utmost longitudinal flexibility and running stability.

Classical wrapped V-belts

(Extra - Oleostatic - Oleostatic Gold)

SECTIONS

Z	E
A	20
B	25
C	45
D	50



Classical raw edge V-belts

(Linea Gold)

SECTIONS

AX
BX
CX

Narrow wrapped V-belts DIN

(Extra - Oleostatic Gold)

SECTIONS

SPZ
SPA
SPB
SPC

Narrow raw edge V-belts DIN

(Linea-X - Linea Gold)

SECTIONS

XPZ
XPA
XPB
XPC

Narrow wrapped V-belts RMA

(Oleostatic)

SECTIONS

3V
5V
8V

Variable speed V-belts

(Varisect)

SECTIONS

13x6	36x12
17x6	37x10
21x7	42x13
22x8	47x13
26x8	52x16
28x8	55x16
30x10	65x20
32x10	70x20

Xtra Duty V-belts

(XDV2)

SECTIONS

XDV2-38
XDV2-48
XDV2-58

Double V-belts

(Esaflex)

SECTIONS

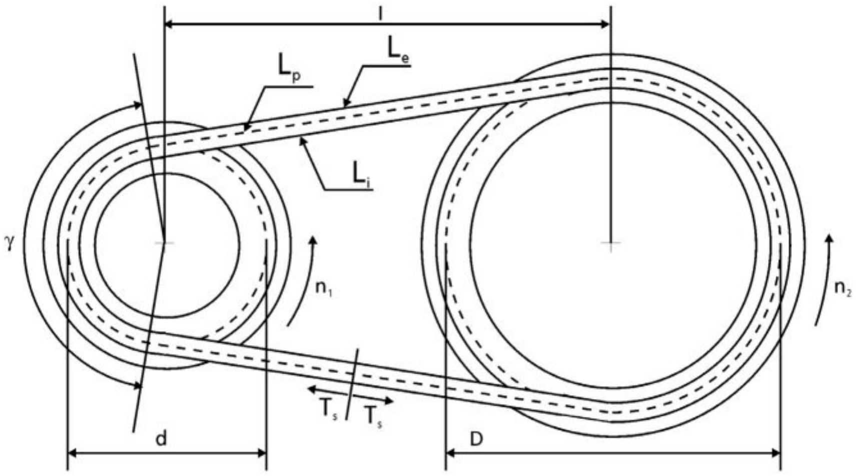
AA
BB
CC

Banded V-belts

(Pluriband)

SECTIONS

RA	RSPC
RB	R3V
RC	R5V
RSPZ	R8V
RSPA	R3VX
RSPB	R5VX



Symbol	*Unit*	*Definition*	*Symbol*	*Unit*	*Definition*
C_γ		correction factor C_γ	**L_p**	mm	pitch length (effective)
C_L		correction factor C_L	**n_1**	RPM	speed of smaller pulley (faster)
C_c		correction factor C_c	**n_2**	RPM	speed of bigger pulley (slower)
d	mm	pitch diameter of smaller pulley	**P**	kW	power to be transmitted
D	mm	pitch diameter of bigger pulley	**P_a**	kW	actual power of the transmission
I	mm	theoretical center distance	**P_b**	kW	basic performance of a single belt
I_e	mm	effective center distance	**P_c**	kW	corrected power
i		transmission ratio	**P_d**	kW	difference to Pb due to K≠1
L'	mm	calculated pitch length	**Q**		number of belts
L_e	mm	external length (L_p+Δ_e)	**T_s**	N	static belt tension
L_i	mm	internal length (L_p-Δ_i)	**v**	m/s	peripheral belt speed
			γ	°	arc of contact

BELT SECTION

Necessary data for selection of the belt section:
P = power to be transmitted in kW
n_1 = speed in RPM of the smaller pulley
n_2 = speed in RPM of the bigger pulley
It is necessary to correct the power P by a coefficient C_c (see table 1 page 6) which considers into account the actual operating conditions.

Corrected power P_c is given by:
$P_c = P \cdot C_c$
The graphs gives a guiding criterion for the section of the belt.

TRANSMISSION RATIO

Transmission ratio is calculated as follows:

$$i = \frac{n_1}{n_2} = \frac{D}{d}$$

where D is the pitch diameter of larger pulley and d is the pitch diameter of the smaller pulley.

TECHNICAL CALCULATION

Peripheral speed of the belts is determined by

$$v = \frac{d \bullet n_1}{19100}$$

If the drive being calculated is of the V/flat type (one V pulley and one flat pulley) it is necessary to find the corresponding pitch diameter of the flat pulley.
The pitch diameter of the flat faced pulley is obtained by increasing its external diameter by the amount in millimetres shown in the following table:

Z	A	B	C	D	E	19	20	25
8	10	14	20	24	33	16	15	19

PITCH LENGTH OF THE BELT AND CORRECT CENTER DISTANCE

Whenever the shaft center distance I is not predetermined by the layout of the drive, the optimum distance may be chosen as follows:

$1<i<3 \qquad I \geq \frac{(i+1) \bullet d}{2} + d$

$i>3 \qquad I \geq D$

The pitch length is determined by:

$$L' \sim - = 2 \bullet I + 1{,}57 \bullet (D+d) + \frac{(D-d)^2}{4I}$$

From the list of belt sizes, should be selected the belt pitch lenght L_p nearest to the value of L' above calculated. Since $L' \neq L_p$ the center distance "**I**" may be varied by subtracting half $L' - L_p$. Therefore the effective center distance of the drive will be:

$$I_e = I - \frac{(L'-L_p)}{2}$$

NUMBER OF BELTS

The basic performance P_b is the power which a single belt transmits under the following conditions:

• $i = 1$

This configuration corresponds to 180° arc of contact belt on both pulleys;

• $i \neq 1$

The difference of kW-rating P_d is the power which the belt transmits in excess of P_b because $i \neq 1$ in service conditions.
The actual kW-rating P_a is the power which the belt transmits in operating conditions and is obtained by means of:

$$P_a = (P_b + P_d) \times C_g \times C_L$$

Table 4 (see belt family pages) gives the values of P_b according to RPM and d (smaller diameter) and the values of P_d according to RPM and i.

Table 2 (bottom of this page) and 3 (see belt family pages) give values of the coefficients C_γ and C_L taking into account the operating conditions.

The arc of contact g of the belt on the smaller pulley is determined by:

$$\gamma = 180° - 57 \bullet \frac{D\text{-}d}{l_e}$$

The number of belts Q necessary for the transmission of the power P_c is determined by:

$$Q = \frac{P_c}{P_a}$$

The number of belts actually is obtained in general by rounding up Q to the next highest whole number.

TABLE 1 - TYPE OF MOTOR

Drivers

(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 Centrifugal pumps and compressors, belt conveyors, (light materials) fans and pumps up to 7,5 kW.	1,1	1,1	1,2	1,1	1,2	1,3
Normal use Shears for steel sheet presses, belt and chain conveyors, (heavy material) sifters, generator sets, machine tools, kneading machines, industrial washing machines, printing presses, fans and pumps over 7,5 kW.	1,1	1,2	1,3	1,2	1,3	1,4
Heavy use Hammer mills, piston compressors, belt conveyors for heavy loads, lifters, textile machines, continuous paper machines, piston and dredging pumps, ripping saws.	1,2	1,3	1,4	1,4	1,5	1,6
Extra heavy use High power mills, stone crushers, calendars, mixer, cranes, diggers, dredgers.	1,3	1,4	1,5	1,5	1,6	1,8

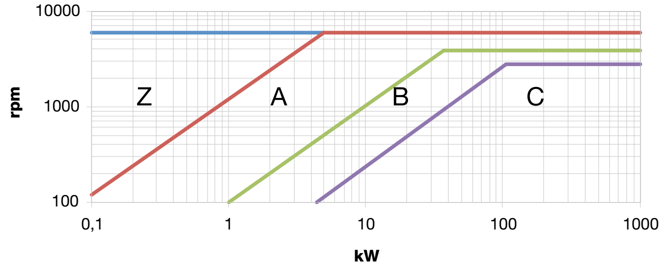
TABLE 2 - Correction factor Cγ (T/T=V/V drives; T/P=V/Flat drives; γ=arc of contact on the smaller pulley)

	γ	180°	175°	170°	165°	160°	155°	150°	145°	140°	135°	130°	125°	120°	115°	110°	105°	100°	90°
C_γ	T/T	1	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	0,69
	T/P	0,75	0,76	0,77	0,79	0,80	0,81	0,82	0,83	0,84	0,85	0,86	0,84	0,82	0,80	0,78	0,76	0,74	0,69

WRAPPED V-BELTS SELECTION CHARTS

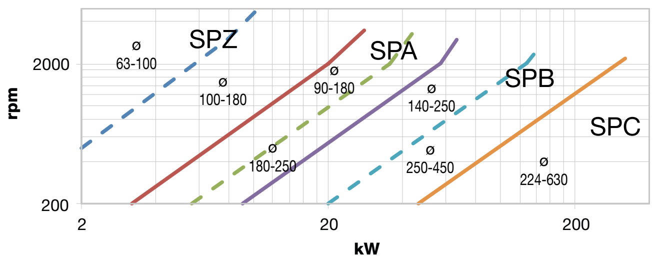
Classical wrapped V-belts

EXTRA

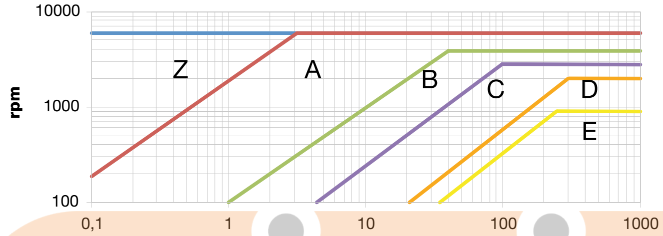


Narrow wrapped V-belts DIN

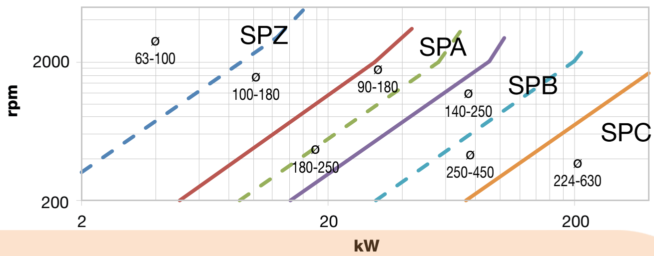
EXTRA



OLEOSTATIC GOLD

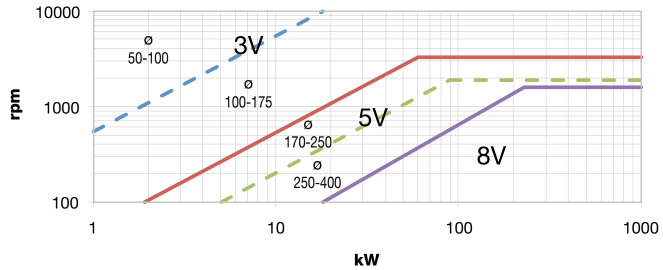


OLEOSTATIC GOLD



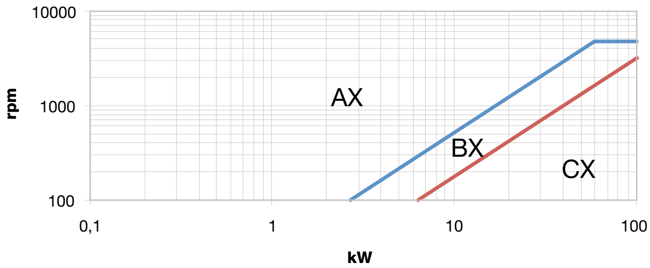
Narrow wrapped V-belts RMA

OLEOSTATIC



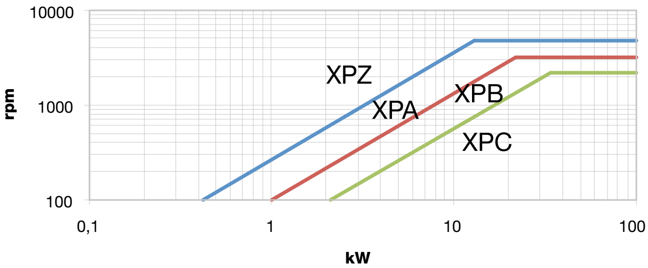
Classical raw edge V-belts

LINEA GOLD

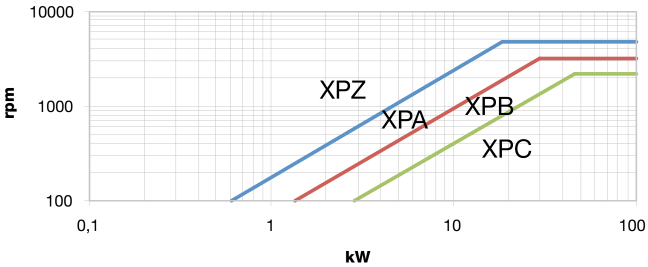


Narrow raw edge V-belts DIN

LINEA-X



LINEA GOLD

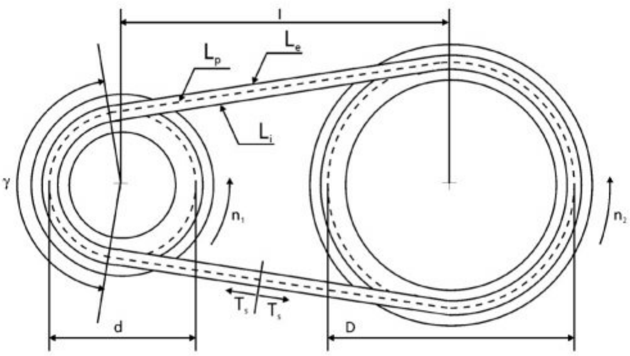


CALCULATION EXAMPLE

EXAMPLE
$P = 22$ kW
$n_1 = 1200$ RPM
$n_2 = 660$ RPM
Textile machine operating 12 hours a day
Type of motor: ac electric motor, normal torque

The correction coefficient is 1,3 (see table 1)
The corrected power is:

$P_c = 22 \cdot 1{,}3 = 28{,}6$ kW



BELT SELECTION

From selection charts, for $P_c = 28{,}6$ and $n_1 = 1200$ RPM it is appropriate to choose section B.

TRANSMISSION RATIO

The transmission ratio can be calculated as follows:

$$i = \frac{n_1}{n_2} = \frac{1200}{660} = 1{,}82$$

Considering diameter d = 250 mm for the smaller pulley, the pitch diameter of the larger pulley is:

$$D = i \cdot d = 1{,}82 \cdot 250 = 455 \text{ mm}$$

Peripheral speed of the belts is determined by

$$v = \frac{d \cdot n_1}{19100}; \quad v = \frac{0{,}052 \cdot 250 \cdot 1200}{19100} = 15{,}7 \text{ m/s}$$

BELT PITCH LENGTH AND CORRECT CENTER DISTANCE

For i = 1,82 (i.e. $1<i<3$) the center distance is given by:

$$I \geq \frac{(i+1) \cdot d}{4} + d \qquad \text{so} \qquad I = 610 \text{ mm}$$

The pitch length of the belt is determined by:

$$L' = 2 \cdot I + 1{,}57 \cdot (D+d) + \frac{(D-d)^2}{4 \cdot I};$$

$$L' = 2 \cdot 610 + 1{,}57 \cdot (455+250) + \frac{(455-250)^2}{4 \cdot 610} = 2344 \text{ mm}$$

From the list of belt sizes (see table on belt family pages), should be selected the belt pitch lenght L_p nearest to the value of L' previously calculated.
The center distance "**I**" may be varied by subtracting half $L'-L_p$. Therefore the effective centre distance of the drive will be:

$$Ie = I - \frac{L'-L_p}{2}$$

Having selected **Oleostatic Gold B 91** ($L_p = 2355$ mm), the actual shaft center distance is calculated by:

$$Ie = 610 - \frac{2344-2355}{2} = 615{,}5 \text{ mm}$$

From table 4 of B section (d=250 mm; 1200 RPM; K=1,82):

$P_b = 11{,}57$ kW

$P_d = 0{,}48$ kW

The arc of contact γ of the belt on the smaller pulley is determined by:

$$\gamma = 180° - 57 \bullet \frac{D-d}{l_e} = 180° - 57 \bullet \frac{455-250}{616} \cong 161°$$

From table 2 for $\gamma = 161°$

$C\gamma = 0{,}95$

From table 3, pag 19 for **Oleostatic Gold B 91** belt

$C_L = 1{,}00$

Therefore:

$P_a = (11{,}57+0{,}48) \bullet 0{,}95 \bullet 1{,}00 = 11{,}45$ kW

The number of belts Q necessary for transmission of the power P_c is established by:

$$Q = \frac{P_c}{P_a} = \frac{28{,}6}{11{,}45} = 2{,}5$$

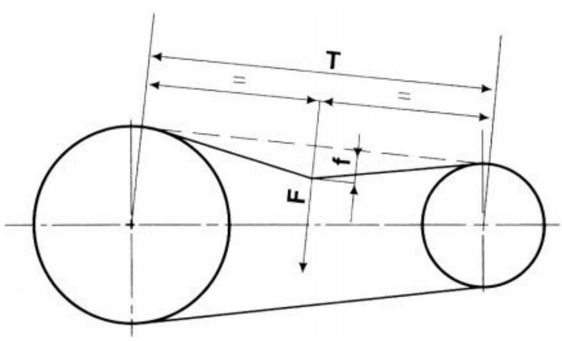
Round up to 3 belts **Oleostatic Gold B 91**.

BELT TENSIONING RECOMMENDATION

The correct belt assembling tension is given by:

$$Ts = 500 \bullet \frac{2{,}5-C_\alpha}{C_\alpha} \bullet \frac{P_C}{Q \bullet v} + m \bullet v^2$$

Symbol	Unit	Definition
C_α		arc correction factor
m	kg/m	belt linear mass (see belt family page)
P_c	kW	corrected power
Q		number of belts
T_s	N/strand	static belt tension
v	m/s	peripheral belt speed
α	°	arc of contact



Arc corretcion factor:

α [°]	180	174	169	163	157	151	145	139	133	127	120	113	106	99	91	83
C_α	1,00	0,98	0,97	0,96	0,94	0,93	0,91	0,89	0,87	0,85	0,82	0,80	0,77	0,73	0,70	0,65

LENGTH MEASURING AND GROOVE PULLEYS

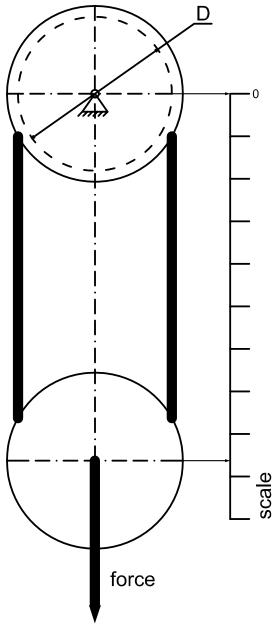
BELT LENGTH MEASURING

The first and easiest way for measuring the V-belt length is by placing the belt on a flat surface, giving the belt a circular shape and finally measuring the internal length L_i by means of a measuring tape. Adding Δ_i and after Δ_e (see belt families pages) to this length, it's possible to calculate respectively L_p and L_e.
This measuring way is not very precise, even if practically easy and feasible with a tape only.

The correct way for measuring the V-belt length is by means of pulleys and dynamometer.
The belt is put on 2 pulleys, specific for the family and size of the belt and having the same pitch diameter. One is fixed while the second can move on a linear graduated scale.
Depending on the belt, a certain force is applied to the second pulley in order to put the complete system under tension. The correct force is tabled the relevant standards referring to the belt family.
To stabilize the system, at least 3 rotations of the pulleys are required.
The pitch length L_p is given by the pulleys pitch diameter D and center distance a in the formula:

$L_p = 2 a * \pi_D$

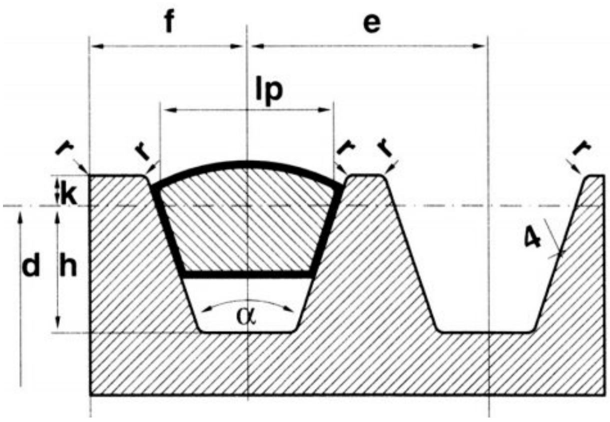
Subtracting Δ_i and adding Δ_e (see belt families pages) it's possible to calculate respectively L_i and L_e.



GROOVE PULLEYS

Groove pulleys for V-belts must be manufactured with care and be made of good quality steel or engineering cast iron. It is most important that the flanks of the grooves shall be perfectly smooth and show no visible sign of machining, that all sharp corners of the grooves shall be rounded off and chamfered and that the external diameter of the face shall be constant overall.
All pulleys must also be statically balanced.
Dynamic balancing is required for speeds over 30 m/second.

Profile and dimension of pulley should be in accordance to DIN 2211, BS 3790, ISO, RMA depending on the belt relevant standard.
In tha drawing are shown the main characteristics and dimensions of groove pulleys for V-belts (example referring to Oleostatic belts).



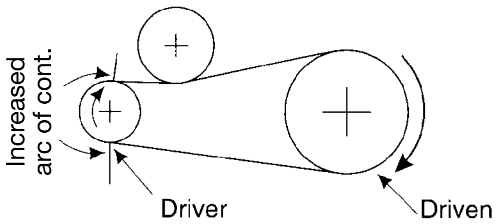
lp = pitch width
k = minimum height of groove above the pitch line
h = minimum depth of groove below the pitch line
α = groove angle
d = pitch diameter
e = distance between the axes of the sections of two grooves
f = distance between the axis of the section of the outer groove and the rim of the pulley

The use of idlers in V-belt drives is not recommended.
However, due to particular drive requirements and limitations, use of idlers may be absolutely necessary.
For using idlers, requirements are as follows:
1. Providing take-up for fixed center drives.
2. Turning corners (as in mule pulley drives).
3. Breaking up long spans where belt whip may be a problem.
4. Maintaining tension, when idler is spring-loaded or weighted.
A power corretcion (see below) is required.

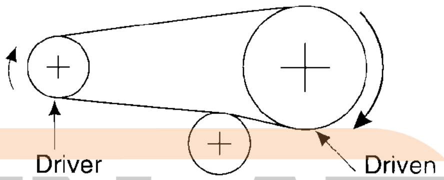
OUTSIDE IDLER

1. An outside idler should be at least one and one-third times as large as the smallest pulley on the drive, unless drive has unusually large pulleys.
2. An outside idler must be flat and without any crown.
3. To find the face width of a flat idler (between flanges if flanged) add 1 ½ times the nominal belt top width to the face width of the grooved pulley used.
4. An outside idler pulley should be located as close as possible to the preceding pulley. This is because V-belts move back and forth slightly on a flat pulley and locating it as far away from the next pulley minimizes the possibility of the belt entering that pulley in a misaligned condition.
5. Idler pulleys should be located only on the slack side of a drive.

RECOMMENDED



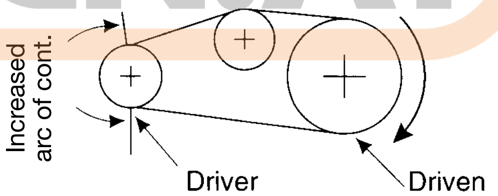
NOT RECOMMENDED



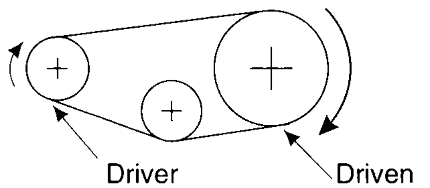
INSIDE IDLER

1. An inside idler will decrease the arc of contact.
2. An inside idler should be at least as large as the smallest pulley on the drive, unless the drive has unusually large pulleys.
3. An inside idler should better be a grooved pulley. In alternative, flat pulleys can be used.
4. A grooved inside idler pulley may be located anywhere along the span, preferably so that it gives nearly equal arcs of contact on the two adjacent pulleys.
5. Idler pulleys should be located only on the slack side of a drive.

RECOMMENDED



NOT RECOMMENDED



RATED POWER CORRECTION

Because idlers impose an additional bending stress point on the V-belt, the transmittable power is reduced.
The smaller the idler diameter, the greater the bending stress, which results in a greater reduction in rated power and belt life.
To compensate this loss, the design power of the drive must be increased.
The following table gives the approximate correction factors according to the number of pulleys in the drive.
The normal power rating should be multiplied by this factor.

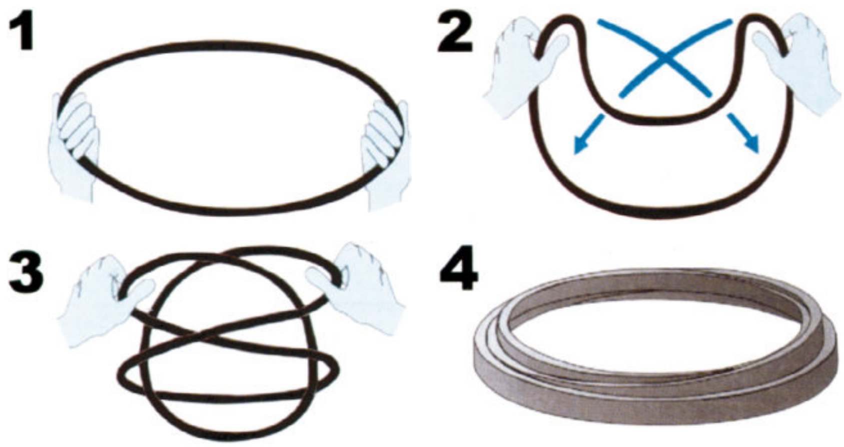
No. of pulleys in drive	2	3 (one idler)	4 (two idlers)
Rating Correction Factor	1,00	0,90	0,80

Note:
As stated, the above listed factors are only approximate values and apply only when idler diameters and their location is in accordance with the above recommendations.

STORAGE MAINTENANCE AND USEFUL ADVICES

HOW TO STORE BELTS

In order to store V-Belts correctly, it is advisable to hang them on “saddles” or on large-diameter tubular brackets. This diameter should be at least ten times the height of belts cross section.
Long belts can be stacked to save space, provided that they are correctly coiled (see figures).
Short belts can be stored on shelves, but be aware that stacks should not be more than 300 mm high, as the bottom belts may be otherwise deformed.
Finally, hooks and nails are unsuitable for suspending the belts.



CONDITIONS OF STORAGE

Rubber V-belts can be stored for several years without causing any performance or reliability loss.
For a correct storage, some prescription have to be taken into account.
- Environment
The storage premises should be cool, dry and well ventilated but not draughty.
- Temperature
Storage temperature should be within +5 and +30°C.
Lower temperatures causes stiffening in the belt but are accepted in the storage. In order to avoid damages in the start-up, it becomes necessary to heat the belt up to around 20° before making it run on the machine.
Higher temperatures due to heating are to be avoided. Distance from heating sources should be at least 1 meter.
- Light
Belts should be protected from light, especially direct sunlight and artificial light with high ultraviolet rays (neon light).
- Ozone
Equipments generating ozone, like high voltage electrical machines or fluorescent light sources, should not be installed in the storage.
Also combustion gases and vapours, that can cause ozone, should be avoided.
- Chemicals
Flammable materials, lubricants, acids and any other aggressive material should not be kept in the storage. Belts elastomers may be affected or even irreparably damaged by such agents.

CLEANING

Never clean V-belts. If you need, for any reason, to clean belts use a dry towel or one soaked with a glycerine/alcohol mixture in the ratio 1:10. Other solvents such as petrol or benzene must not be used.
Sharp-edged objects must not be used for cleaning V-belts.

To ensure a long service life and high performances, it is important to design correctly the application and to take care of correct installation, maintenance and storage of the belt.
A drive must be designed in such a way to make proper provision for both installation and tensioning of the V-belts. For this purpose a take-up device is necessary; a slide adjuster on the motor is recommended to simplify installation and permit optimum tensioning.
Table 5 (see belt family pages) provides minimum variation of center distance permitted for installation and tensioning of the belts.

x = Take up allowance
y = Installation allowance
I = Center distance

Furthermore, the following rules must always be observed:

1) check the alignment of the drive pulleys;
2) make sure that the flanks of the grooves are clean;
3) adjust the tensioner to stretch the belts sufficiently;
4) check the tension (see following section);
5) check correct diameter for tensioning pulley;
6) protect belt from oil and other chemicals;
7) when installing belts, slack off tensioner and avoid using tools or implements which may damage the belts.

Pulleys with large diameters increase belt life. They must be statically balanced up to the speed of 30 m/s and dynamically balanced over this value.

TENSIONING SYSTEM

The satisfactory performance of a transmission equipped with V-belts depends on the correct fitting tension.
It is therefore necessary to proceed in the following way, using the slide adjuster:

Belt tension control by deflection method

The approximate relation among deflection force, belt deflection and belt tension is given by:

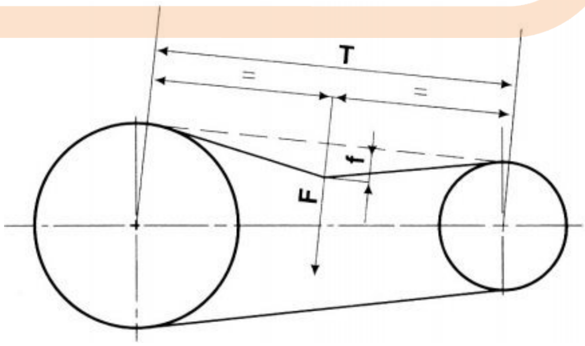
$$T_s \simeq \frac{f \bullet t}{4 \bullet f}$$

Imposing a belt deflection

$$f = \frac{t}{64}$$

the deflection force should be in the range

$$F_{min} \simeq F' = \frac{T_s}{16} \qquad F_{max} \simeq F'' = \frac{1{,}5 \bullet T_s}{16}$$



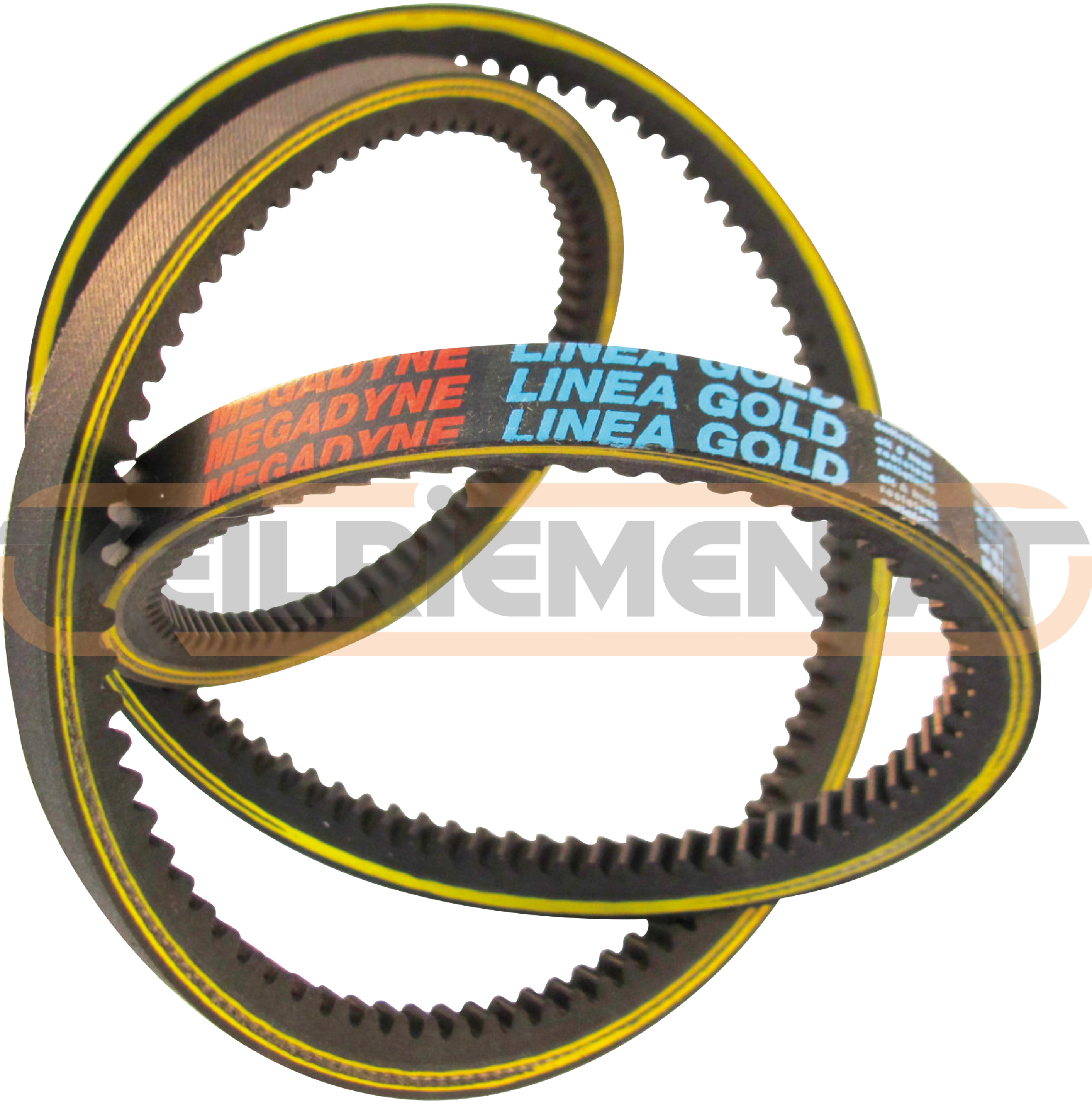
where:

Symbol	Unit	Definition
F	N	perpendicular deflection force
f	mm	belt deflection
t	mm	free span length
T_s	N/strand	static belt tension (see page 9)

Belt tension control by vibration method

Belt vibration frequency: $F^2_r = \frac{T_s}{4 \bullet m \bullet t^2}$

Symbol	Unit	Definition
F_r	Hz	natural frequency of belt
m	kg/m	specific belt mass
t	m	free span length
T_s	N/strand	static belt tension (see page 9)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BELT CHARACTERISTICS

section	AX	BX	CX
a (mm)	13	17	22
s (mm)	8	11	14
pitch length - internal length = Δi (mm)	33	43	62
external length - pitch length = Δe (mm)	17	26	26
weigth (gr/m)	114	162	297
min. pulley diam. (mm)	63	90	140
working temperature	-40°C / +110°C		
relevant standards	RMA/MPTA IP20 - DIN 2215		
relevant antistatic standard	ISO 1813		
materials	EPDM compound - polyester cord		

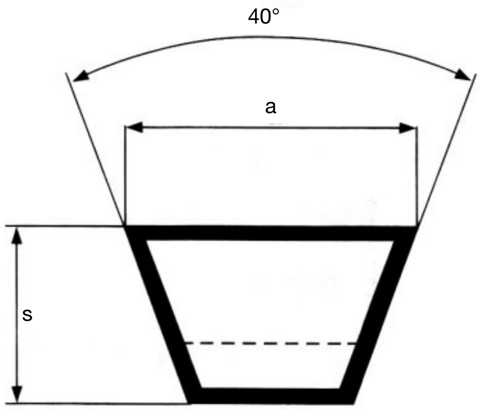
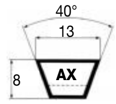


TABLE 3 - CORRECTION FACTOR C_L according to type and length of the belt

	9½	16	22	24	28	32	35	48	53	75	81	90	128
AX		0,73	0,79	0,80	0,83	0,85	0,87	0,93	0,95	1,03	1,05	1,07	1,16
BX		0,98	0,73	0,75	0,77	0,80	0,81	0,87	0,89	0,96		1,00	1,08
CX						0,72	0,73	0,79	0,80	0,87	0,88	0,90	0,97

TABLE 5 - INSTALLATION AND TAKE UP ALLOWANCE

L (mm)			Y (mm)			X (mm)
			AX	BX	CX	
500	/	1000	19	25	-	25
1001	/	1500	19	25	38	38
1501	/	2500	19	32	38	51
2501	/	3000	25	32	38	63
3001	/	3500	25	38	38	75



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AX SECTION

Code	External length LE (mm)	Code	External length LE (mm)	Code	External length LE (mm)	Code	External length LE (mm)	Code	External length LE (mm)	Code	External length LE (mm)	Code	External length LE (mm)
AX21	585	AX35	950	AX49	1300	AX63	1655	AX77	2010	AX91	2360	AX128	3310
AX22	610	AX36	965	AX50	1325	AX64	1680	AX78	2030	AX92	2390	AX136	3510
AX23	635	AX37	1000	AX51	1350	AX65	1710	AX79	2060	AX93	2420	AX144	3710
AX24	665	AX38	1020	AX52	1375	AX66	1730	AX80	2080	AX94	2440	AX158	4070
AX25	690	AX39	1045	AX53	1400	AX67	1760	AX81	2120	AX95	2470	AX173	4450
AX26	710	AX40	1075	AX54	1425	AX68	1790	AX82	2140	AX96	2500	AX180	4620
AX27	750	AX41	1095	AX55	1450	AX69	1810	AX83	2160	AX97	2520		
AX28	765	AX42	1120	AX56	1475	AX70	1830	AX84	2190	AX98	2540		
AX29	800	AX43	1150	AX57	1500	AX71	1865	AX85	2220	AX100	2600		
AX30	815	AX44	1170	AX58	1525	AX72	1890	AX86	2240	AX103	2670		
AX31	850	AX45	1195	AX59	1550	AX73	1905	AX87	2260	AX105	2730		
AX32	865	AX46	1230	AX60	1585	AX74	1935	AX88	2290	AX110	2850		
AX33	900	AX47	1245	AX61	1600	AX75	1965	AX89	2310	AX112	2910		
AX34	915	AX48	1270	AX62	1630	AX76	1985	AX90	2350	AX120	3110		

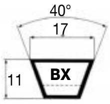
TABLE 4 - P_b (kW) referred to Ø (mm)

RPM / Ø	63	67	71	80	90	100	112	125	140	160	180	200
100	0,16	0,18	0,20	0,24	0,28	0,32	0,37	0,43	0,49	0,57	0,64	0,72
200	0,28	0,31	0,34	0,41	0,49	0,57	0,66	0,76	0,87	1,01	1,15	1,29
500	0,53	0,61	0,68	0,83	1,00	1,17	1,37	1,58	1,82	2,13	2,43	2,73
700	0,67	0,76	0,86	1,06	1,29	1,51	1,77	2,05	2,36	2,77	3,17	3,55
900	0,78	0,90	1,01	1,27	1,55	1,82	2,14	2,48	2,86	3,36	3,84	4,31
1.000	0,83	0,96	1,08	1,36	1,67	1,96	2,31	2,68	3,10	3,64	4,16	4,67
1.400	1,00	1,17	1,33	1,70	2,09	2,48	2,94	3,42	3,96	4,65	5,32	5,97
1.500	1,03	1,21	1,39	1,77	2,19	2,60	3,08	3,59	4,15	4,88	5,59	6,27
1.700	1,10	1,29	1,49	1,91	2,38	2,83	3,35	3,91	4,53	5,33	6,09	6,83
1.800	1,13	1,33	1,53	1,98	2,46	2,93	3,48	4,06	4,71	5,54	6,33	7,09
2.500	1,27	1,54	1,80	2,37	2,99	3,59	4,29	5,01	5,81	6,82	7,77	8,66
2.900	1,32	1,62	1,91	2,55	3,24	3,90	4,66	5,46	6,33	7,42	8,42	9,33*
3.000	1,33	1,63	1,93	2,59	3,29	3,97	4,75	5,56	6,45	7,55	8,56	9,47*
3.500	1,35	1,69	2,02	2,75	3,53	4,28	5,14	6,01	6,96	8,11	9,13*	
3.600	1,35	1,70	2,04	2,78	3,58	4,34	5,20	6,09	7,04	8,20*	9,22*	
4.000	1,34	1,71	2,08	2,88	3,72	4,53	5,44	6,36	7,34	8,50*		
4.500	1,30	1,71	2,10	2,96	3,86	4,71	5,66	6,61	7,60*			
5.000	1,24	1,67	2,09	3,00	3,94	4,83	5,81	6,76*				

P_d (kW) referred to i

RPM / i	1,00/1,01	1,02/1,05	1,06/1,26	1,27/1,57	over 1,57
100	0,00	0,00	0,01	0,02	0,02
200	0,00	0,00	0,02	0,03	0,04
500	0,00	0,01	0,05	0,08	0,09
700	0,00	0,01	0,08	0,11	0,13
900	0,00	0,02	0,10	0,14	0,17
1.000	0,00	0,02	0,11	0,16	0,19
1.400	0,00	0,02	0,15	0,22	0,26
1.500	0,00	0,03	0,16	0,23	0,28
1.700	0,00	0,03	0,18	0,26	0,32
1.800	0,00	0,03	0,20	0,28	0,34
2.500	0,00	0,04	0,27	0,39	0,47
2.900	0,00	0,05	0,31	0,45	0,55
3.000	0,00	0,05	0,33	0,47	0,57
3.500	0,00	0,06	0,38	0,54	0,66
3.600	0,00	0,06	0,39	0,56	0,68
4.000	0,00	0,07	0,43	0,62	0,75
4.500	0,00	0,08	0,49	0,70	0,85
5.000	0,00	0,08	0,54	0,78	0,94

* Belt speed is greater than 30 m/s then is necessary to use dynamically balanced pulleys. A reduction in belt life can be expected. Suggested a smaller section.



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BX SECTION

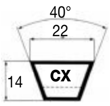
Code	External length LE (mm)	Code	External length LE (mm)	Code	External length LE (mm)	Code	External length LE (mm)	Code	External length LE (mm)	Code	External length LE (mm)	Code	External length LE (mm)
BX28	785	BX44	1190	BX58	1545	BX72	1900	BX86	2260	BX100	2620	BX133	3450
BX30	835	BX45	1215	BX59	1570	BX73	1930	BX87	2280	BX103	2690	BX136	3530
BX32	885	BX46	1250	BX60	1600	BX74	1955	BX88	2310	BX105	2740	BX140	3630
BX33	908	BX47	1265	BX61	1625	BX75	1980	BX89	2330	BX106	2770	BX144	3740
BX34	935	BX48	1295	BX62	1650	BX76	2000	BX90	2360	BX108	2820	BX148	3830
BX35	960	BX49	1320	BX63	1675	BX77	2030	BX91	2390	BX112	2920	BX150	3880
BX36	990	BX50	1345	BX64	1700	BX78	2050	BX92	2410	BX113	2940	BX154	3990
BX37	1009	BX51	1370	BX65	1725	BX79	2080	BX93	2440	BX115	2990	BX158	4090
BX38	1040	BX52	1400	BX66	1750	BX80	2110	BX94	2460	BX116	3020	BX162	4200
BX39	1060	BX53	1420	BX67	1775	BX81	2130	BX95	2500	BX120	3130	BX173	4480
BX40	1090	BX54	1445	BX68	1800	BX82	2160	BX96	2510	BX123	3200	BX180	4650
BX41	1120	BX55	1470	BX69	1825	BX83	2180	BX97	2540	BX124	3220	BX191	4930
BX42	1140	BX56	1500	BX70	1850	BX84	2210	BX98	2560	BX126	3270		
BX43	1165	BX57	1520	BX71	1875	BX85	2240	BX99	2590	BX128	3330		

TABLE 4 - P_b (kW) referred to Ø (mm)

RPM / Ø	90	100	112	125	140	160	180	200	224	250	265	280
100	0,37	0,43	0,50	0,57	0,66	0,77	0,88	0,99	1,12	1,26	1,34	1,41
200	0,65	0,75	0,88	1,02	1,18	1,38	1,59	1,79	2,02	2,27	2,41	2,55
500	1,32	1,57	1,85	2,15	2,49	2,94	3,38	3,81	4,31	4,85	5,15	5,45
700	1,70	2,02	2,40	2,80	3,25	3,84	4,42	4,98	5,63	6,33	6,72	7,10
900	2,05	2,44	2,90	3,39	3,95	4,67	5,36	6,04	6,83	7,65	8,12	8,57
1.000	2,20	2,63	3,14	3,67	4,27	5,05	5,81	6,54	7,38	8,27	8,76	9,24
1.400	2,77	3,33	3,99	4,68	5,45	6,44	7,39	8,30	9,32	10,36	10,92	11,46
1.500	2,90	3,49	4,18	4,91	5,72	6,76	7,74	8,68	9,73	10,79	11,36	11,90
1.700	3,14	3,79	4,54	5,34	6,22	7,34	8,39	9,38	10,47	11,54	12,11	12,63
1.800	3,25	3,93	4,71	5,54	6,45	7,60	8,69	9,69	10,80	11,86	12,41	12,91
2.500	3,89	4,74	5,71	6,70	7,77	9,07	10,21	11,19	12,14	12,85*	13,11*	
2.900	4,16	5,08	6,12	7,17	8,28	9,56	10,63	11,45*	12,09*			
3.000	4,22	5,15	6,21	7,27	8,37	9,65	10,67	11,44*				
3.500	4,42	5,42	6,52	7,59	8,66	9,78	10,54*					
3.600	4,45	5,46	6,56	7,63	8,68	9,76*	10,44*					
4.000	4,52	5,54	6,64	7,67	8,61	9,44*						
4.500	4,49	5,51	6,56	7,47*	8,19*							
5.000	4,34	5,31*	6,26*	6,97*								

P_d (kW) referred to i

RPM / i	1,00/1,01	1,02/1,05	1,06/1,26	1,27/1,57	over 1,57
100	0,00	0,00	0,02	0,03	0,04
200	0,00	0,01	0,05	0,07	0,08
500	0,00	0,02	0,12	0,17	0,20
700	0,00	0,03	0,16	0,24	0,29
900	0,00	0,03	0,21	0,30	0,37
1.000	0,00	0,04	0,23	0,34	0,41
1.400	0,00	0,05	0,33	0,47	0,57
1.500	0,00	0,06	0,35	0,51	0,61
1.700	0,00	0,06	0,40	0,57	0,69
1.800	0,00	0,07	0,42	0,61	0,73
2.500	0,00	0,09	0,59	0,84	1,02
2.900	0,00	0,11	0,68	0,98	1,18
3.000	0,00	0,11	0,70	1,01	1,22
3.500	0,00	0,13	0,82	1,18	1,43
3.600	0,00	0,13	0,85	1,21	1,47
4.000	0,00	0,15	0,94	1,35	1,63
4.500	0,00	0,17	1,06	1,52	1,84
5.000	0,00	0,18	1,17	1,69	2,04



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CX SECTION

Code	External length LE (mm)	Code	External length LE (mm)	Code	External length LE (mm)	Code	External length LE (mm)	Code	External length LE (mm)	Code	External length LE (mm)	Code	External length LE (mm)
CX51	1400	CX72	1935	CX85	2270	CX101	2670	CX112	2950	CX136	3550	CX158	4120
CX55	1500	CX75	2000	CX90	2390	CX105	2770	CX115	3030	CX144	3760	CX162	4220
CX60	1630	CX78	2090	CX96	2540	CX109	2870	CX120	3150	CX148	3860	CX173	4500
CX68	1830	CX81	2160	CX100	2650	CX111	2920	CX128	3350	CX150	3920	CX180	4680

TABLE 4 - P_b (kW) referred to d (mm)

RPM / Ø	140	160	180	200	224	250	280	315	335	400	500	560
100	0,95	1,14	1,32	1,51	1,73	1,96	2,23	2,54	2,71	3,27	4,11	4,60
200	1,70	2,05	2,39	2,73	3,14	3,57	4,06	4,63	4,94	5,96	7,48	8,37
300	2,37	2,87	3,36	3,85	4,43	5,04	5,74	6,53	6,99	8,42	10,55	11,78
400	2,99	3,64	4,27	4,89	5,63	6,41	7,30	8,32	8,89	10,70	13,37	14,91
500	3,58	4,36	5,12	5,88	6,77	7,71	8,78	10,00	10,68	12,84	15,98	17,77
600	4,13	5,04	5,94	6,81	7,85	8,94	10,18	11,58	12,37	14,84	18,38	20,35
700	4,66	5,70	6,71	7,71	8,88	10,12	11,51	13,08	13,96	16,70	20,55	22,65
900	5,64	6,92	8,17	9,38	10,80	12,30	13,96	15,83	16,86	19,99	24,19	26,31
1.000	6,10	7,49	8,85	10,17	11,70	13,31	15,09	17,07	18,15	21,42	25,63	27,64
1.400	7,76	9,56	11,29	12,95	14,85	16,80	18,90	21,13	22,30	25,50		
1.500	8,14	10,02	11,83	13,56	15,53	17,54	19,67	21,90	23,05	26,07		
1.700	8,83	10,88	12,83	14,68	16,75	18,83	20,97	23,13	24,17			
1.800	9,15	11,27	13,28	15,18	17,29	19,38	21,50	23,57	24,54			
2.000	9,74	12,00	14,11	16,07	18,22	20,28	22,29	24,09				
2.500	10,92	13,40	15,63	17,61	19,62	21,31						
2.900	11,54	14,07	16,25	18,05	19,67							
3.000	11,65	14,18	16,32	18,04								
3.500	11,89	14,27	16,07									

P_d (kW) referred to i

RPM / i	1,00/1,01	1,02/1,05	1,06/1,26	1,27/1,57	over 1,57
100	0,00	0,01	0,03	0,05	0,06
200	0,00	0,01	0,07	0,10	0,12
300	0,00	0,02	0,10	0,15	0,18
400	0,00	0,02	0,14	0,20	0,24
500	0,00	0,03	0,17	0,24	0,30
600	0,00	0,03	0,20	0,29	0,36
700	0,00	0,04	0,24	0,34	0,41
900	0,00	0,05	0,31	0,44	0,53
1.000	0,00	0,05	0,34	0,49	0,59
1.400	0,00	0,07	0,48	0,68	0,83
1.500	0,00	0,08	0,51	0,73	0,89
1.700	0,00	0,09	0,58	0,83	1,01
1.800	0,00	0,10	0,61	0,88	1,07
2.000	0,00	0,11	0,68	0,98	1,18
2.500	0,00	0,13	0,85	1,22	1,48
2.900	0,00	0,15	0,99	1,42	1,72
3.000	0,00	0,16	1,02	1,47	1,78
3.500	0,00	0,19	1,19	1,71	2,07

* Belt speed is greater than 30 m/s then is necessary to use dynamically balanced pulleys. A reduction in belt life can be expected. Suggested a smaller section.

DATA SHEET FOR CALCULATION

CUSTOMER DATA

Date ____/_____/_____

Company Name ____
Address ________________________________ Zip Code ______________
City ____________________ State ___________ Country ______________
Customer Name/Surname ____
Office____________________ Tel. ____________ Fax _________________
e-mail ____

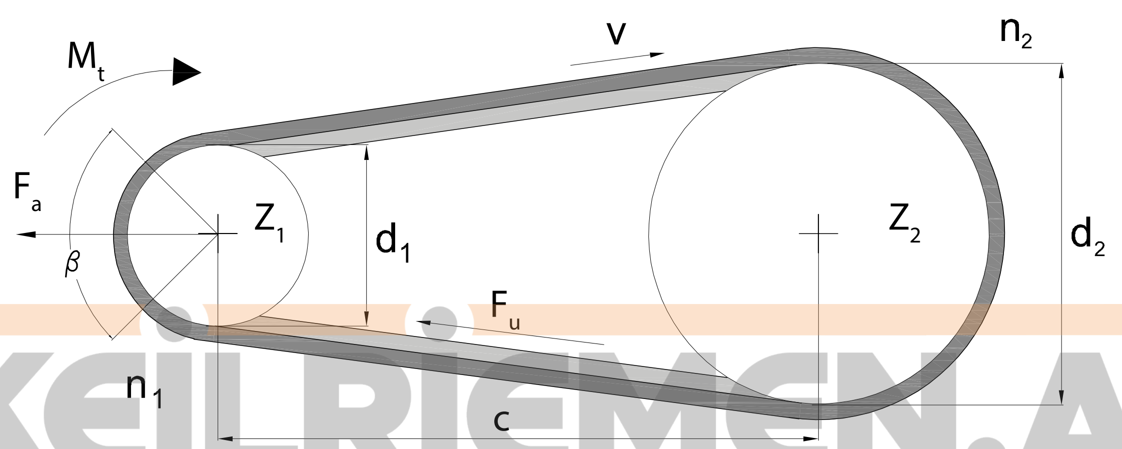
Application field _________________________________ New Existing*

Volume: ______________________________________

*Please enclose to this request all the details of the existing application (competitor's belt, current data, etc..)

POWER TRANSMISSION

TRANSMISSION LAYOUT



If layout is different please sketch it below

DRIVE INFORMATION

MOTOR:

☐ AC ☐ DC ☐ Soft Start ☐ Inverter

Power: ______________________________
Speed: ______________________________
Torque: ______________________________
Acceleration: _________________________
Working time: ☐ < 8h ☐ From 8h up to 16h ☐ >16h

APPLICATION:

Driver pulley diameter: ___________________
Driven pulley diameter: ___________________
Center distance: _________________________
Minimum safety factor required: ____________
Are there any size limitation? ☐ Yes ☐ No
(if yes please indicate):
diameter (min. and/or max.): _______________
width (min. and/or max.): _________________
center distance: (min. and/or max.) __________

NOTES