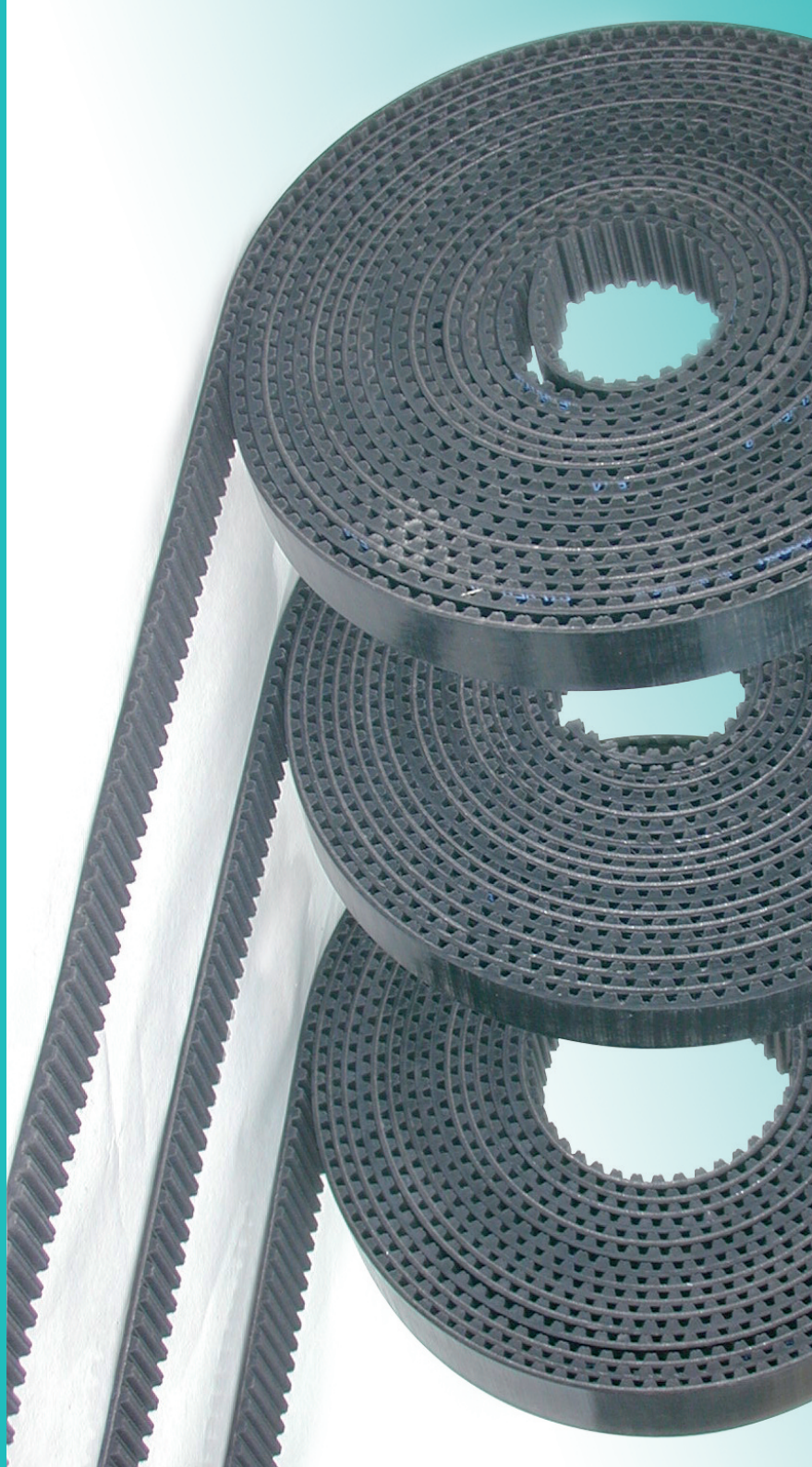
MEGARUBBER

Rubber open-end timing belts

MEGADYNE



MEGARUBBER

rubber open-end timing belts

ISO 9001:2000 - ISO 14001:2004

MEGADYNE RUBBER S.A.

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MEGARUBBER

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INTRODUCTION TO OPEN END BELTS

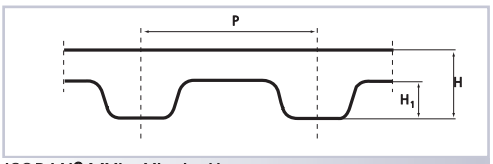
MEGADYNE ***"OPEN END BELTS"*** are rubber based timing belts manufactured with high quality materials and state of the art production process. As a result of this MEGADYNE offers belts which have been designed to respond the high demands of today's industrial market.

MEGADYNE ***"OPEN END BELTS"*** are specially suitable for reversing drives and applications where rotational movements need to be transformed into linear motions and high positioning accuracy is required.

MEGADYNE *"OPEN END BELTS"* are a great solution when substituting expensive conventional linear systems . Noise level improvement will be obtained as well as economical benefits due to the reduction of the initial investment and the maintenance costs.

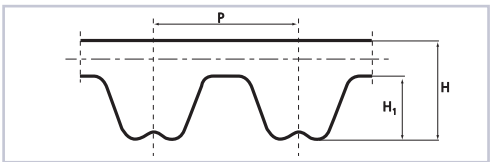
Taking into account the advantages and the available product range, these belts can be considered as a solution for a very wide field of applications in industrial equipments.

STANDARD RANGE



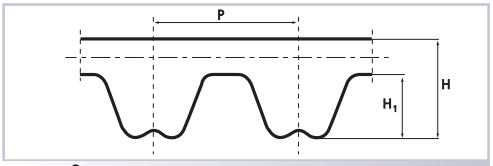
ISORAN® MXL - XL - L - H

MXL	XL	L	H
Std. width (inches)	Std. width (inches)	Std. width (inches)	Std. width (inches)
0.25	0.25	0.50	0.50
0.31	0.31	0.75	0.75
0.37	0.37	1.00	1.00
			1.50
			2.00
			3.00
P 2.032	P 5.08	P 9.525	P 12.7
H 1.14	H 2.4	H 3.6	H 4.4
H_1 0.51	H_1 1.27	H_1 1.91	H_1 2.29

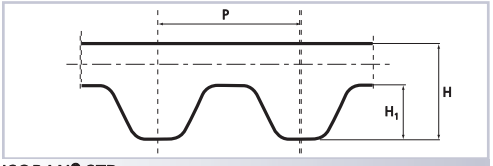


ISORAN® RPP

RPP3	RPP5	RPP8
Std. width (inches)	Std. width (inches)	Std. width (inches)
9	9	10
12	12	15
15	15	20
	20	25
	25	30
	30	50
		85
P 3	P 5	P 8
H 2.4	H 3.8	H 5.4
H_1 1.15	H_1 2	H_1 3.2



ISORAN® RPP SILVER



ISORAN® STD

SLV5	SLV8	STD8 M
Std. width (inches)	Std. width (inches)	Std. width (inches)
15	10	10
25	15	20
30	20	30
	30	50
	50	85
	85	
P 5	P 8	P 8
H 3.8	H 5.4	H 5.3
H_1 2	H_1 3.2	H_1 3.05

CLASSIFICATIONS

MEGADYNE "OPEN END BELTS" are specially designed for reverse drives with long centre distance and for drives where rotation has to be translated into translatory movements.

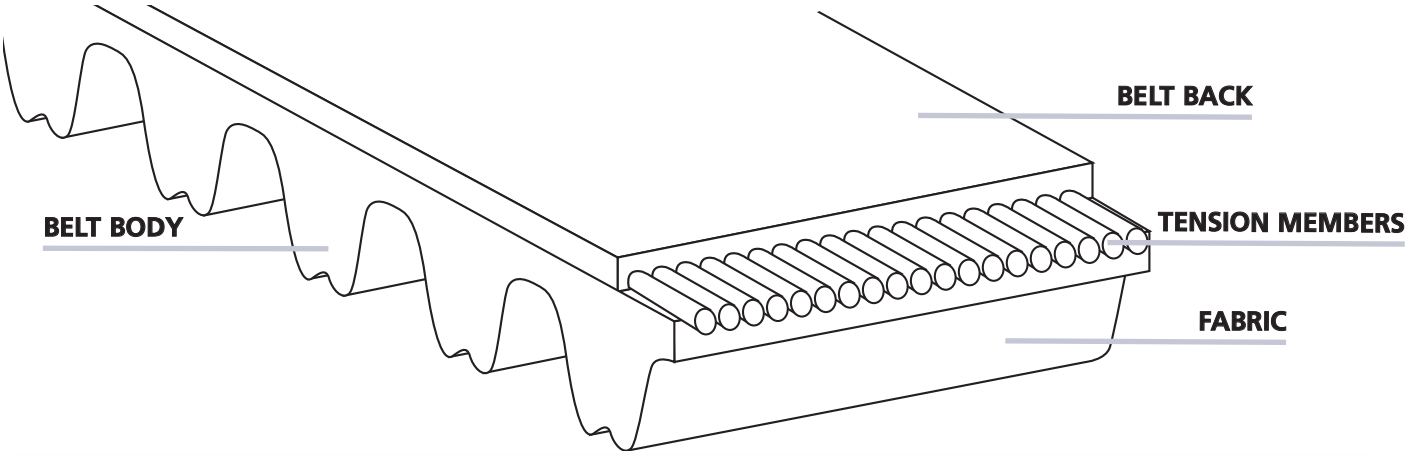
The combination of different tooth profiles, belt widths and performance classes gives to this type of belt a very wide coverage of its use. Just a view examples of typical applications can be:

- Automatic door opening systems for garages
- Automatic sliding door systems
- X-Y tables on tooling machines
- Level control on elevator systems
- Fitness machines
- Printers
- Linear positioning systems

The advantages of MEGADYNE "OPEN END BELTS" are:

- High positioning accuracy on reverse drives
- Covers wide range of applications
- Low noise level due to vibration absorbing characteristic of rubber
- Low operation costs due mantenance free and long lasting service life
- Compact and light drives are feasible due to high specific belt performance

BELT CONSTRUCTION



BELT BACK. The back side cushion protects the tensile member and permits due to its elasticity the use of backside idlers.
TENSION MEMBERS. Fiberglass tensile member of the latest technology grants the longitudinal rigidity and resistance of the belt.
BELT BODY. The belt body is made of special polychloroprene-based rubber compound. These compounds guarantee highest tooth share resistance.
FABRIC. Hard wearing nylon fabric is bonded to the tooth surface to improve torque carrying capacity. In addition a special graphite impregnation process confers self lubricating action and increases drive efficiency.

MECHANICAL AND CHEMICAL CHARACTERISTICS

- Constant dimensions
- Noiseless
- Free maintenance
- High flexibility with fiberglass cords
- Linear speeds up to 70 m/s
- Low pretension
- Constant length
- High abrasion resistance
- Standard working temperature -30°C / +80°C
- High resistance to water

BODY

MEGADYNE "OPEN END BELTS" are manufactured with polychoroprene compound. Special compounds (different hardnesses, special properties) are available on request. Here under some rubber characteristics:

	BELT RESISTANCE
	STANDARD
Resistance to:	
Mineral Oils	LOW
Water	MEDIUM
Acids/ Alkalis	NONE
Solvents	NONE
Oils	LOW
Greases	MEDIUM
Fuels	NONE
Environment Agents	MEDIUM
Temperature:	
Min. T (°C)	-30
Max T (°C)	80
Max peak T (°C)	95

IDENTIFICATION CODE

Using the information in the table below, it is possible to identify the correct belt for every application.
The code is composed of letters and numbers as the following example:

FAMILY	+	WIDTH
MXL		025
RPP5M		20
RPP8M		85

FAMILY. This code composed by letters and numbers indicates the selection profile
WIDTH. This number indicates the width of requested belt. The value is in mm for a belt with a pitch in mm, and in inch for a belt with a pitch in inches.

TRASMISSION CALCULATION PROCEDURE

CALCULATION OF THE PERIPHERAL FORCE OF THE TIMING BELT

HORIZONTAL CONVEYING DRIVES $F_u = m_c \cdot a + m_c \cdot g \cdot \mu$

VERTICAL CONVEYING DRIVES $F_u = m_c \cdot (a + g) + F_{RM}$

OMEGA LINEAR DRIVES $F_u = m_c \cdot a + m_c \cdot g \cdot \mu$

ESTIMATE THE BELT WIDTH AND PROFILE

With the result of Fu select according DIAGRAM page 9 "Belt width selection" the belt type profile and approximate belt width.

DEFINITION OF PULLEYS

Choose closest standard pulley according to the data sheet of each belt type.

$$z = \frac{\pi \cdot dp1}{Pitch} \qquad n = \frac{6000 \cdot V}{Pitch \cdot Z}$$

TOOTH RESISTANCE

TRASMITTABLE FORCE FOR TOOTH UNIT WIDTH (see table on belt data pages).

DETERMINATION OF THE BELT WIDTH

The belt width should be calculated using the followinf formula:

$$F_{width} = \frac{F_u \cdot F_s}{F_{tspec} \cdot Z_m}$$

From the calculated width factor (F_{width}) choose next higher width factor from belt data page, and define the belt width.

F_{width} : Width factor
F_u: From above calculation
F_s: Service factors (see table page 9)
F_{tspec} : Trasmittable force for tooth unit width (see table on belt data pages)
Z_m: Number of teeth in mesh on drive sprocket (if calculated $Z_m >= 12$ for an open-end application use $Z_m = 12$)

CALCULATION OF THE BELT TENSION

HORIZONTAL CONVEYING DRIVES $T_s = 0{,}7 \cdot F_u$

VERTICAL CONVEYING DRIVES $T_s = 0{,}9 \cdot F_u$

OMEGA LINEAR DRIVES $T_s = 1{,}1 \cdot F_u$

SAFETY CHECK

In order to guarantee the correct function of the drive check the safety factor against break as following:

$$\sigma_{BL} = \frac{BL}{F_u + T_s}$$

Type	Low security	Mid. security	High security
RPP belts	10	12	14
SLV belts	8	10	12

BL : Breaking load (see table on belt data pages)
F_u: From above calculation
T_s: Tension, from above calculation
σ_{BL} : Safety real value
$\sigma_{BL} \geq$: See table

SERVICE FACTORS

$$F_S = \frac{F_1 + F_3 + F_4}{F_2}$$

F_S: Service Factor
F_1: Load Factor
F_2: Teeth in mesh Factor
F_3: Ratio Factor
F_4: Reverse Bending Factor

LOAD FACTOR (F_1)

Uniform load	1.0		
	Daily service in hours		
	3-8 hours	**8-16 hours**	**16-24 hours**
With low peak load	1,2	1,4	1,6
With high peak load	1,5	1,7	1,9
With very high peak load	1,8	2,0	2,2

TEETH IN MESH FACTOR (F_2)

T.I.M.	F_2
>6	1,0
5	0,8
4	0,6
3	0,4

RATIO FACTOR (F_3)

Applies only to speed-up ratios.

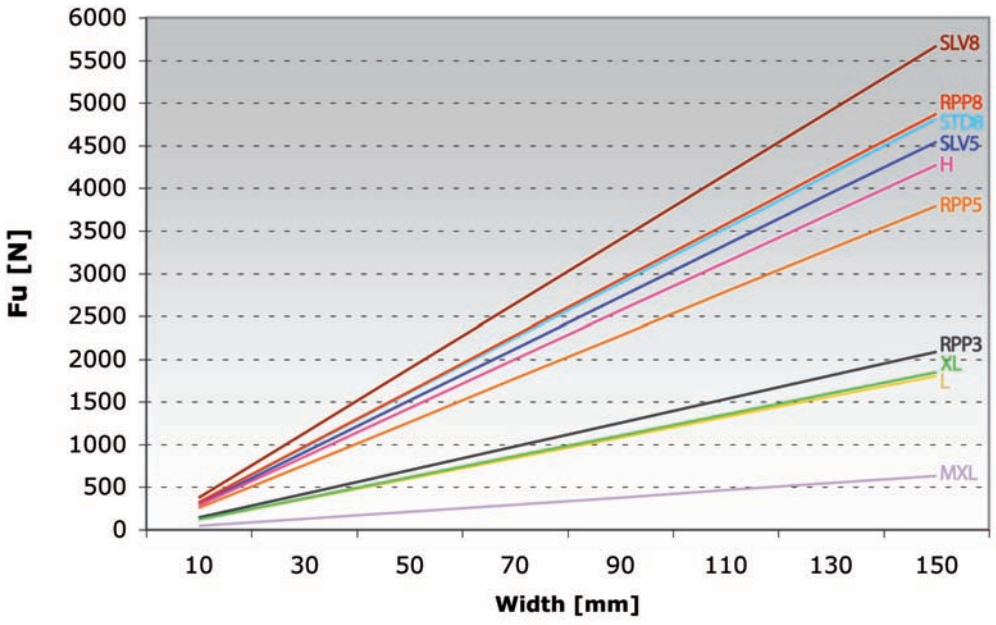
Speed ratios	F_3
1 / 1,24	-
1,25 / 1,74	0,10
1,75 / 2,49	0,20
2,50 / 3,49	0,30
3,50 and above	0,40

REVERSE BENDING FACTOR (F_4)

With reverse by back idlers.

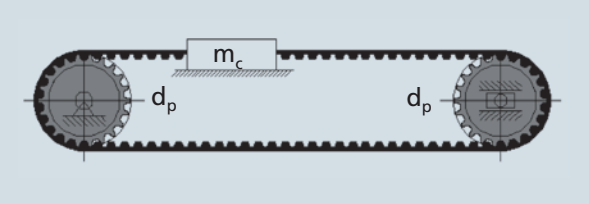
F_4
0,2

BELT WIDTH SELECTION



DRIVE CALCULATION PROCEDURE FOR HORIZONTAL CONVEYING DRIVES

DRIVE SKETCH



DRIVE DATA

Type of application	Automatic door system			
Type of load	Low fluctuation load			
Desired pulley pitch diameter	d_p	=	38.2	[mm]
Centre distance	l	=	3	[m]
Mass of carriage	m	=	100	[kg]
Coefficient of friction	μ	=	0.3	
Lineal velocity	v	=	1.5	[m/s]
Acceleration	a	=	1.5	[m/s^2]
Deceleration	a_b	=	1.5	[m/s^2]
Gravitational acceleration	g	=	9.8	[m/s^2]

STEP 1: SELECT TOOTH PROFILE

COMMENT	EXPLANATION	RESULT
Step 1a. Calculate the peripheral force.	$F_u = m_c \cdot a + m_c \cdot g \cdot \mu$ m_c = 100 [kg] a = 1,5 [m/s^2] g = 9,8 [m/s^2] μ = 0,3	F_u = 444 [N]
Step 1b. Choose belt type and estimate belt width.	With the result of F_u, select according DIAGRAM page 9 "belt width selection" the belt type profile and the approximate belt width.	First approach RPP 5M 15 Belt type Belt pitch Belt width

STEP 2: DEFINITION OF PULLEYS

COMMENT	EXPLANATION	RESULT
Step 2a. Define the number of teeth on the driver pulley	If pitch diameter is known: $z = \frac{(\pi \cdot d_{p1})}{Pitch}$ If the linear speed & rpm are known: $n = \frac{60000 \cdot v}{Pitch \cdot z}$ d_{p1} = 19,09 [mm] Pitch = 5	Calculated number of teeth: z = 24 Choose closest standard pulley according to the datasheet of each belt type. Standard z = 24 d_{p1} = 38.2 [mm] pulley width = 20.5 [mm] n = 750 [rpm] If known rpm we can choose the correct Ft, spec in belt data (see table on belt data pages).

STEP 3: CALCULATE THE WIDTH FACTOR

COMMENT	EXPLANATION	RESULT
Step 3a. Calculate the width factor. f_{width}	$$f_{width} = \frac{F_u \cdot f_s}{Ft_{spec} \cdot Zm}$$ F_u = 444 [N] f_s = 1,4 (see table page 9 "Service factor") Ft_{spec} = 24,32 [N/cm/tooth] Zm = 12	$f_{width\ calc.}$ = 2,13 Choose next higher width factor to define belt from belt data (see page 28) Standard f_{width} = 2,11 w = 20 [mm]

STEP 4: SAFETY CHECK

COMMENT	EXPLANATION	RESULT
Step 4a. Check the safety of belt break.	In order to guarantee the correct function of the drive check the safety factor against break as following: $$\sigma_{BL} \leq \frac{BL}{F_u + T_s}$$ And compare it with the required values given in chart at the corresponding belt type B.L = 7896 [N] F_u = 444 [N] (from STEP 6a) T_s = 310,8 [N]	<table><tr><th>Type of conveying</th><th>A Low security</th><th>B Mid. security</th><th>C High security</th></tr><tr><td>Horizontal RPP belts</td><td>10</td><td>12</td><td>14</td></tr><tr><td>Vertical SLV belts</td><td>8</td><td>10</td><td>12</td></tr></table> 10,45 > 10

STEP 5: FINAL SELECTION

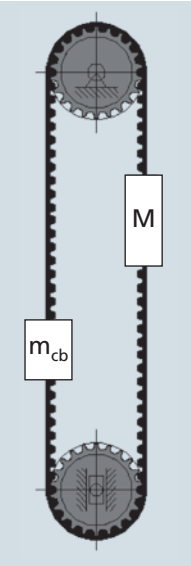
COMMENT	EXPLANATION	RESULT
	After confirming the belt function with the safety factor, the type and width of the belt are defined.	RPP 5M 20 Has been confirmed

STEP 6: BELT ASSEMBLING PARAMETERS

COMMENT	EXPLANATION	RESULT
Step 6a. Calculate the belt tension.	For standard drives: $T_s = 0,7 \cdot F_u$ F_t = 444 [N]	T_s = 310,8 [N]
Step 6b. Control of the belt elongation.	See table on belt data pages.	Δl_{TS} = 0,0015 [m] It is recommendable to work with a belt elongation of approximate 2-4mm.

DRIVE CALCULATION PROCEDURE FOR VERTICAL CONVEYING DRIVES

DRIVE SKETCH



DRIVE DATA

Mass (Lift + Load)	M	=	200	[kg]
Counterbalance	m_{cb}	=	150	[kg]
Aprox. diameter	d_{p1}	=	100	[mm]
Centre distance	l	=	7	[m]
Lineal velocity	v	=	1.5	[m/s]
Acceleration	a	=	1	[m/s2]
Deceleration	b	=	1	[m/s2]
Acceleration of gravity	g	=	9.8	[m/s2]
Friction force of Mass	F_{RM}	=	150	[N]
Friction force of mcb	F_{Rmc}	=	100	[N]

STEP 1: SELECT TOOTH PROFILE

COMMENT	EXPLANATION	RESULT
Step 1a. Calculate the traction load "Ft.adm" with and without load.	If there is not counterbalance choose $m_{cb} = 0$. Load rising: **ACCELERATION** $F_t = M \cdot (g + a) - m_{cb} \cdot (g - a) + F_R$ **DECELERATION** $F_t = M \cdot (g - b) - m_{cb} \cdot (g + b) + F_R$ Load descending: **ACCELERATION** $F_t = M \cdot (g - a) - m_{cb} \cdot (g + a) + F_R$ **DECELERATION** $F_t = M \cdot (g + b) - m_{cb} \cdot (g - b) + F_R$ $F_R = F_{RM} + F_{Rmcb}$ M = 200 [kg] m_{cb} = 100 [kg] a = 1 [m/s²] b = 1 [m/s²] F_{RM} = 150 [N] F_{Rmc} = 100 [N]	F_t = 1090 [N] M = 200 [kg] m_{cb} = 150 [kg] UP: Acceleration Ft = 1090 [N]; Deceleration Ft = 390 [N] DOWN: Acceleration Ft = -110 [N]; Deceleration Ft = 590 [N] Take the highest traction load as the reference for further procedure.
Step 1b. Calculate Fu for strand of M and for strand of mcb	Choose the max acceleration. Fu for M rising: $Fu_M = M \cdot (g + a) + F_{RM}$ Fu for mcb rising: $Fu_{mc} = m_{cb} \cdot (g - a) + F_{Rmc}$ M = 200 [kg] m_{cb} = 100 [kg] a = 1 [m/s²] F_{RM} = 150 [N] F_{Rmc} = 100 [N]	Fu_M = 2310 [N] Fu_{mc} = 1220 [N]
Step 1c. Choose belt cross section and estimate belt width.	With the result of F_u, select according DIAGRAM page 9 "belt width selection" the belt type profile and the approximate belt width.	First approach RPP 8M 75 Belt type Belt pitch Belt width

STEP 2: DEFINITION OF PULLEYS

COMMENT	EXPLANATION	RESULT
Step 2a. Calculate the number of teeth of pulley definition	If pitch diameter is known: $z = \frac{(\pi \cdot d_{p1})}{Pitch}$ If the linear speed & rpm are known: $n = \frac{60000 \cdot v}{Pitch \cdot z}$ d_{p1} = 100 [mm] Pitch = 5	Calculated number of teeth: z = 24 Choose closest standard pulley according to the datasheet of each belt type. Standard z = 40 d_{p1} = 101,86 [mm] pulley width = 50,5 [mm] n = 281,25 [rpm] If known rpm we can choose the correct Ft, spec in belt data (see table on belt data page 30).

STEP 3: CALCULATE THE WIDTH FACTOR

COMMENT	EXPLANATION	RESULT
Step 3a. Calculate the width factor. f_{width}	$f_{width} = \frac{F_u \cdot f_s}{Ft_{spec} \cdot Zm}$ F_u = 2310 [N] f_s = 1,6 (see table pag 9 "Service factor") Ft_{spec} = 32,44 [N/cm/tooth] Zm = 15	$f_{width\ calc.}$ = 7,59 (calculated) Choose next higher width factor to define belt from belt data Standard f_{width} = 10,74 w = 85 [mm]

STEP 4: SAFETY CHECK

COMMENT	EXPLANATION	RESULT
Step 4a. Check the safety factor.	In order to guarantee the correct function of the drive check the safety factor against break as following: $\sigma_{BL} \leq \frac{BL}{F_u + T_s}$ B.L = 45206 [N] F_u = 2310 [N] (from STEP 6a) T_s = 2079 [N]	**Type of conveying** / **A Low security** / **B Mid. security** / **C High security** Horizontal RPP belts: 10 / 12 / 14 Vertical SLV belts: 8 / 10 / 12 10,29 > 10

STEP 5: FINAL SELECTION

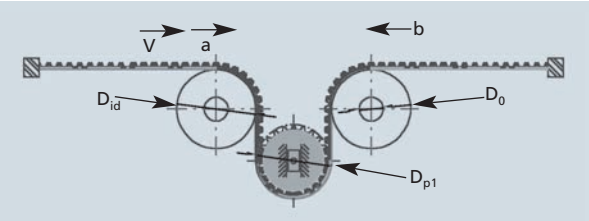
COMMENT	EXPLANATION	RESULT
	After confirming the belt function with the safety factor, the type and width of the belt are defined.	RPP 8M 85 Has been confirmed

STEP 6: BELT ASSEMBLING PARAMETERS

COMMENT	DATA FORMULA	RESULT
Step 6a. Calculate the belt tension.	For vertical conveying drives: $T_s = 0,9 \cdot F_u$ F_u = 2310 [N]	T_s = 2079 [N]
Step 6b. Control of the belt elongation.	See table on belt data pages.	Δl_{TS} = 0,0027 [m]

DRIVE CALCULATION PROCEDURE FOR OMEGA LINEAR DRIVES

DRIVE SKETCH



DRIVE DATA

Acceleration	a'	=	3	[m/s^2]
Speed	v	=	2	[m/s^2]
Pulley pitch diameter	d_{p1}	=	100	[mm]
Pitch belt length	L	=	8000	[mm]
Mass of carriage	m_c	=	35	[kg]
Coefficient of friction	μ	=	0.6	
Idler diameter	d_{id}	>	60	[mm]

STEP 1: SELECT TOOTH PROFILE

COMMENT	EXPLANATION	RESULT
Step 1a. Calculate the peripheral force.	$F_u = (m_c \cdot a) + (m_c \cdot g \cdot \mu)$ m_c = 35 [kg] a = 3 [m/s^2] g = 9,81 [m/s^2] μ = 0,6	F_u = 311 [N]
Step 1b. Choose the belt cross section and estimate belt width.	With the result of F_t, select according DIAGRAM page 9 "belt width selection" the belt type profile and the approximate belt width.	First approach RPP 5M 10 Belt type Belt pitch Belt width

STEP 2: DEFINITION OF PULLEYS

COMMENT	EXPLANATION	RESULT
Step 2a. Calculate the number of teeth of pulley definition	If pitch diameter is known: $z = \frac{(\pi \cdot d_{p1})}{Pitch}$ If the conveyed speed is known, use: $n = \frac{60000 \cdot v}{Pitch \cdot z}$ d_{p1} = 80 [mm]	Calculated number of teeth: z = 50,3 Choose closest standard pulley according to the datasheet of each belt type. Standard z = 60 d_{p1} = 95,49 [mm] pulley width = 15,5 [mm]

STEP 3: CALCULATE THE WIDTH FACTOR

COMMENT	EXPLANATION	RESULT
Step 3a. Calculate the width factor. f_{width}	$f_{width} = \frac{F_u \cdot f_s}{Ft_{spec} \cdot Zm}$ F_u = 311 [N] f_s = 1,2 (see table pag 9 "Service factor") Ft_{spec} = 24 [N/cm/tooth] (from RPP5M belt data pag 28) Zm = 6	$f_{width\ calc.}$ = 2,59 Choose next higher width factor to define belt from belt data Standard f_{width} = 3,73 w = 30 [mm]

STEP 4: SAFETY CHECK

COMMENT	EXPLANATION	RESULT
Step 4a. Check the safety of belt break.	In order to guarantee the correct function of the drive check the safety factor against break as following: $\sigma_{BL} \leq \frac{BL}{F_u + T_s}$ And compare it with the required values given in chart at the corresponding belt type BL = 11844 [N] F_u = 311 [N] (from STEP 6a) T_s = 342,1 [N]	<table><tr><th>Type of conveying</th><th>A Low security</th><th>B Mid. security</th><th>C High security</th></tr><tr><td>Omega drive RPP belts</td><td>10</td><td>12</td><td>14</td></tr><tr><td>Omega drive SLV belts</td><td>8</td><td>10</td><td>12</td></tr></table> 18,1 > 10

STEP 5: FINAL SELECTION

COMMENT	EXPLANATION	RESULT
	After confirming the belt function with the safety factor, the type and width of the belt are defined.	RPP 5M 85 Has been confirmed

STEP 6: BELT ASSEMBLING PARAMETERS

COMMENT	EXPLANATION	RESULT
Step 6a. Calculate the belt tension.	For standard drives: $T_s = 1,1 \cdot F_u$ F_t = 342,1 [N]	T_s = 342,1 [N]
Step 6b. Control of the belt elongation.	See table on belt data pages.	Δl_{TS} = 1,85 [m]

BELT INSTALLATION AND FEASIBILITY TABLE

PROCEDURE TO MEASURE

The procedure to measure the tension of the belt is to use a Belt Tension Gauging Equipement. This device consists of a small sensing head which is held across the belt to be measured. The belt is then tapped to induce the belt to vibrate at its natural frequency. The vibrations are detected and the frequency of vibration is then displayed on the measuring unit.

The relation between belt static tension (T_S) and frequency of vibration (f) may be calculated using the following formula:

$$f = \frac{1}{2t} \cdot \sqrt{\frac{T_s}{m}} \quad \text{or} \quad T_s = 4 \cdot m \cdot t^2 \cdot f^2 \quad (16)$$

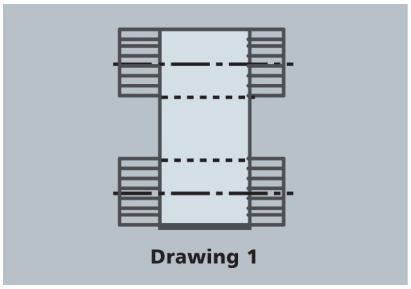
Where:	
T_S = Static tension (N)	f = Frequency of vibration in Hertz (Hz)
m = Belt mass per unit length (kg/m)	t = Free belt span length in meters (m)

BELT AND PULLEY ALIGNMENT

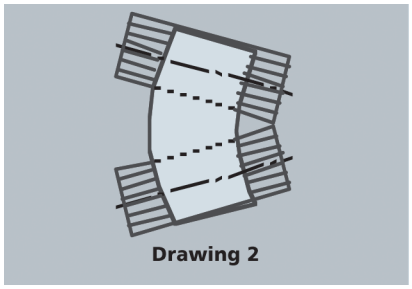
For a correct system functioning and to increase belt life, it is necessary a correct pulley installation: pulleys has to be parallel and aligned as shown in drawing 1 (correct configuration).

If pulleys are not parallel as in drawing 2, belt could fall during functioning and this can provoke damages to complete equipment.

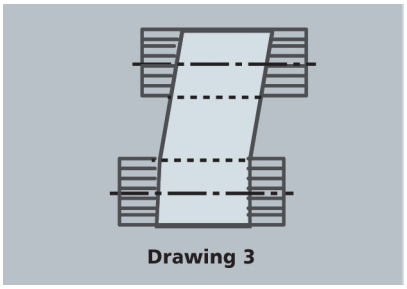
To grant a correct belt running, configuration according drawing 3 has to be avoided.



Drawing 1

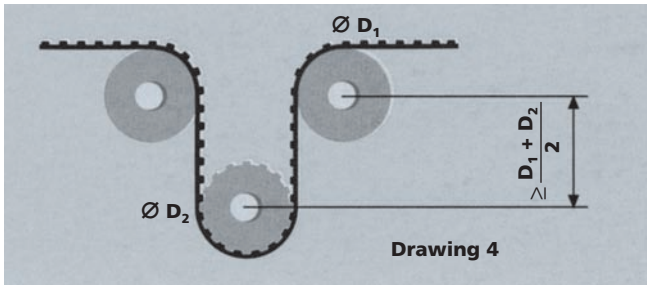


Drawing 2



Drawing 3

In omega application to grant good mesh between pulley and teeth and to respect belt flexibility avoiding excessive stress on cords, distance d (as drawing 4) has to be:



Drawing 4

FEASIBILITY TABLE

MEGADYNE manufactures a wide range of open-end belts. In the next table a general overview is shown of the present range of products and their main characteristics. For any special belt version which might not be included, please do not hesitate to contact our Application Engineering Team, or check the page 38 “Special Execution Feasibility”.

	TRAPEZOID PROFILE				PARABOLIC PROFILE					STANDARD PROFILE
	MXL	XL	L	H	RPP 3M	RPP 5M	RPP 8M	SLV 5	SLV 8	STD 8M
STANDARD *Standard*	S	S	S	P	S	S	P	P	P	P

P	Ex stock (Production process: Straight cut)
S	Ex stock (Production process: Spiral cut)

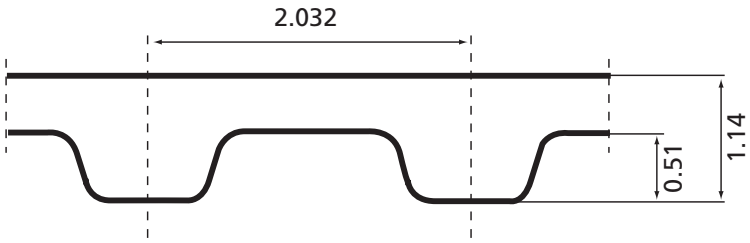
BELT FAILURES

	PROBLEMS	CAUSES	CORRECTION ACTION
EXESSIVE BELT WEAR	Unexpected wear along the complete tooth width.	Belt overload.	Use a wider belt. Use a belt of a higher performance class.
	Unexpected wear on one side of the tooth only.	Incorrect pulley execution. Incorrect pulley alignment.	Control pulley dimensions and replace if necessary. Control and adjust pulley alignment.
	Tooth bottom shows wear.	Excessive belt installation tension. Incorrect pulley execution.	Calculate and adjust the belt tension. Control pulley dimensions and replace if necessary.
	Tooth root shows signs of wear.	Incorrect diameter of pulley.	Control pulley dimensions and replace if necessary.
	The flanks of the belt show clear signs of wear.	Incorrect pulley execution.	Control pulley dimensions and replace if necessary.
		Misalignment or wrong setting of pulleys	Control pulley dimensions and replace if necessary.
		Oscillation of the axes and/or of the bearings	Correct the positioning of the pulleys and reinforce the bearings
		Flanks bent	Straighten flanks
	Damaged belt tensile member.	Diameter of pulley is below specified minimum.	Increase the diameter of the pulleys or use belts and pulleys of smaller pitch
		Excessive moisture	Eliminate the moisture
BELT DEMAGES	Torn tooth along the belt.	Too few teeth in mesh on the motor pulley.	Increase the number of teeth in mesh by using a bigger pulley. Use a belt of a higher performance class. Increase belt width.
		Belt overload.	Use a belt of a higher performance class or increase belt width.
		Incorrect pulley execution.	Control pulley dimensions and replace if necessary.
	Rupture of tensile member.	Belt overload.	Use a belt of a higher performance class. Increase belt width.
		Diameter of pulley is below specified minimum.	Increase the diameter of the pulleys
		Tooth jump due to missing belt installation tension.	Calculate and adjust the belt tension.
	Breaks or cracks in the back side of the belt.	Exposure to temperatures which are out of the admissible temperature range.	Protect the transmission from extreme temperature.
		Diameter of pulley is below specified minimum.	Increase the diameter of the pulleys
		Excessive exposure to UV radiation.	
	Softening of the top surface of the belt.	Operation with excessive amount of oil.	Protect the belt from oil.
	Apparent elongation of the belt.	Reduction of centre distance due to bearings not being firmly fixed	Restore the initial centre distance and strengthen the bearings
DRIVE FUNCTION PROBLEMS	Belt overriding the pulley flanks.	Faulty installation of the flanks.	Reinstall the flanks properly.
		Misalignment of pulleys.	Align pulleys.
	Excessive wear on the pulley teeth.	Excessive overloading.	Use a wider belt.
		Excessive belt installation tension.	Calculate and adjust the belt tension.
		Pulley material insufficient hard.	Harden the pulley surface.
	Drive excessively noisy.	Pulleys out of line.	Align pulleys.
		Excessive belt installation tension.	Calculate and adjust the belt tension.
		Incorrect pulley execution.	Control pulley dimensions and replace if necessary.

BELT CHARACTERISTICS

STANDARD WIDTHS (inch)	025	031	037
Weight (gr/m)	8,5	10,5	16

Standard compound: **Chloroprene 78±4 ShA**
Standard back cover: **none, grinded on the back**
Standard tooth cover: **nylon Fabric**
Standard cords: **glass**
Standard width tolerance: **± 0,4 mm**
Standard thickness: **± 0,25 mm**
Standard length tolerance: **± 0,8 mm/m**
Standard roll length: **50 mt ± 4 mt**

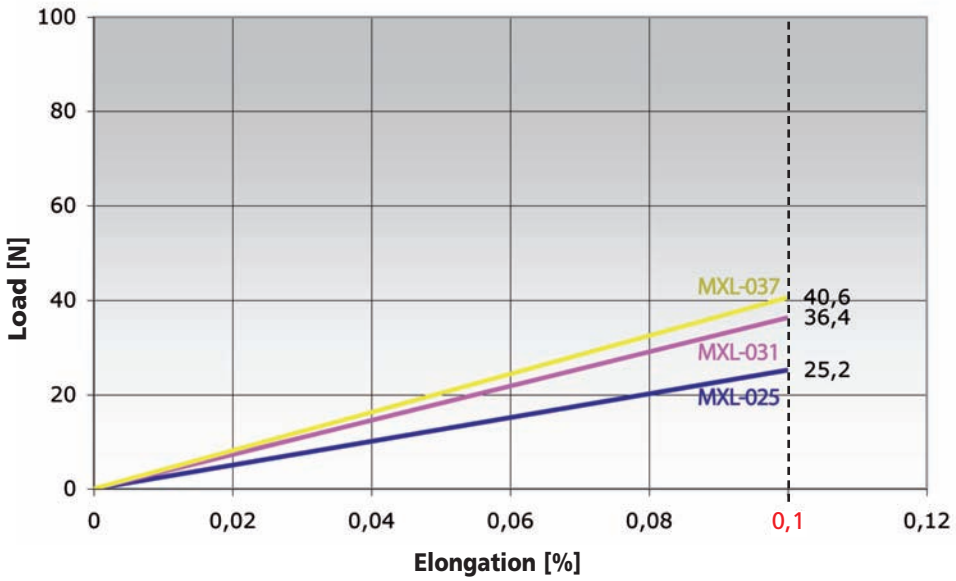


TRACTION RESISTANCE AND ELONGATION DATA

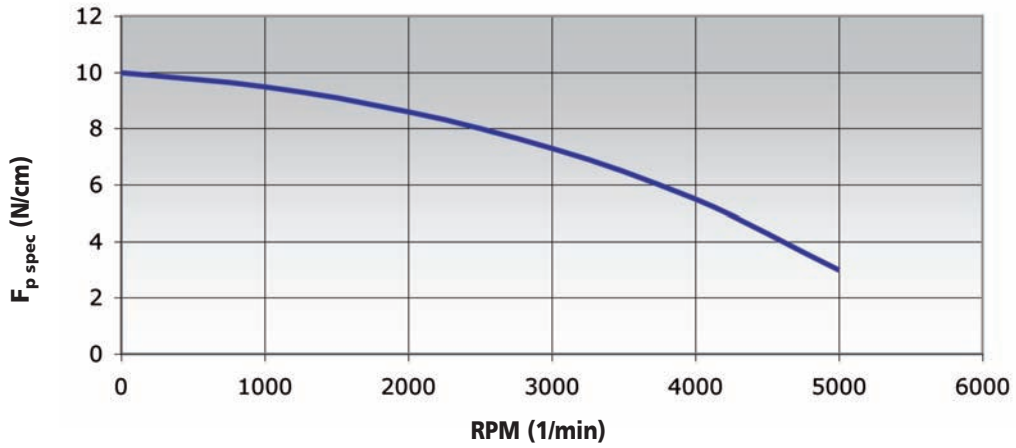
CALCULATION PARAMETERS

Belt width (inch)	Width Factor (W)	Breaking Load [N]
025	1	660
031	1,24	780
037	1,55	940

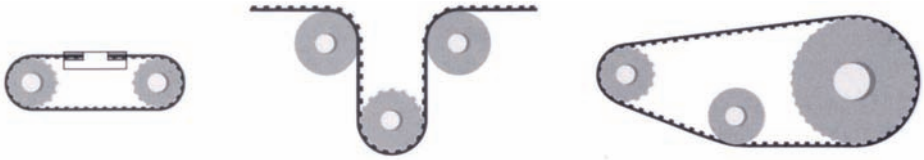
BELT ELONGATION



TOOTH RESISTANCE

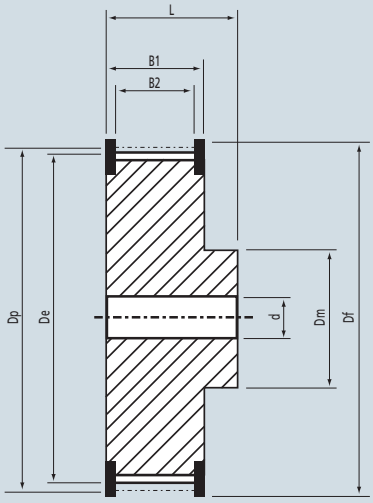


FLEXION RESISTANCE



	Z min	Z min	Idler min dia (mm)	Z min	Idler min dia (mm)
Glass cords	12	14	20	12	20

PULLEYS (for more details please see our pulleys catalogue)



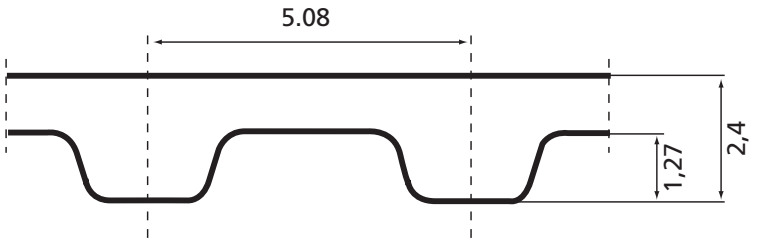
N° Teeth	Dp	De
12	7,76	7,25
13	8,41	7,90
14	9,06	8,55
15	9,70	9,19
16	10,35	9,84
17	11,00	10,49
18	11,64	11,13
19	12,29	11,78
20	12,94	12,43
21	13,58	13,07
22	14,23	13,72
24	15,52	15,01
26	16,81	16,30

N° Teeth	Dp	De
28	18,11	17,60
30	19,40	18,89
32	20,70	20,19
34	21,99	21,48
36	23,29	22,78
40	25,87	25,36
42	27,17	26,66
44	28,46	27,95
48	31,05	30,54
60	38,81	38,30
65	42,04	41,53
72	46,57	46,06

BELT CHARACTERISTICS

STANDARD WIDTHS (inch)	025	031	037
Weight (gr/m)	12,5	17,5	21

Standard compound: **Chloroprene 78±4 ShA**
Standard back cover: **none, grinded on the back**
Standard tooth cover: **nylon Fabric**
Standard cords: **glass**
Standard width tolerance: **- 0,8 / +0,4 mm**
Standard thickness: **± 0,25 mm**
Standard length tolerance: **± 0,8 mm/m**
Standard roll length: **50 mt ± 4 mt**

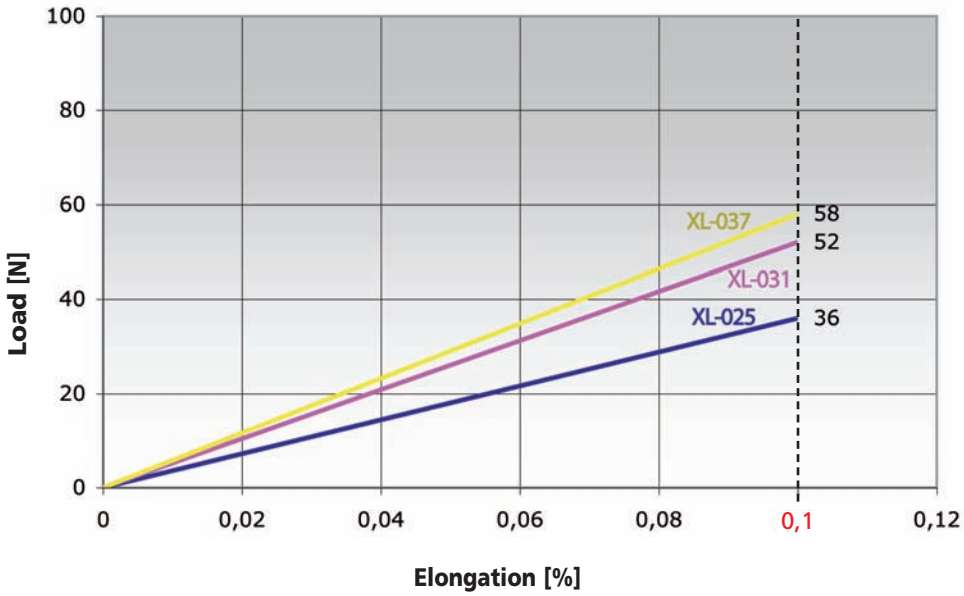


TRACTION RESISTANCE AND ELONGATION DATA

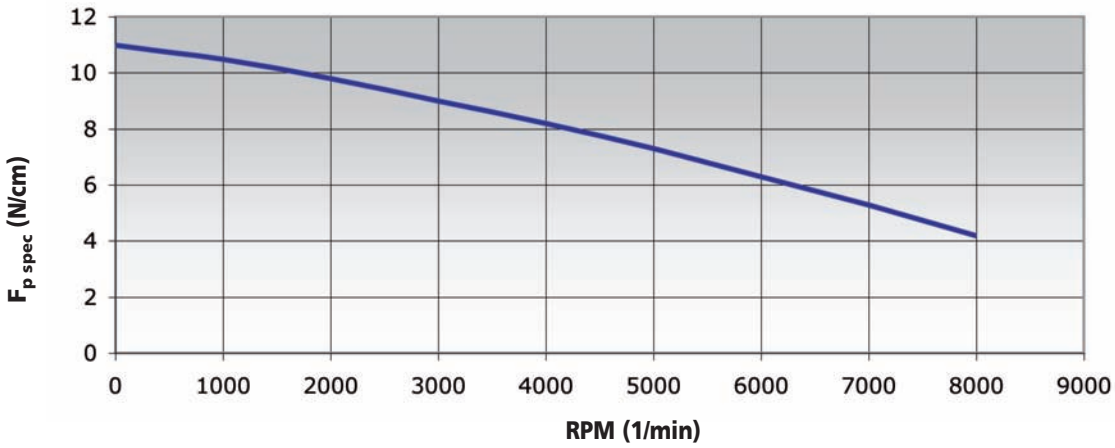
CALCULATION PARAMETERS

Belt width (inch)	Width Factor (W)	Breaking Load [N]
025	1	940
031	1,24	1200
037	1,55	1410

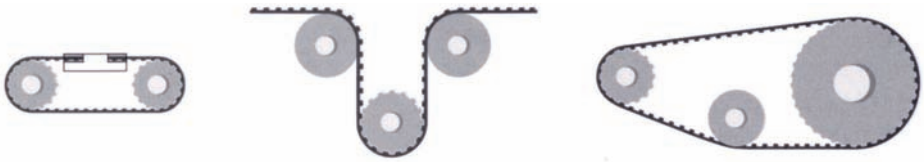
BELT ELONGATION



TOOTH RESISTANCE

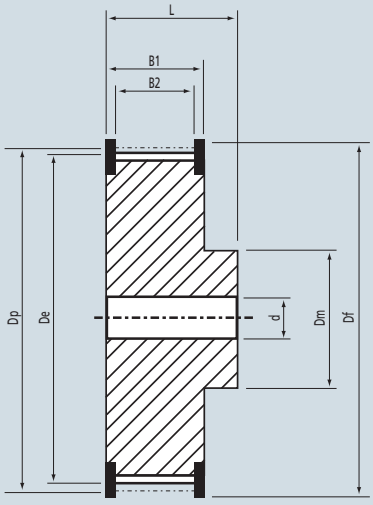


FLEXION RESISTANCE



	Z min	Z min	Idler min dia (mm)	Z min	Idler min dia (mm)
Glass cords	10	11	35	10	35

PULLEYS (for more details please see our pulleys catalogue)



N° Teeth	Dp	De
10	16,17	15,66
11	17,79	17,28
12	19,40	18,89
13	21,02	20,51
14	22,64	22,13
15	24,26	23,75
16	25,87	25,36
17	27,49	26,98
18	29,11	28,60
19	30,72	30,21
20	32,34	31,83
21	33,96	33,45
22	35,57	35,07
24	38,81	38,30

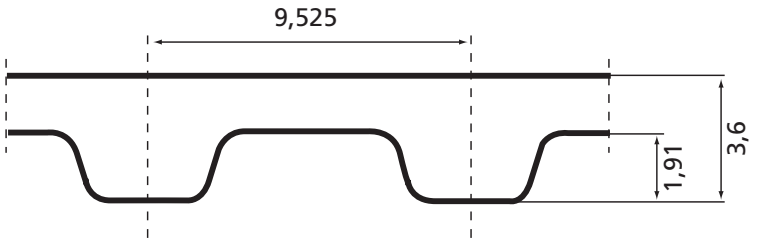
N° Teeth	Dp	De
26	42,04	41,53
27	43,67	43,16
28	45,28	44,77
29	46,89	46,38
30	48,51	48,00
32	51,74	51,23
34	54,98	54,47
35	56,60	56,09
36	58,21	57,70
38	61,45	60,94
39	63,06	62,55
40	64,68	64,17
42	67,91	67,40
44	71,15	70,64

MEGARUBBER L OPEN-END (SPIRAL CUT)

BELT CHARACTERISTICS

STANDARD WIDTHS (inch)	050	075	100
Weight (gr/m)	42	62	102

Standard compound: **Chloroprene 78±4 ShA**
Standard back cover: **none, grinded on the back**
Standard tooth cover: **nylon Fabric**
Standard cords: **glass**
Standard width tolerance: **± 0,6 mm**
Standard thickness: **± 0,25 mm**
Standard length tolerance: **± 0,8 mm/m**
Standard roll length: **50 mt ± 4 mt**

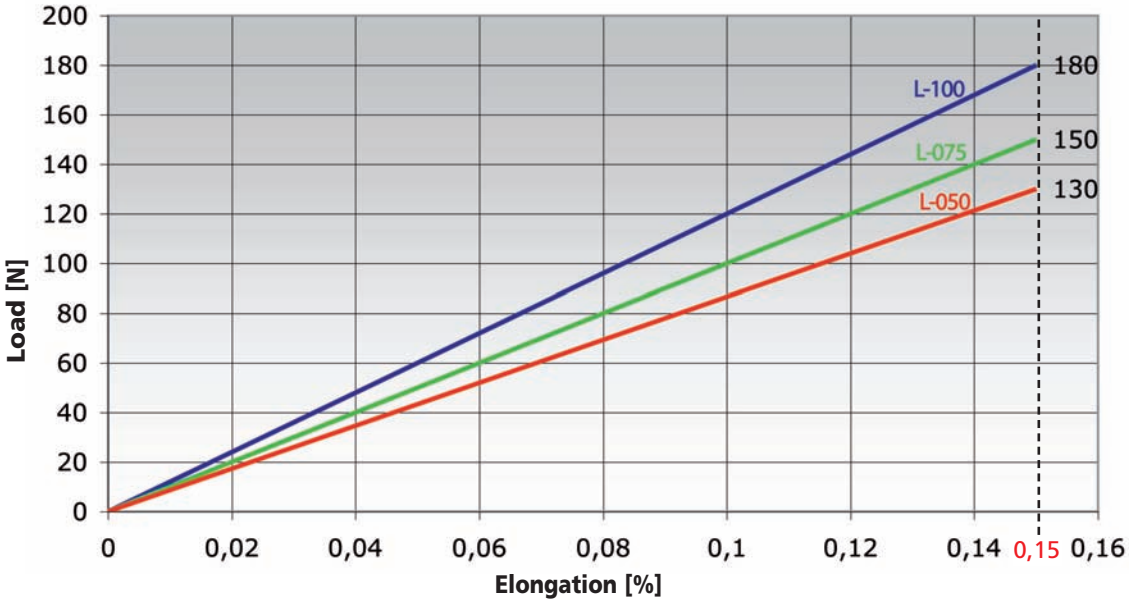


TRACTION RESISTANCE AND ELONGATION DATA

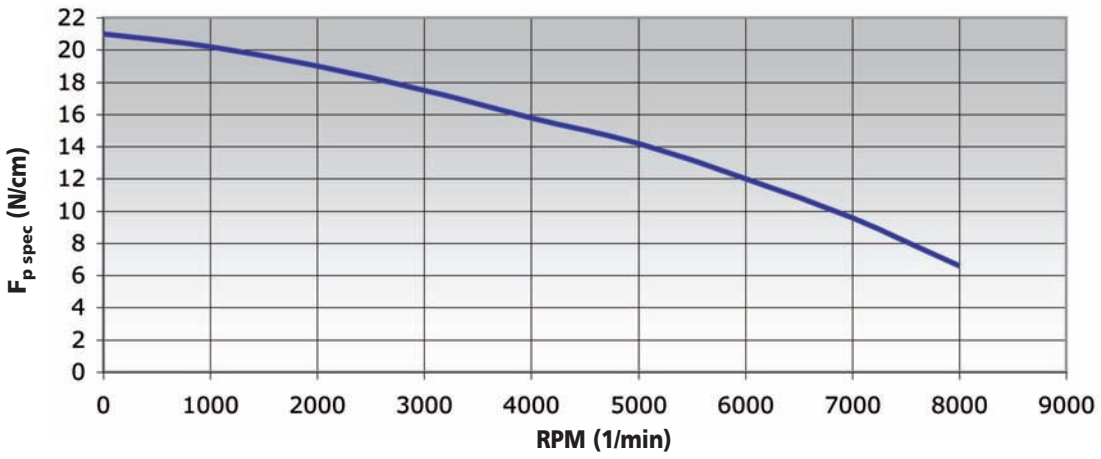
CALCULATION PARAMETERS

Belt width (inch)	Width Factor (W)	Breaking Load [N]
050	1	2500
075	1,25	3500
100	2,15	4700

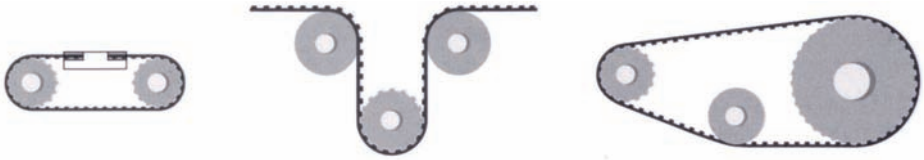
BELT ELONGATION



TOOTH RESISTANCE

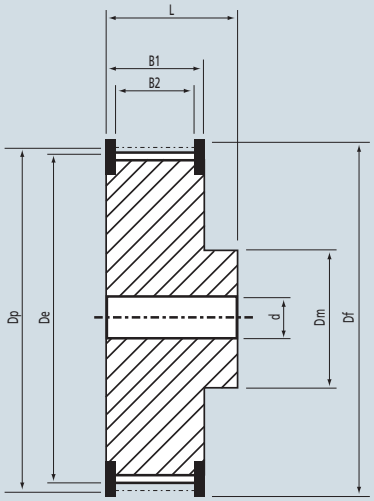


FLEXION RESISTANCE



	Z min	Z min	Idler min dia (mm)	Z min	Idler min dia (mm)
Glass cords	12	14	60	12	60

PULLEYS (for more details please see our pulleys catalogue)



N° Teeth	Dp	De
12	36,38	35,62
14	42,45	41,69
15	45,48	44,72
16	48,51	47,75
17	51,54	50,78
18	54,57	53,81
19	57,61	56,85
20	60,64	59,88
21	63,67	62,91
22	66,70	65,94
23	69,73	68,97
24	72,77	72,01

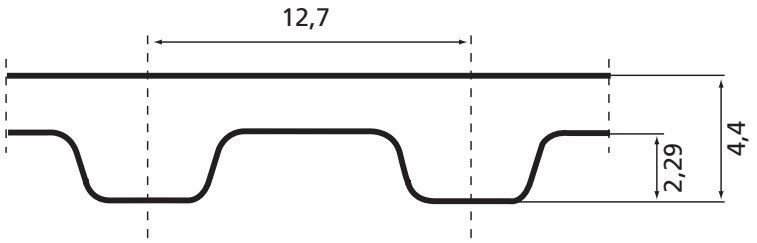
N° Teeth	Dp	De
25	75,80	75,04
26	78,83	78,07
27	81,86	81,10
28	84,89	84,13
29	87,93	87,17
30	90,96	90,20
32	97,02	96,26
34	103,08	102,32
36	109,15	108,39
40	121,28	120,52
44	133,40	132,64
48	145,53	144,76

MEGARUBBER H OPEN-END (STRAIGHT CUT)

BELT CHARACTERISTICS

STANDARD WIDTHS (inch)	050	075	100	150	200	300
Weight (gr/m)	55	82	110	165	220	330

Standard compound: **Chloroprene 78±4 ShA**
Standard back cover: **none**
Standard tooth cover: **nylon Fabric**
Standard cords: **glass**
Standard width tolerance: **± 0,5 mm**
Standard thickness: **± 0,25 mm**
Standard length tolerance: **± 0,8 mm/m**
Standard roll length: **50 mt ± 4 mt**

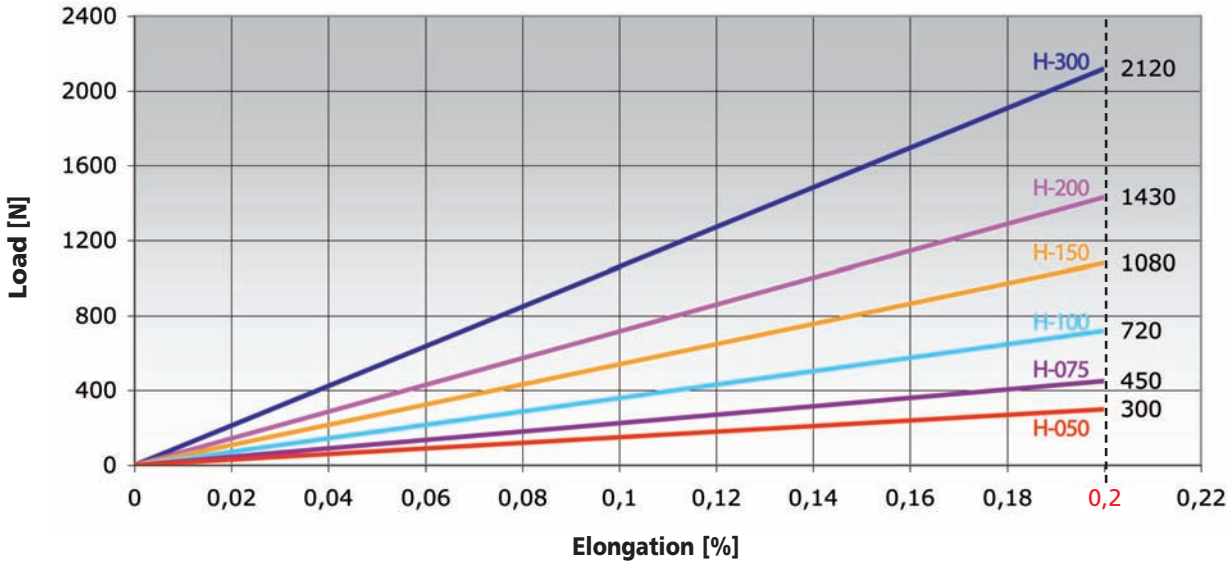


TRACTION RESISTANCE AND ELONGATION DATA

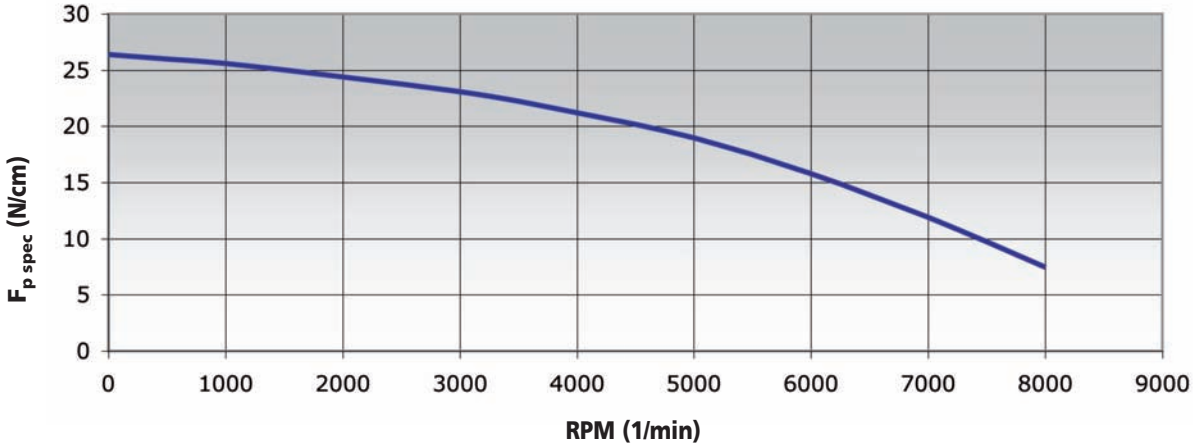
CALCULATION PARAMETERS

Belt width (inch)	Width Factor (W)	Breaking Load [N]
050	1	6400
075	1,25	9500
100	2,10	12800
150	3,25	19200
200	4,38	25500
300	6,42	38350

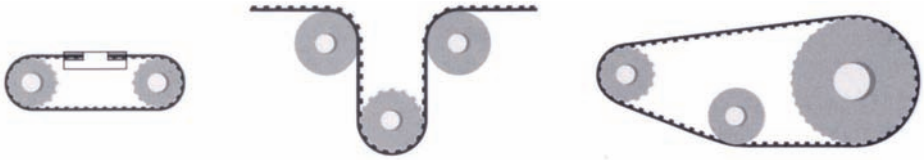
BELT ELONGATION



TOOTH RESISTANCE

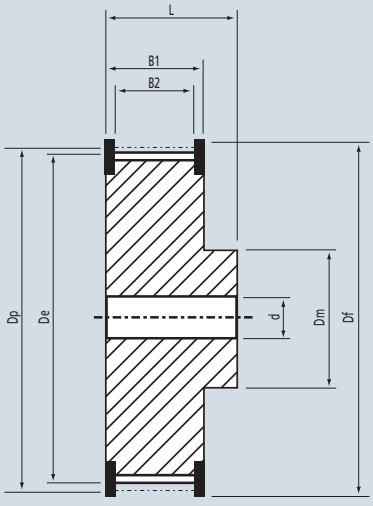


FLEXION RESISTANCE



	Z min	Z min	Idler min dia (mm)	Z min	Idler min dia (mm)
Glass cords	14	14	80	14	80

PULLEYS (for more details please see our pulleys catalogue)



N° Teeth	Dp	De
14	56,60	55,23
15	60,64	59,27
16	64,68	63,31
17	68,72	67,35
18	72,77	71,40
19	76,81	75,44
20	80,85	79,48
21	84,89	83,52
22	88,94	87,57
23	92,98	91,61
24	97,02	95,65
25	101,06	99,69
26	105,11	103,74
27	109,15	107,78

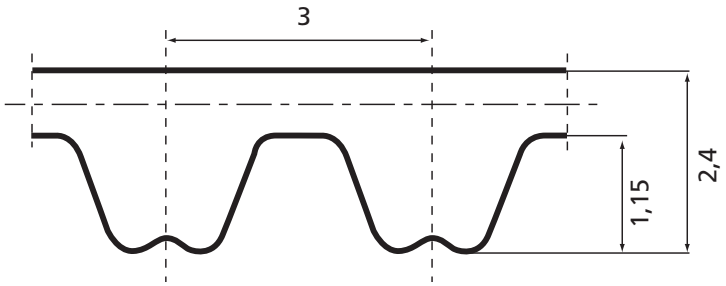
N° Teeth	Dp	De
28	113,19	111,82
29	117,23	115,86
30	121,28	119,91
32	129,36	127,99
33	133,40	132,03
34	137,45	136,08
35	141,49	140,12
36	145,53	144,16
38	153,62	152,25
40	161,70	160,33
44	177,87	176,50
48	194,04	192,67
52	210,21	208,84
60	242,55	241,18

MEGARUBBER RPP3 OPEN-END (SPIRAL CUT)

BELT CHARACTERISTICS

STANDARD WIDTHS (inch)	9	12	15
Weight (gr/m)	21	28	35

Standard compound: **Chloroprene 78±4 ShA**
Standard back cover: **none**
Standard tooth cover: **nylon Fabric**
Standard cords: **glass**
Standard width tolerance: **± 0,5 mm**
Standard thickness: **± 0,25 mm**
Standard length tolerance: **± 0,8 mm/m**
Standard roll length: **50 mt ± 4 mt**

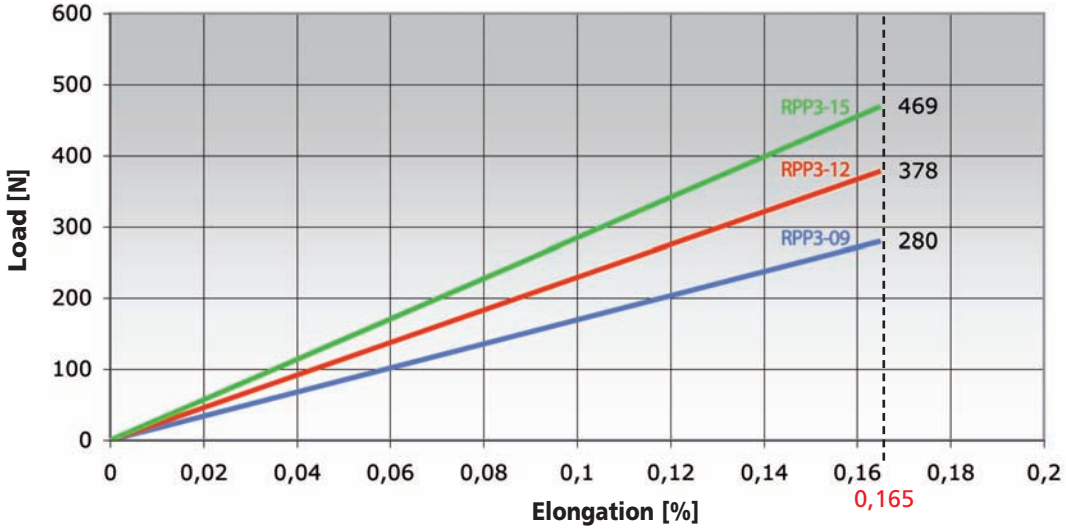


TRACTION RESISTANCE AND ELONGATION DATA

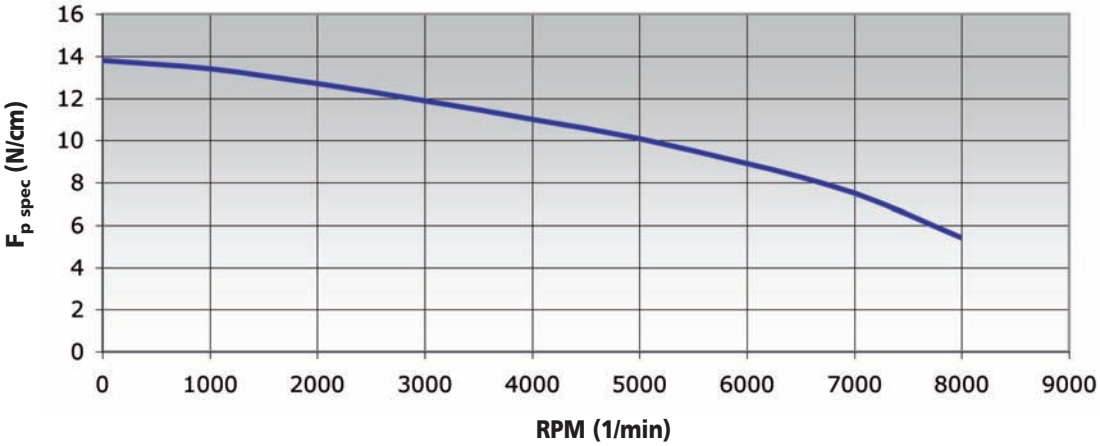
CALCULATION PARAMETERS

Belt width (inch)	Width Factor (W)	Breaking Load [N]
9	1	1600
12	1,3	2480
15	1,7	3000

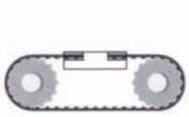
BELT ELONGATION

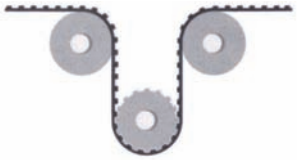


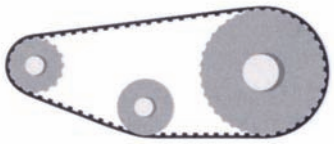
TOOTH RESISTANCE



FLEXION RESISTANCE

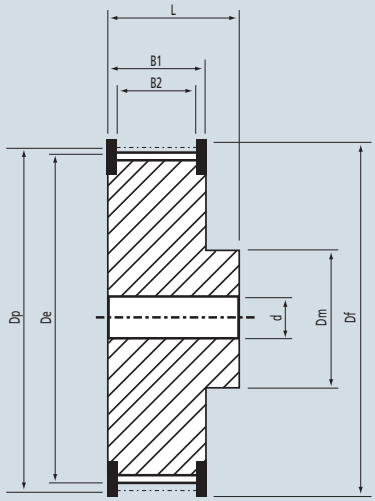






	Z min	Z min	Idler min dia (mm)	Z min	Idler min dia (mm)
Glass cords	12	14	30	12	30

PULLEYS (for more details please see our pulleys catalogue)



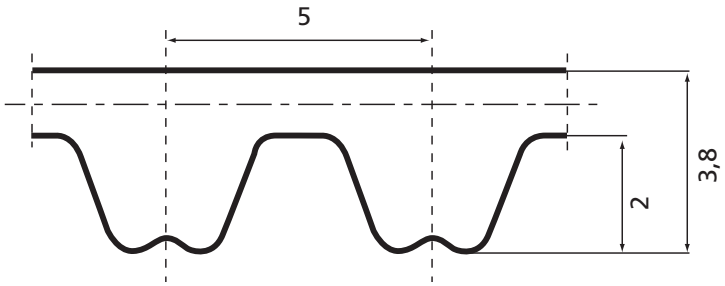
N° Teeth	Dp	N° Teeth	Dp
12	11,46	28	26,74
14	13,37	30	28,65
16	15,28	32	30,56
18	17,19	36	34,38
20	19,10	40	38,20
21	20,05	44	42,02
22	21,01	48	45,84
24	22,92	60	57,30
26	24,83	72	68,75

MEGARUBBER RPP5 OPEN-END (STRAIGHT CUT)

BELT CHARACTERISTICS

STANDARD WIDTHS (inch)	9	12	15	20	25	30
Weight (gr/m)	40	54	67	90	115	138

Standard compound: **Chloroprene 78±4 ShA**
Standard back cover: **none**
Standard tooth cover: **nylon Fabric**
Standard cords: **glass**
Standard width tolerance: **± 0,5 mm**
Standard thickness: **± 0,25 mm**
Standard length tolerance: **± 0,8 mm/m**
Standard roll length: **50 mt ± 4 mt**

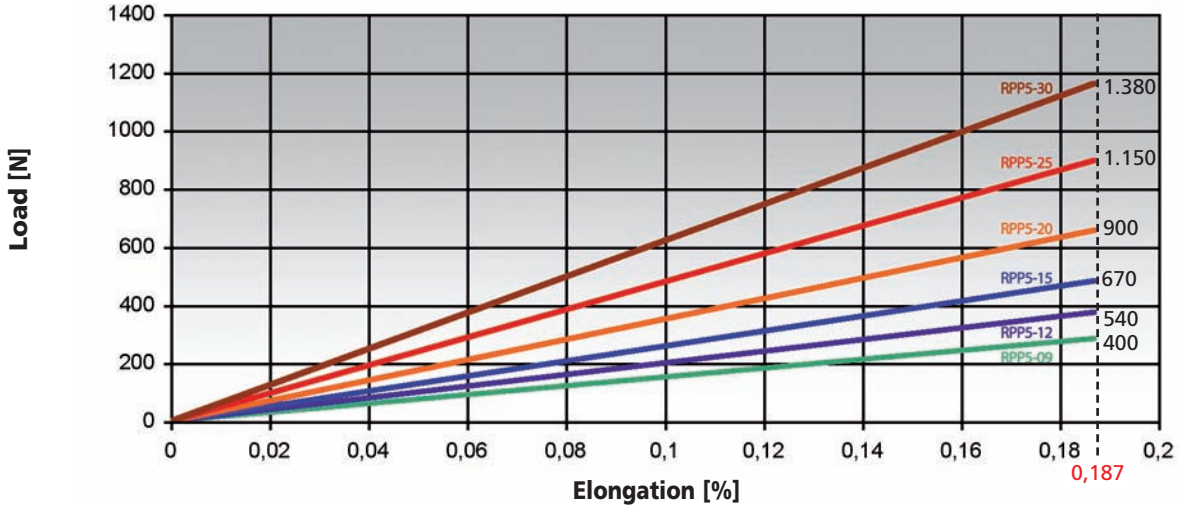


TRACTION RESISTANCE AND ELONGATION DATA

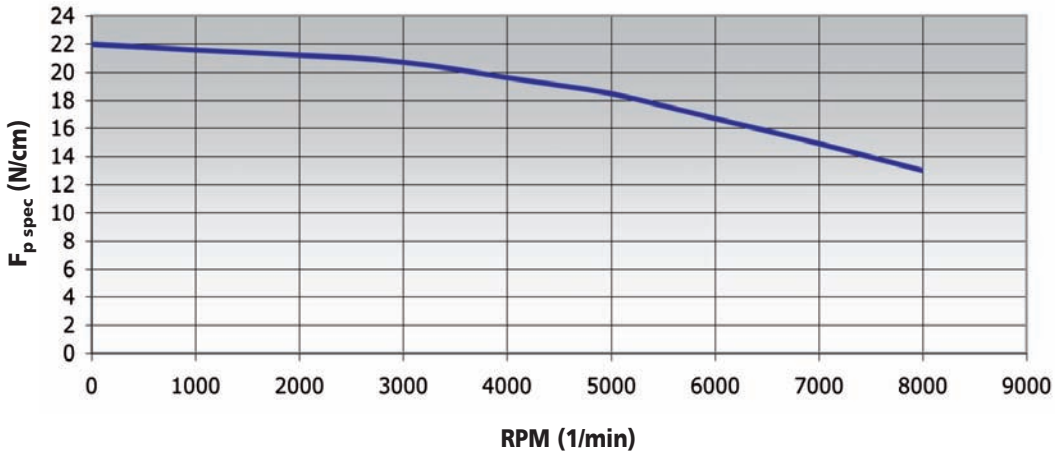
CALCULATION PARAMETERS

Belt width (inch)	Width Factor (W)	Breaking Load [N]
10	1	4305
12	1,2	5166
15	1,55	5544
20	2,11	7896
25	2,62	9870
30	3,73	11844

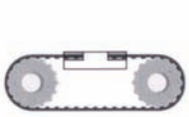
BELT ELONGATION

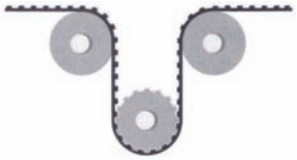


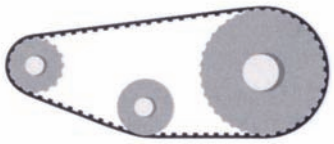
TOOTH RESISTANCE



FLEXION RESISTANCE

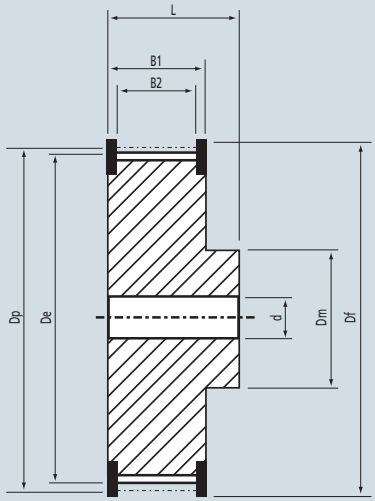






	Z min	Z min	Idler min dia (mm)	Z min	Idler min dia (mm)
Glass cords	14	16	50	14	50

PULLEYS (for more details please see our pulleys catalogue)



N° Teeth	Dp	De
14	22,28	21,14
15	23,87	22,73
16	25,46	24,32
18	28,65	27,50
20	31,83	30,69
21	33,42	32,28
22	35,01	33,87
24	38,20	37,05
26	41,38	40,24

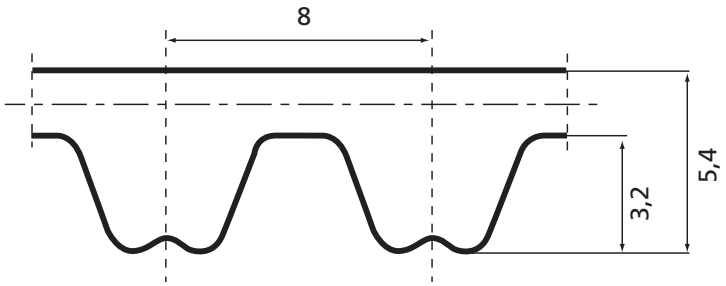
N° Teeth	Dp	De
28	44,56	43,42
30	47,75	46,60
32	50,93	49,79
36	57,30	56,15
40	63,66	62,52
44	70,03	68,89
48	76,39	75,25
60	95,49	94,35
72	114,59	113,45

MEGARUBBER RPP8 OPEN-END (STRAIGHT CUT)

BELT CHARACTERISTICS

STANDARD WIDTHS (mm)	10	15	20	25	30	50	85
Weight (gr/m)	55	83	110	138	166	276	470

Standard compound: **Chloroprene 78±4 ShA**
Standard back cover: **none**
Standard tooth cover: **nylon Fabric**
Standard cords: **glass**
Standard width tolerance: **± 0,5 mm**
Standard thickness: **± 0,3 mm**
Standard length tolerance: **± 0,8 mm/m**
Standard roll length: **50 mt ± 4 mt**

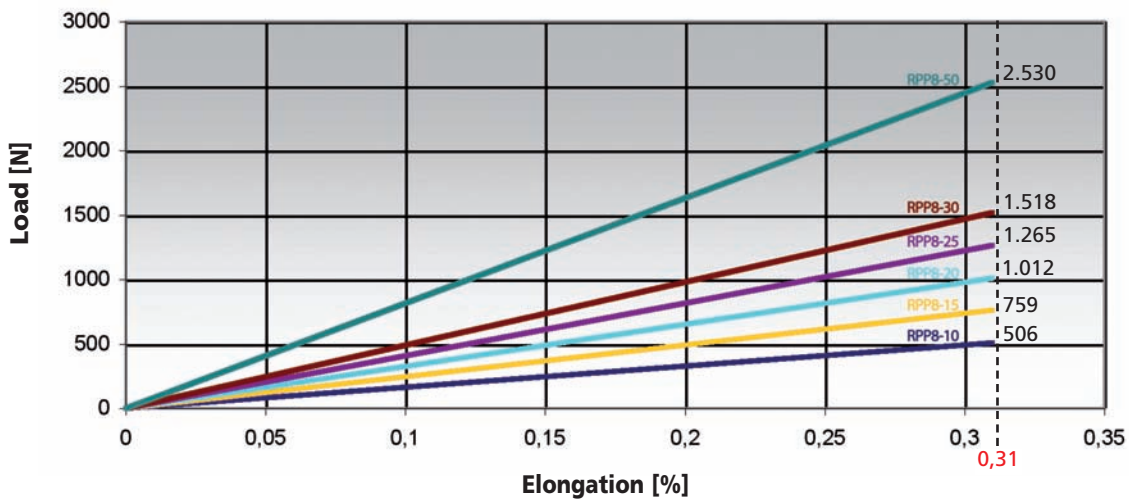


TRACTION RESISTANCE AND ELONGATION DATA

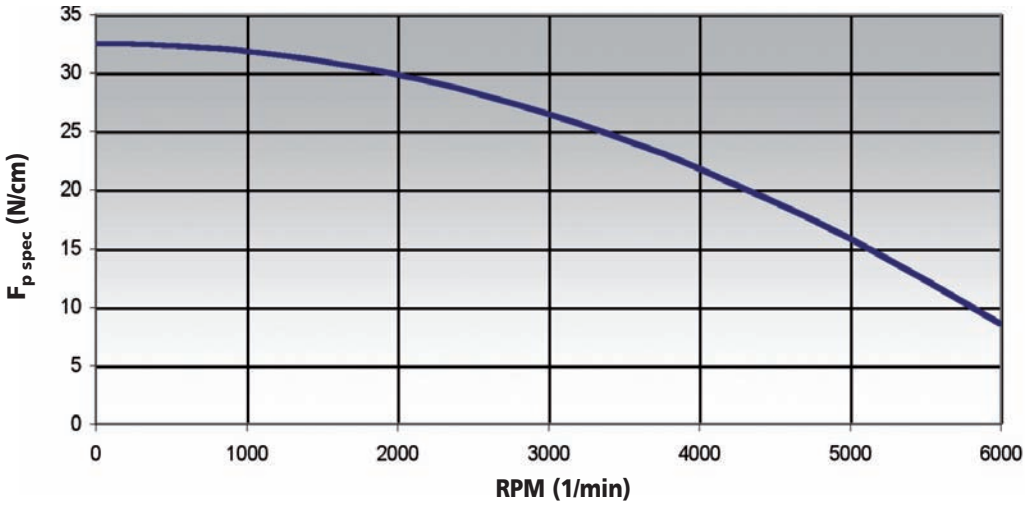
CALCULATION PARAMETERS

Belt width (inch)	Width Factor (W)	Breaking Load [N]
10	1	4829
15	1,59	7248
20	2,17	9648
25	2,71	12060
30	3,40	15312
50	6,32	26592
85	10,74	45206

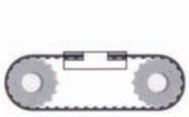
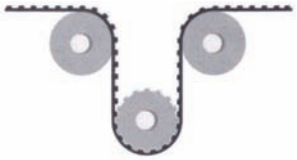
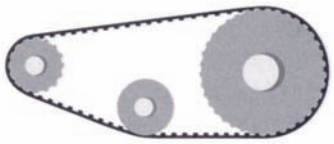
BELT ELONGATION



TOOTH RESISTANCE

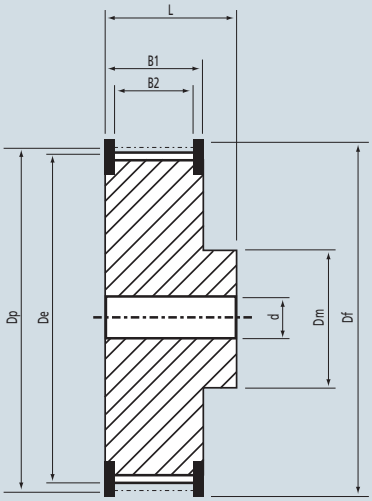


FLEXION RESISTANCE

	Z min	Z min	Idler min dia (mm)	Z min	Idler min dia (mm)
Glass cords	22	22	100	22	100

PULLEYS (for more details please see our pulleys catalogue)



N° Teeth	Dp	De
22	56,02	54,65
24	61,12	59,74
26	66,21	64,84
28	71,30	69,93
30	76,39	75,02
32	81,49	80,12
34	86,58	85,21
36	91,67	90,30
38	96,77	95,39
40	101,86	100,49
44	112,04	110,67

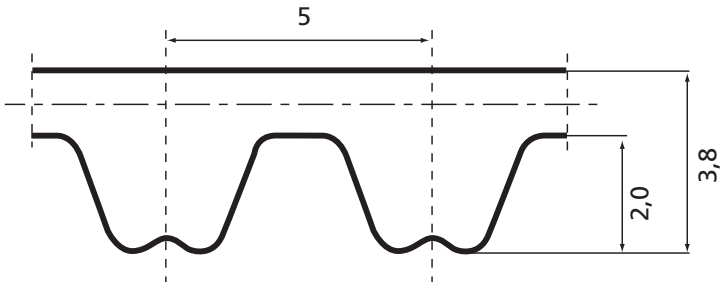
N° Teeth	Dp	De
48	122,23	120,86
54	137,51	136,14
64	162,97	161,60
72	183,35	181,97
80	203,72	202,35
90	229,18	227,81
112	285,20	283,83
144	366,69	365,32
168	427,81	426,44
192	488,92	487,55

MEGARUBBER SLV5 OPEN-END (STRAIGHT CUT)

BELT CHARACTERISTICS

STANDARD WIDTHS (inch)	10	12	15	25	30
Weight (gr/m)	45	54	67	108	135

Standard compound: **Chloroprene 90±3 ShA**
Standard back cover: **none**
Standard tooth cover: **nylon Fabric**
Standard cords: **glass**
Standard width tolerance: **± 0,5 mm**
Standard thickness: **± 0,25 mm**
Standard length tolerance: **± 0,8 mm/m**
Standard roll length: **50 mt ± 4 mt**

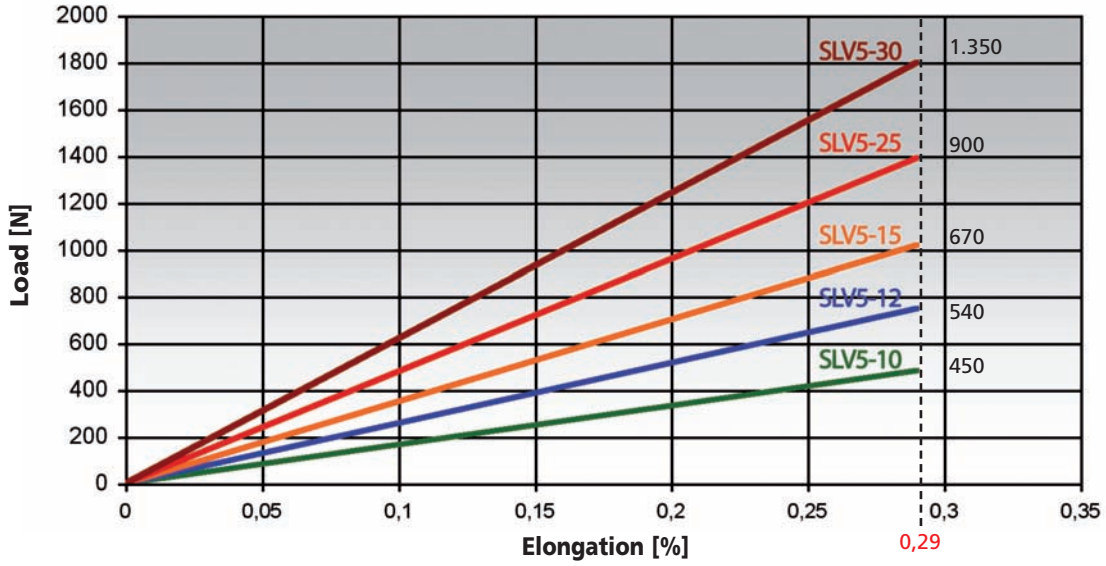


TRACTION RESISTANCE AND ELONGATION DATA

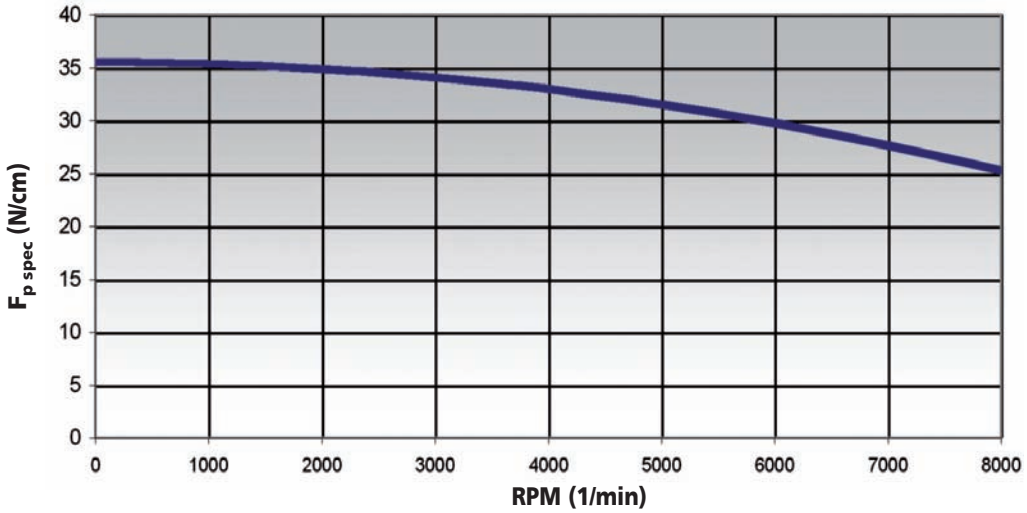
CALCULATION PARAMETERS

Belt width (inch)	Width Factor (W)	Breaking Load [N]
10	1	4305
12	1,2	5166
15	1,55	5544
25	2,62	9870
30	3,73	11844

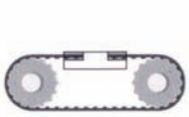
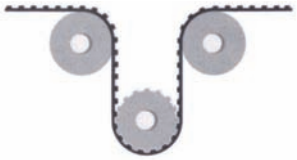
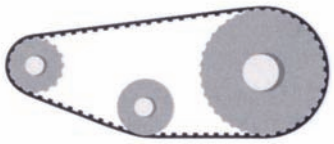
BELT ELONGATION



TOOTH RESISTANCE

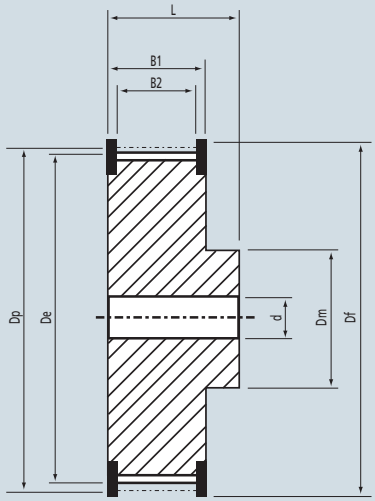


FLEXION RESISTANCE

	Z min	Z min	Idler min dia (mm)	Z min	Idler min dia (mm)
Glass cords	14	16	50	14	50

PULLEYS (for more details please see our pulleys catalogue)



N° Teeth	Dp	De
14	22,28	21,14
15	23,87	22,73
16	25,46	24,32
18	28,65	27,50
20	31,83	30,69
21	33,42	32,28
22	35,01	33,87
24	38,20	37,05
26	41,38	40,24

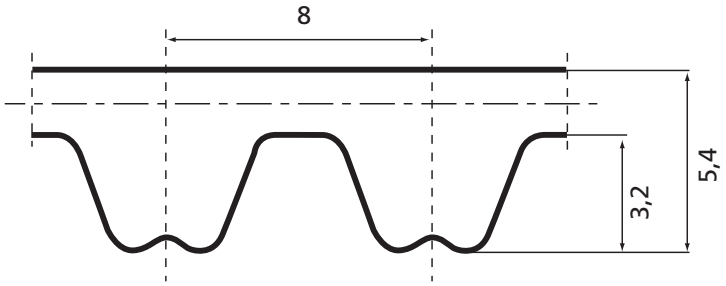
N° Teeth	Dp	De
28	44,56	43,42
30	47,75	46,60
32	50,93	49,79
36	57,30	56,15
40	63,66	62,52
44	70,03	68,89
48	76,39	75,25
60	95,49	94,35
72	114,59	113,45

MEGARUBBER SLV8 OPEN-END (STRAIGHT CUT)

BELT CHARACTERISTICS

STANDARD WIDTHS (mm)	10	15	20	25	30	50	85
Weight (gr/m)	55	83	110	138	166	276	470

Standard compound: **Chloroprene 90±3 ShA**
Standard back cover: **none**
Standard tooth cover: **nylon Fabric**
Standard cords: **glass**
Standard width tolerance: **± 0,5 mm**
Standard thickness: **± 0,3 mm**
Standard length tolerance: **± 0,8 mm/m**
Standard roll length: **50 mt ± 4 mt**
Antistatic in standard version (according BS 2050)

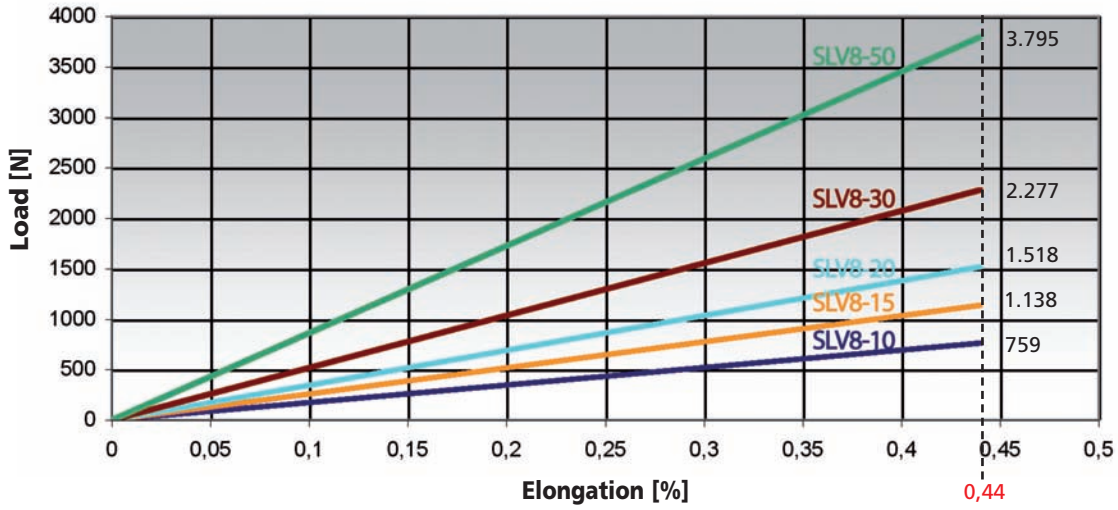


TRACTION RESISTANCE AND ELONGATION DATA

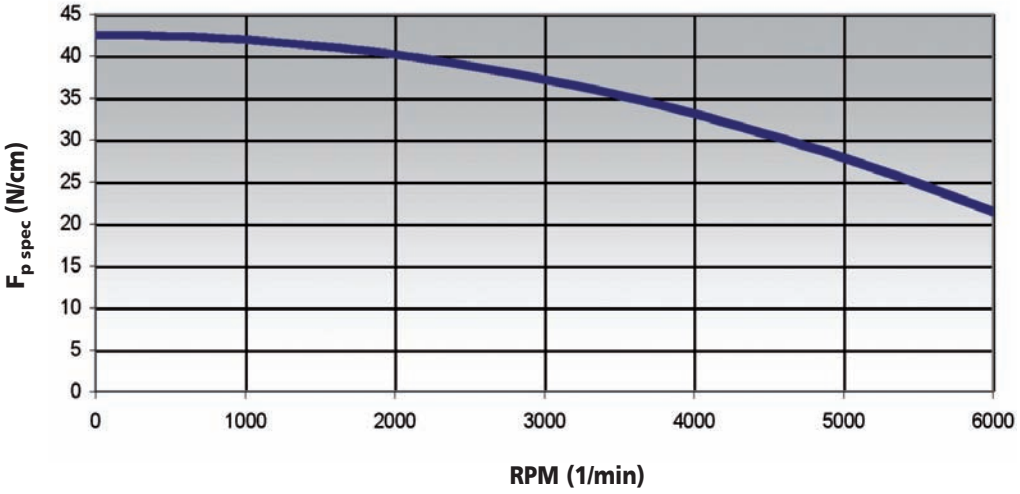
CALCULATION PARAMETERS

Belt width (inch)	Width Factor (W)	Breaking Load [N]
10	1	4829
15	1,59	7248
20	2,17	9648
25	2,71	12060
30	3,40	15312
50	6,32	26592
85	10,74	45206

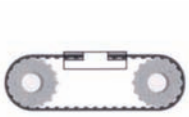
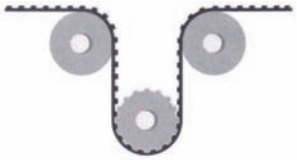
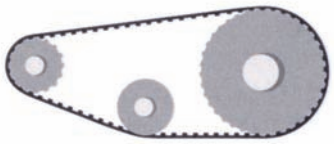
BELT ELONGATION



TOOTH RESISTANCE

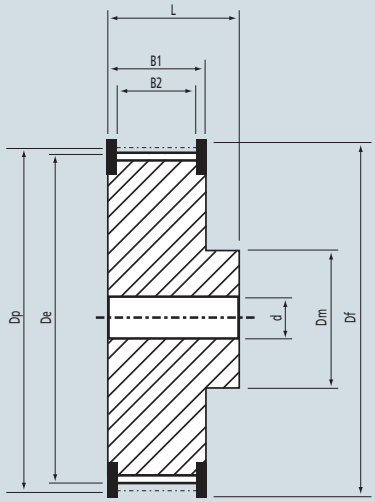


FLEXION RESISTANCE

	Z min	Z min	Idler min dia (mm)	Z min	Idler min dia (mm)
Glass cords	22	22	100	22	100

PULLEYS (for more details please see our pulleys catalogue)



N° Teeth	Dp	De
22	56,02	54,65
24	61,12	59,74
26	66,21	64,84
28	71,30	69,93
30	76,39	75,02
32	81,49	80,12
34	86,58	85,21
36	91,67	90,30
38	96,77	95,39
40	101,86	100,49
44	112,04	110,67

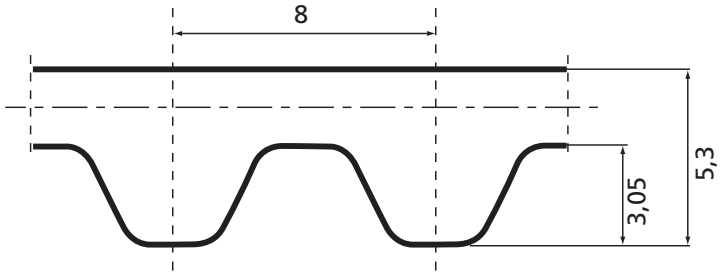
N° Teeth	Dp	De
48	122,23	120,86
54	137,51	136,14
64	162,97	161,60
72	183,35	181,97
80	203,72	202,35
90	229,18	227,81
112	285,20	283,83
144	366,69	365,32
168	427,81	426,44
192	488,92	487,55

MEGARUBBER STD8 OPEN-END (STRAIGHT CUT)

BELT CHARACTERISTICS

STANDARD WIDTHS (mm)	10	15	20	25	30	50	85
Weight (gr/m)	55	83	110	138	166	276	470

Standard compound: **Chloroprene 78±4 ShA**
Standard back cover: **none**
Standard tooth cover: **nylon Fabric**
Standard cords: **glass**
Standard width tolerance: **± 0,5 mm**
Standard thickness: **± 0,3 mm**
Standard length tolerance: **± 0,8 mm/m**
Standard roll length: **50 mt ± 4 mt**

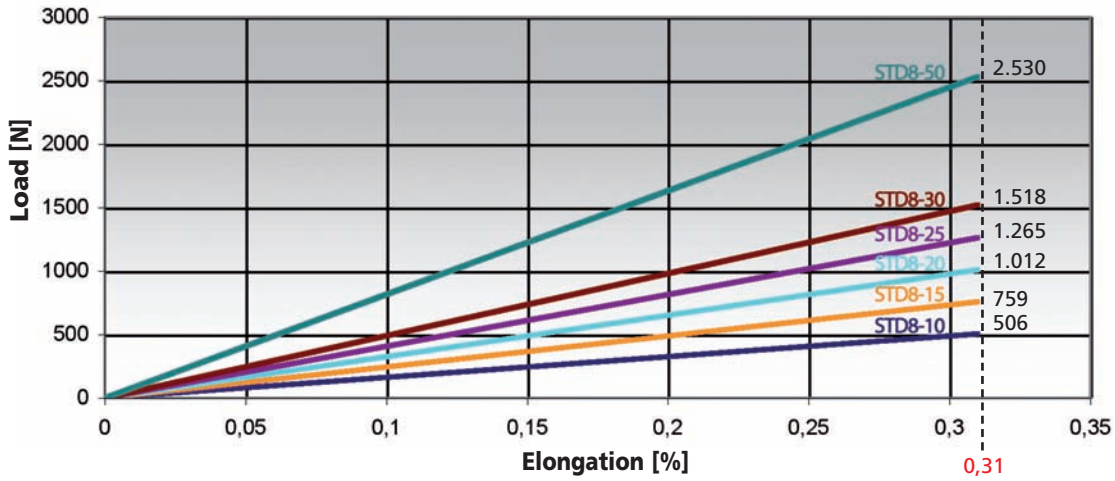


TRACTION RESISTANCE AND ELONGATION DATA

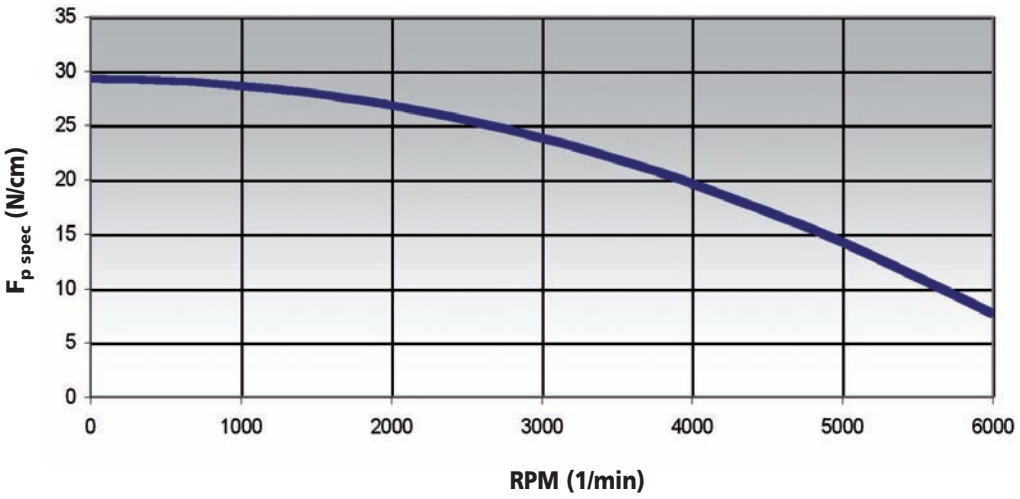
CALCULATION PARAMETERS

Belt width (inch)	Width Factor (W)	Breaking Load [N]
10	1	4829
15	1,59	7248
20	2,17	9648
25	2,71	12060
30	3,40	15312
50	6,32	26592
85	10,74	45206

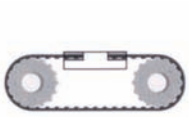
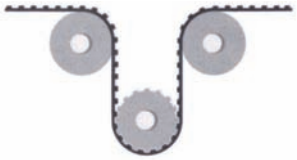
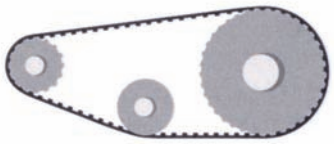
BELT ELONGATION



TOOTH RESISTANCE

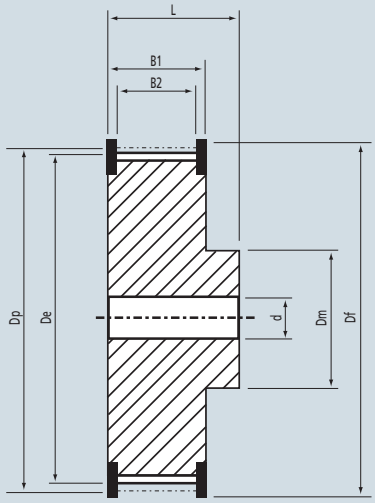


FLEXION RESISTANCE

	Z min	Z min	Idler min dia (mm)	Z min	Idler min dia (mm)
Glass cords	22	22	100	22	100

PULLEYS (for more details please see our pulleys catalogue)



N° Teeth	Dp	De
22	56,05	54,65
24	61,14	59,75
26	66,24	64,84
28	71,33	69,93
30	76,43	75,02
32	81,52	80,12
34	86,62	85,21
36	91,71	90,30
38	96,81	95,40
40	101,91	100,49
44	112,10	110,68

N° Teeth	Dp	De
48	122,29	120,86
56	142,67	141,23
64	163,05	161,60
72	183,43	181,98
80	203,82	202,35
90	229,29	227,81
112	285,35	283,84
144	366,87	365,32
168	428,02	426,44
192	489,17	487,55

SPECIAL EXECUTION FEASIBILITY

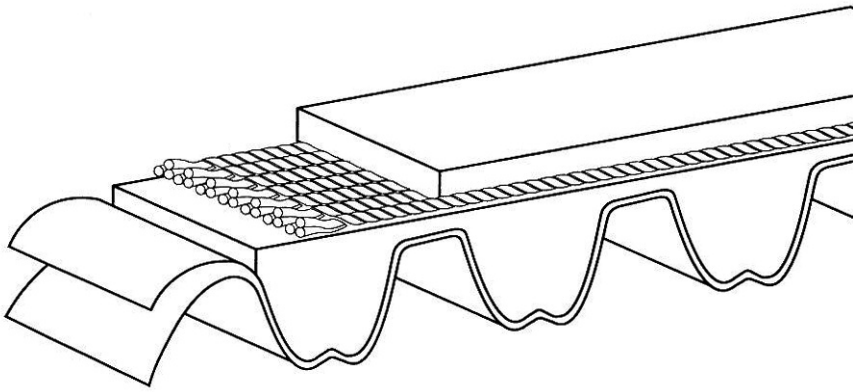
MEGADYNE can make special execution on customer request to improve belt properties and to suit better to special applications.

SUPER

On customer request and with minimun quantity, we can produce the belt with a double nylon fabric, on the tooth surface, to improve torque carrying capacity.
The advantages are follows:

- exceptional resistance to abrasion;
- low coefficient of friction;
- increased drive efficiency;
- increased belt and pulley life.

From the table of this book we increase all the performance of 10%.



ANTISTATIC

On customer request and with minimun quantity we can produce the belts in antistatic version (according BS 2050).

HIGHT TEMPERATURE

On customer request and with minimun quantity we can produce the belts:

RPP 8
STD 8
H

for working in hight temperature range of 130°C.

SPECIAL BRANDING

On customer request and with minimun quantity we can brand the belts with same “Logo”.

SPECIAL PACKAGING

On customer request and with minimun quantity we can packaging the belt follow some special indications.

SPECIAL WIDTH

On customer request and with minimun quantity we can produce the belts in special width:

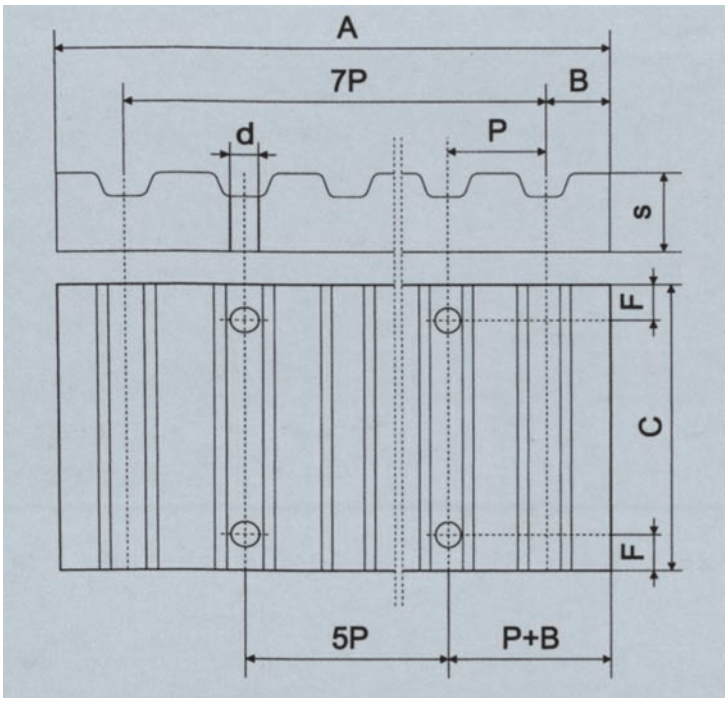
SPIRAL CUT, max width 28 mm
STRAIGHT CUT, max width 200 mm.

LOW NOISE

On customer request and with minimun quantity we can produce the belt with soft compound (60 ± 3 ShA) to reduce noise problems. In this case we decrease the performance indicated in this book of 10%.

FIXING PLATES

The fixing plates are used to fix the tail of the open belts.
On customer's request, the plates can be delivered with or without fixing holes.
As the belt can't be stretched with the fixing plates we suggest to use other tension system.
The plates are delivered in aluminium alloy.
Megadyne Technical Staff is ready to study special or particular applications.



Order code example: RPP8 pitch clamping plate for 50 mm width belt

Clamping plates for imperial pitch belts

							Belt width (inches)								
	Pitch	F	d	B	A	S	025	037	050	075	100	150	200	300	400
											C				
Aluminium	• XL	6	5,5	3,5	42,5	8	25,5	28,5	32	38	45				
	• L	8	9	5	76,5	15		36	39	45	51,5	64	77		
	• H	10	11	9	106,9	22			45	51	57,5	70	83	108	134

Clamping plates for HTD pitch belts

							Belt width (mm)												
	Pitch	F	d	B	A	S	6	9	10	15	20	25	30	40	50	55	85	115	170
													C						
Aluminium	• 5M	6	5,5	3,25	41,5	8	25	28		34		44							
	• 8M	8	9	5	66	15			35	40	45		55		75		110		

• Available in customized length

USEFUL FORMULAS AND CONVERSION TABLE

SPEED

$$V = \frac{d_1 \cdot n_1}{19100} \qquad n_1 = \frac{V \cdot 19100}{d_1} \qquad d_1 = \frac{V \cdot 19100}{n_1}$$

V : peripheral speed [m/s]
n_1 : rotation speed [RPM]
d_1 : pulley diameter [mm]

FORCES AND TORQUE

$$F_u = \frac{19{,}1 \cdot 10^6 \cdot P}{d_1 \cdot n_1} \qquad F_u = \frac{2000 \cdot M_t}{d_1} \qquad F_u = \frac{P \cdot 10^3}{d_1}$$

$$M_t = \frac{P \cdot 9550}{n_1} \qquad M_t = \frac{F_u \cdot d_1}{2000} \qquad M_t = \frac{P \cdot d_1}{2 \cdot V}$$

F_u : peripheral force [N]
M_t : drive torque [Nm]
P : power [kW]
n_1 : rotation speed [RPM]
d_1 : pulley diameter [mm]
V : peripheral speed [m/s]

POWER

$$P = \frac{F_u \cdot d_1 \cdot n_1}{19{,}1 \cdot 10^6} \qquad P = \frac{M_t \cdot n_1}{9550} \qquad P = \frac{F_u \cdot V}{1000}$$

P : power [kW]
F_u : peripheral force [N]
M_t : drive torque [Nm]
n_1 : rotation speed [RPM]
d_1 : pulley diameter [mm]

To convert from	to	multiply by
CV	HP	0,9863201
CV	kcal/h	63,24151
CV	W	735,4988
CV	kW	0,7354988
CV	kgf m/s	75
CV	lbf ft/s	542,476
HP	CV	1,01387
HP	kcal/h	641,1865
HP	W	745,6999
HP	kW	0,7456999
HP	kgf m/s	76,04022
HP	lbf ft/s	550
in	m	0,0254
in	cm	2,54
in	mm	25,4
in	ft	0,083
in^2	m^2	0,00064516
in^2	cm^2	6,4516
in^2	mm^2	645,16
in^2	ft^2	0,006944444
in^3	m^3	$1{,}63871 \cdot 10^{-5}$
in^3	cm^3	16,38706
in^3	mm^3	16387,06
in^3	ft^3	0,000578704

To convert from	to	multiply by
J	CV h	$3{,}77673 \cdot 10^{-7}$
J	HP h	$3{,}72506 \cdot 10^{-7}$
J	kWh	$2{,}77778 \cdot 10^{-7}$
kg	lb	2,204623
kgf	N	9,80665
kgf	lbf	2,204623
kgf m/s	CV	0,01333333
kgf m/s	W	9,80665
kgf m/s	kW	0,00980665
kW	CV	1,359622
kW	kcal/h	859,8452
kW	W	1000
kW	kgf m/s	101,9716
kW	lbf ft/s	737,5621
lb	kg	0,4535924
lb	kgf	0,4535924
lb	N	4,448222
N	kgf	0,1019716
N	lbf	0,2248089
W	CV	0,001359622
W	HP	0,001341022
W	kcal/h	0,8598452
W	kW	0,001
W	kgf m/s	0,1019716
W	lbf ft/s	0,7375621

NOTES

NOTES

The data given in this catalogue are updated at the day of printing and are not intended as a guarantee: Megadyne S.p.A. reserves the right to modify the characteristics of the belts described herein without any prior notice.

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Jason Industrial

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