RUBBER
Open end

MEGADYNE

INDEX

INTRODUCTION TO RUBBER OPEN END BELTS

Megadyne Rubber 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 Rubber Open End Belts are specially suitable for reversing drives and applications when rotational movements need to be transformed into linear motions and high positioning accuracy is required.
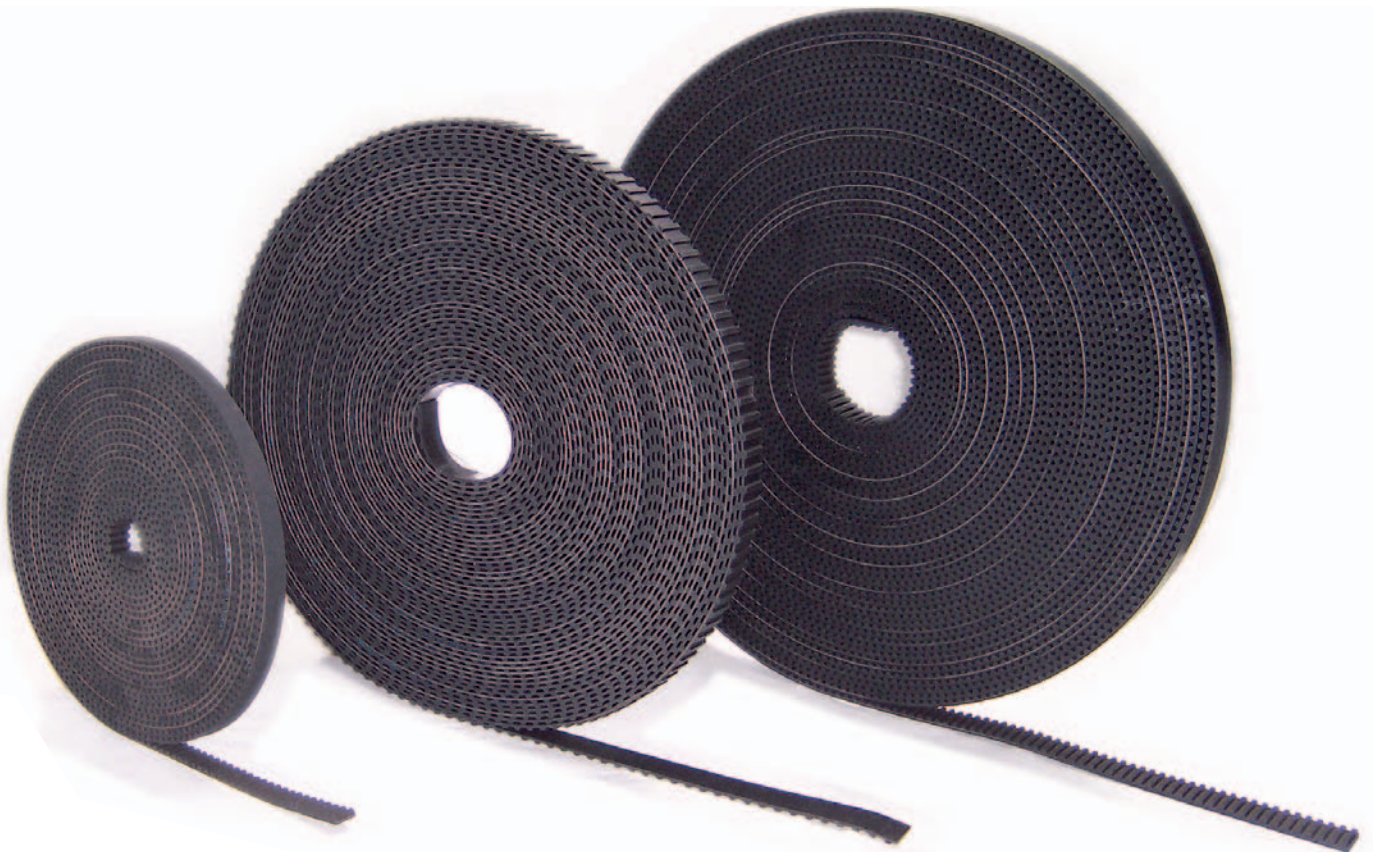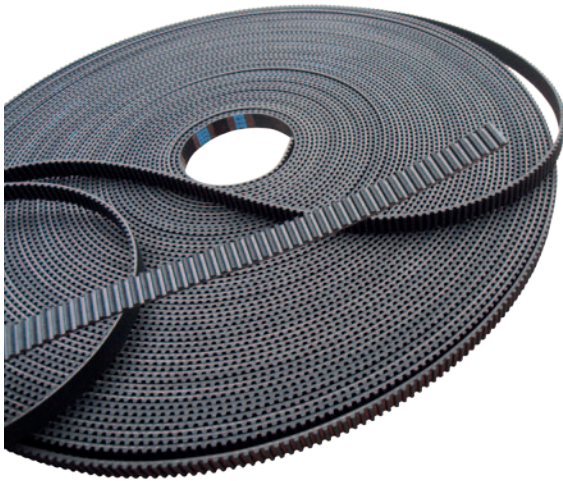
INTRODUCTION TO RUBBER OPEN END BELTS

Megadyne Rubber Open End Belts are a great solution when substituting expensive conventional linear systems. Noise level improvement will be obtained as well as economic benefits due to the reduction of the initial investment and the maintenance costs.

Taking into account the advantages and the available products range, these belts can be considered as a solution for a very wide field of applications in industrial equipments. Few examples of typical applications can be:
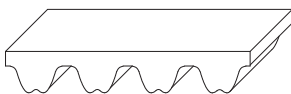
• Automatic doors for garage
• Automatic sliding doors
• X-Y tables on tooling machines
• Level control on elevators
• Fitness machines
• Printers
• Linear positioning systems

STANDARD RANGE

| MXL | XL | L | H | |
| RPP3 | RPP5 | RPP8 | SILVER5 | SILVER8 |

STD8

CLASSIFICATIONS

Megadyne Rubber Open End Belts are manufactured in rubber compound. They come from sleeves for spiral cut belts and from press for straight cut belts.

The belt is made by:

BELT BACK	The back side cushion protects the tensile member and permits the use of backside idlers thanks to its elasticity.
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. This compound guarantees the highest tooth share resistance.
FABRIC	Hard wearing nylon fabric is bonded on tooth surface to improve torque carrying capacity. In addition a special graphite impregnation process gives self-lubricating action and increases drive efficiency.

BELT CONSTRUCTION
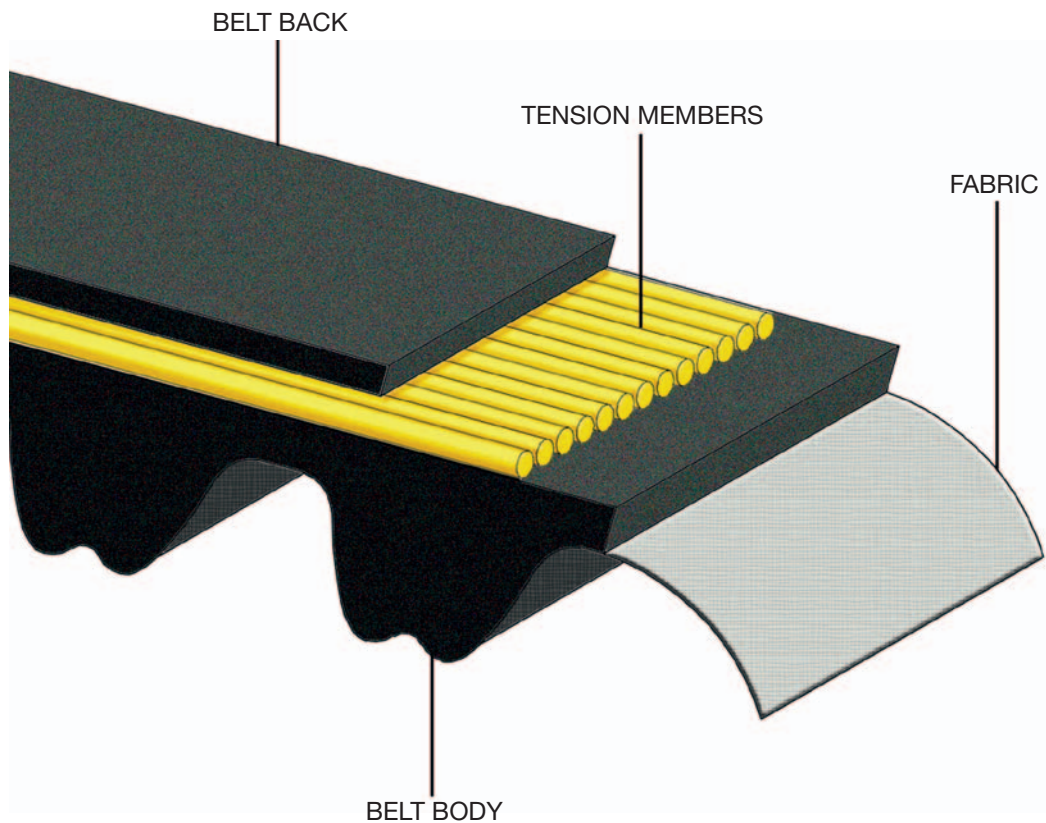
The advantages of Megadyne Rubber Open End Belts are:
- High positioning accuracy on reverse drives
- To cover a wide range of applications
- Low noise level due to vibration absorbing characteristic of rubber
- Low operation costs due to free of maintenance and long lasting service life
- Compact and light drives are feasible due to high specific belt performances.

MECHANICAL AND CHEMICAL CHARACTERISTICS

- Constant dimensions
- Noiseless
- Free maintenance
- High flexibility with fiberglass cords
- Linear speed up to 50 m/s

- Low pretension
- Constant length
- High abrasion resistance
- Standard working temperature -25 /+80 °C

BODY

Megadyne Rubber Open End Belts are manufactured with polychloroprene compound. Special compounds (different hardness, special properties) are available on request. Here under some compound's characteristics:

Resistance to	Standard Belt's Resistance
Mineral oils	LOW
Water	MEDIUM
Acids / Alkalis	NONE
Solvents	NONE
Oils	LOW
Greases	MEDIUM
Fuels	NONE
Environment agents	MEDIUM

Temperature	
Min T (°C)	-25
Max T (°C)	80
Max peak T (°C)	100

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:

1		2
H	+	200
RPP5	+	15
SILVER8	+	25

1) This code composed by letters and numbers indicates the selection of profile.
2) This number indicates the width of the requested belts. The value is in mm for belts with metric pitch and in inches for belts with imperial pitch.

TECHNICAL CALCULATION

LINEAR MOTION BELT
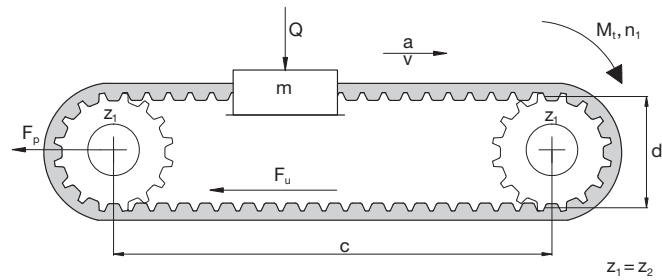
OMEGA LINEAR MOTION BELT

The following pages contain data, formulae and tables that are required to design a new belt drive.
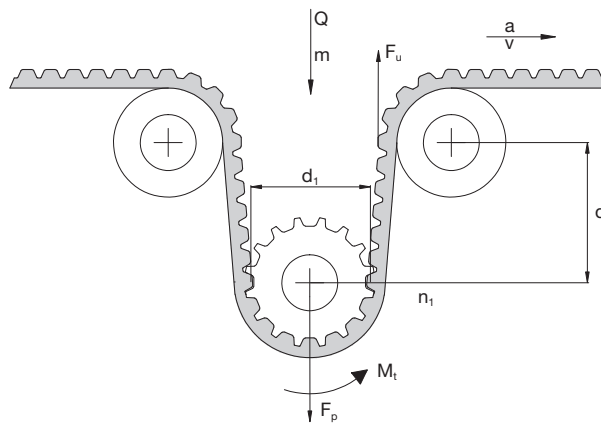For critical and difficult drives, it is raccomended that you contact our Application Department for advice.

Symbol	Unit	Definition	Symbol	Unit	Definition
b	mm	belt width	F_p	N	pretension
L	mm	belt length	F_u	N	peripheral force
c	mm	centre distance	$F_{p\ spec}$	N/cm	transmittable force per tooth per unit
d_i	mm	pitch diameter of pulley i	M_t	Nm	drive torque
m	kg	total conveyed mass	n_1	1/min	revs/min (RPM)
a	m/s²	acceleration	P	kW	drive power
v	m/s	belt speed	Q	N	force exerted by mass (m)
C_s	-	safety factor	z_i		number of teeth on pulley i
g	m/s²	gravity (9.81)	z_m		number of teeth in mesh on driver pulley
μ	-	coefficient of friction[1]	z_s		number of teeth on small pulley
p	-	belt pitch	z_L		number of teeth on largest pulley
MTL	N	Max Traction Load	BS	N	Breaking Strength

Max Traction Load is maximum acceptable traction on cords   Breaking Strength is necessary load to break belt cord
[1] Between the belt and the guide

USEFUL FORMULAE AND CONVERSION FACTORS

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

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

CALCULATION OF THE PERIPHERAL FORCE ON THE TIMING BELT

Knowing mass $\longrightarrow$ For horizontal & conveying drives $\qquad F_u = (m \cdot a) + (m \cdot g \cdot \mu)$

$\longrightarrow$ For vertical drives $\qquad F_u = (m \cdot a) + (m \cdot g)$

Knowing drive torque $\longrightarrow$ $F_u = 2000 \cdot M_t / d_1$

Knowing drive power $\longrightarrow$ $F_u = 19{,}1 \cdot 10^6 \cdot P / (d_1 \cdot n_1)$

BELT WIDTH AND PROFILE ESTIMATION

With the result of F_u select the belt type profile and approximate the belt width according to DIAGRAM 1 page 10 on "Belt width selection".

CHOICE OF PULLEYS

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

$$z = \frac{\pi \cdot d_1}{p} \qquad\qquad n_1 = \frac{6000 \cdot v}{p \cdot z_1}$$

Always verify that the chosen z is higher or equal to z_{min} written in belt data pages.

DETERMINATION OF BELT WIDTH

The belt width b should be calculated using the following formula

$$b = \frac{F_u \cdot F_s \cdot 10}{F_{p,\,spec} \cdot z_m}$$

where:
- F_u from above calculation
- F_s is the safety factor from page 10
- $F_{p,\,spec}$ is the transmittable force per tooth per cm, from belt data pages
- z_m is the number of teeth in mesh on driver pulley, that you can calculate as per below:

$$z_m = \left\{ 0{,}5 - \left[\frac{4\,p}{79\,c} \cdot (z_l - z_s) \right] \right\} \cdot z_s$$

This value z_m can't be higher than 12.
From the calculated width b, choose the next higher available width; you can check available widths in belt data page.

PRE-TENSIONING

The suggested installation tension is $F_p = 2\,F_u$

MESHING CHECK

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

$$\sigma_{BS} = \frac{BS}{F_u + \dfrac{F_p}{2}}$$

where:
- BS is the Breaking Strength (see tables on belt data pages)
- F_u from above calculation
- F_p is the tension, from above calculation

The σ_{BS} outcoming value has to be higher than 11. If it is lower, please retry with the next wider belts till you will get a value higher than 11.

ELONGATION

You can find belt elongation from Belt Elongation diagrams in belt data pages at Load equal to $F_p/2$ using the formula:

$$\Delta_{l/00} = \frac{\text{Belt's Max Elongation} \cdot F_p/2}{BS}$$

TRANSMISSION CALCULATION EXAMPLE

DRIVE CALCULATION PROCEDURE FOR HORIZONTAL CONVEYING DRIVES

DRIVE DATA

Type of application	Automatic door	
Type of load	Low fluctuation load	
Hours of daily service	12 hours	
Desired pulley pitch diameter	d_1 = 38,2 mm	
Centre distance	c = 3 m	
Mass to carry	m = 100 kg	
Coefficient of friction	μ = 0,3	
Speed	v = 1,5 m/s	
Acceleration	a = 1,5 m/s^2	
Deceleration	a_b = 1,5 m/s^2	
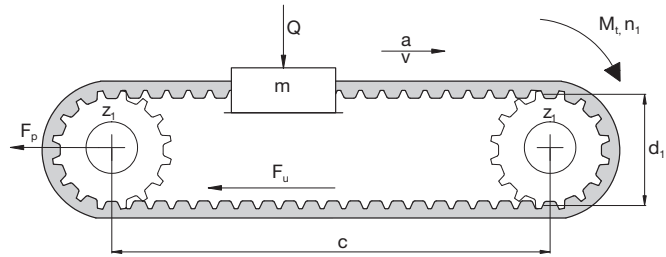
CALCULATION OF THE PERIPHERAL FORCE ON THE TIMING BELT

Since the mass is known, F_u can be calculated:

$$F_u = m \cdot a + m \cdot g \cdot \mu = 100 \cdot 1,5 + 100 \cdot 9,8 \cdot 0,3 = 444 \text{ N}$$

BELT WIDTH AND PROFILE ESTIMATION

With the result of F_u select the belt type profile and approximate the belt width according to DIAGRAM 1 page 10 on "Belt width selection". The first estimation is for a RPP5M15.

CHOICE OF PULLEYS

Knowing the pitch diameter

$$z_1 = \frac{\pi \cdot d_1}{p} = \frac{\pi \cdot 38,2}{5} = 24 > 14$$

where 14 is z_{min} as per belt data page.

Always verify that the chosen z is higher or equal to z_{min} written in belt data pages.

Knowing the linear speed

$$n_1 = \frac{6000 \cdot V}{p \cdot z_1} = \frac{6000 \cdot 1,5}{5 \cdot 24} = 750 \text{ rpm}$$

DETERMINATION OF BELT WIDTH

To calculate the belt width b we need to find out the service factor F_s first:

$$F_s = \frac{F_1 + F_3 + F_4}{F_2} = \frac{1,4 + 0 + 0}{1} = 1,4$$

where:
- F_1, from table page 10, according to input data
- $F_2 = 1$ because $z_m = \frac{z_1}{2} = \frac{24}{2} = 12$
- $F_3 = 0$ because $n_2 / n_1 = 1$
- $F_4 = 0$ because no reverse bending

Then, the belt width b should be calculated using the following formula

$$b = \frac{F_u \cdot F_s \cdot 10}{F_{p, spec} \cdot z_m} = \frac{444 \cdot 1,4 \cdot 10}{28,5 \cdot 12} = 12,17 \text{ mm}$$

We will choose the next higher available width: 20 > 18,7

PRE-TENSIONING
The suggested installation tension is $F_p = 2\,F_u = 2 \cdot 444 = 888$ N

MESHING CHECK

$$\sigma_{BS} = \frac{BS}{F_U + \dfrac{F_p}{2}} = \frac{7780}{444 + \dfrac{888}{2}} = 8,76$$

This value is lower than 11, that is the required minimum. Because of this you should check with the next wider available belt, that is 25 mm. This is the correct width as demonstrated by below calculation

$$\sigma_{BS} = \frac{BS}{F_U + \dfrac{F_p}{2}} = \frac{11150}{444 + \dfrac{888}{2}} = 12,55$$

where 11150 is the BS for a RPP5M25.

ELONGATION
From Belt Elongation diagram at page 24 we will find:

$$\Delta_{I/00} = \frac{\text{Belt's Max Elongation} \cdot \dfrac{F_p}{2}}{BS} = \frac{3,00 \cdot 444}{11150} = 0,12 \text{ mm}$$

where Max Elongation is for the elongation of the specific length at BS.

FINAL SELECTION
The selected belt is RPP5M25.

CALCULATION PARAMETERS

SERVICE FACTOR

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

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

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)

Teeth in mesh	F_2
12	1,0
10	0,8
8	0,6
6	0,4

RATIO FACTOR (F_3)

Speed ratios	F_3
1 / 1,24	0
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 idler

F_4
0,2

BELT WIDTH SELECTION

DIAGRAM 1

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 vibration 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:

$$f = \frac{1}{2t} \cdot \sqrt{\frac{T_s}{m}} \qquad \text{or} \qquad T_s = 4 \cdot m \cdot t^2 \cdot f^2$$

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 ALIGNEMENT

For a correct system functioning and to increase belt life, it is necessary a correct pulley installation: pulleys have 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 the complete equipment.
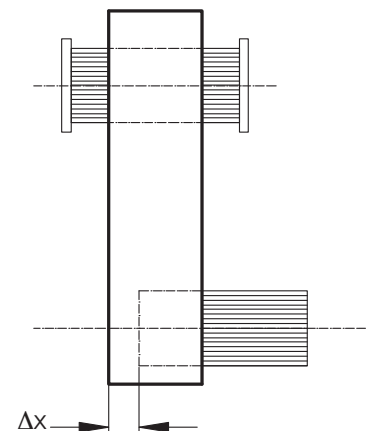
To grant a correct belt running α and Δx must be as smaller as possible. For more information, please contact our technical staff.
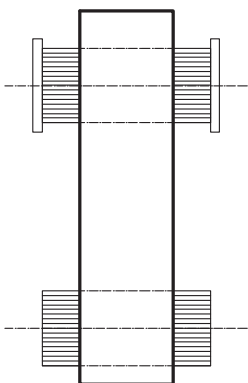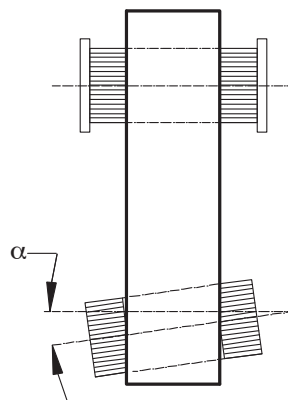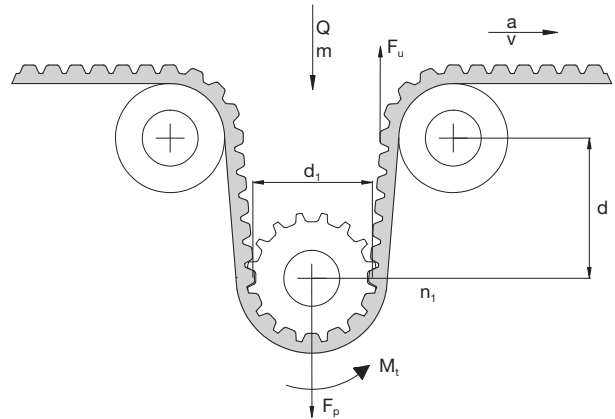
Drawing 1   **Drawing 2**   **Drawing 3**

BELT INSTALLATION AND FEASIBILITY TABLE

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:

d = 4 • belt width

Suggested angle 120°

drawing 4

FEASIBILITY TABLE

MEGADYNE manufactures a wide range of Rubber Open End Belts. In the next table a general overview is shown of the today 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 Department or check page "Special Execution Feasibility".
Please consider that special version might have different performance from what declared in belt data pages.

	Trapezoidal Profile				Parabolic Profile					Standard Profile
	MXL	**XL**	**L**	**H**	**RPP 3M**	**RPP 5M**	**RPP 8M**	**SILVER 5**	**SILVER 8**	**STD 8M**
STANDARD	S	S	S	P	S	P	P	S	S	S

P = Ex stock (production process: Straight cut)
S = Ex stock (production process: Spiral cut)

	Problems	Causes	Correction Action
Excessive 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 Damages	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 or 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 by extreme temperatures.
		Diameter of pulley is below specified minimum.	Increase the diameter of the pulleys.
		Excessive exposure to UV radiation.	Reduce 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.

MXL OPEN-END (SPIRAL CUT)

BELT CHARACTERISTICS

STANDARD WIDTHS (inch)	025	031	037
STANDARD WIDTHS (mm)	**6,35**	**7,87**	**9,39**
Weight (gr/m)	8,5	10,5	13,0

Standard compound: **Chloroprene 74 ± 4 ShA**
Standard tooth cover: **nylon fabric**
Standard cord: **glass**
Standard width tolerance: **± 0,4 mm**
Standard thickness tolerance: **± 0,25 mm**
Standard length tolerance: **± 0,8 mm/m**
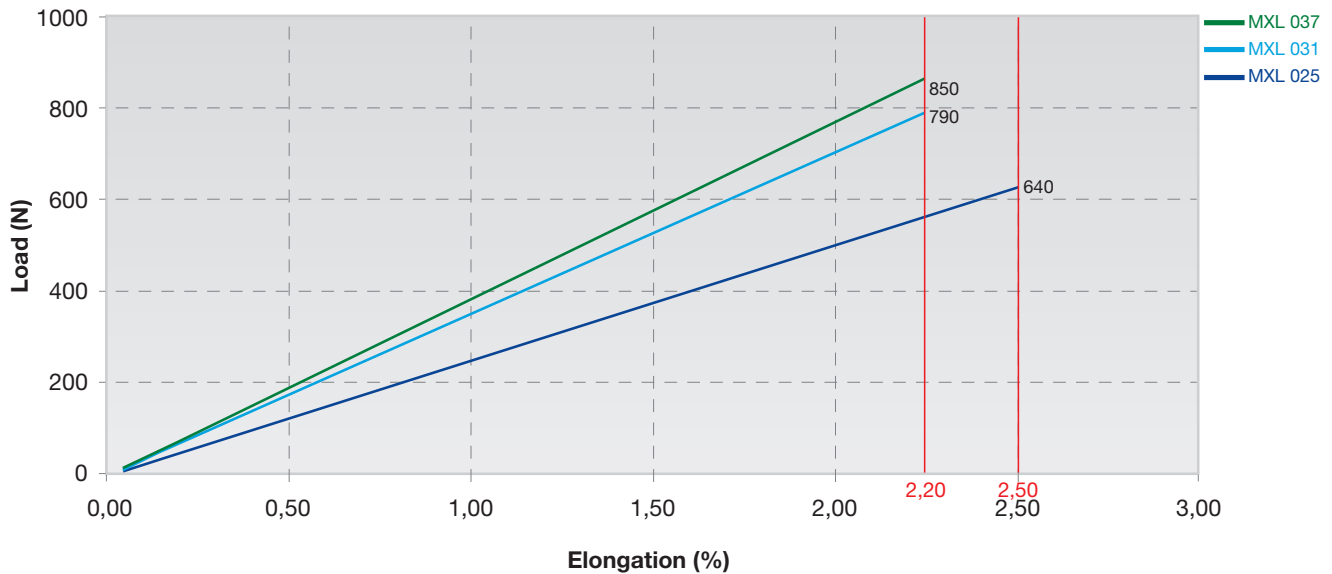Standard roll length: **50 ± 5 m**
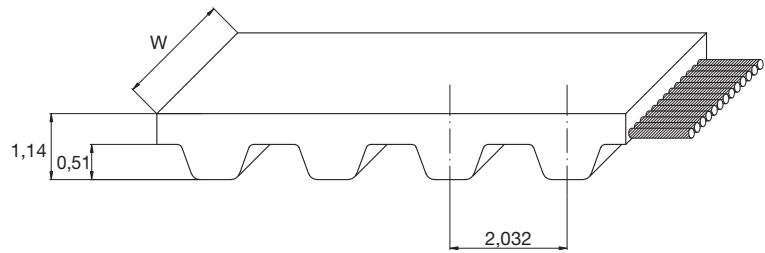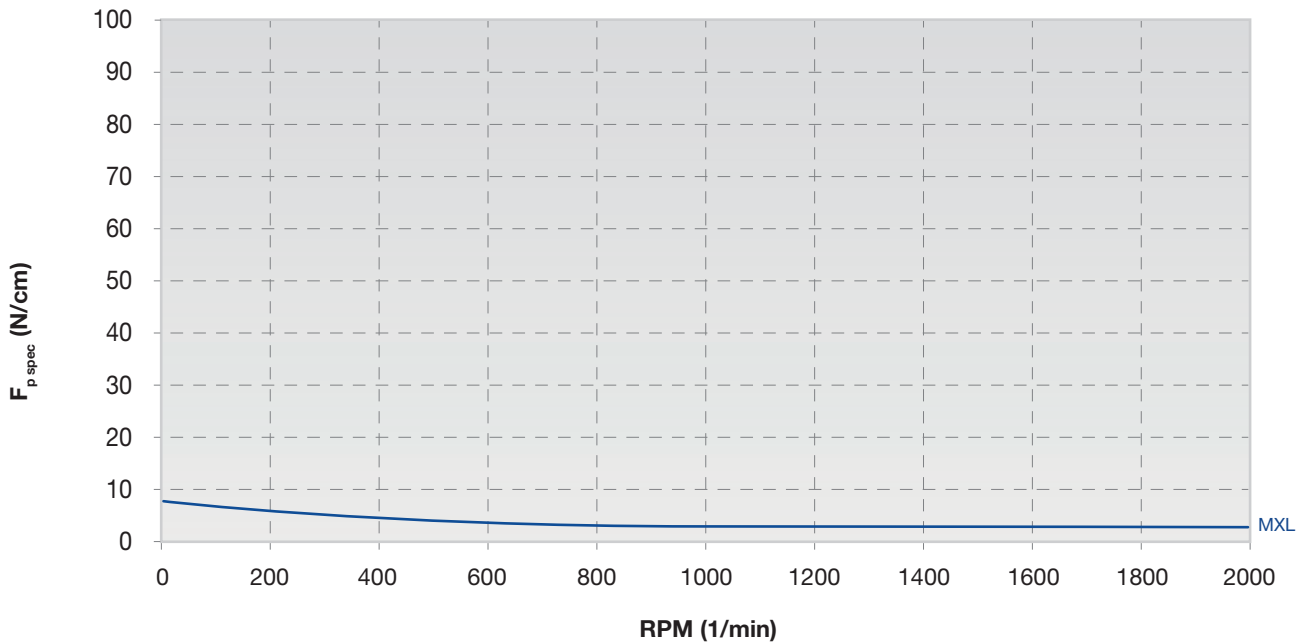
TRACTION RESISTANCE AND ELONGATION DATA

CALCULATION PARAMETERS

Belt Width (inch)	Breaking Strength (N)
025	640
031	790
037	850

BELT ELONGATION

TOOTH RESISTANCE

RPM (1/min)	0	10	50	100	200	500	1000	1500	2000
$F_{p\ spec}$ (N/cm)	6,0	5,8	5,5	5,0	4,5	4,0	3,5	3,3	3,0

FLEXION RESISTANCE
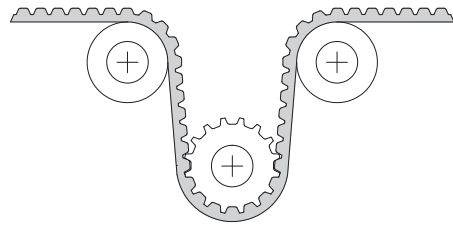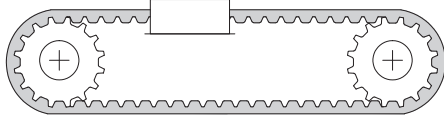
	z_{min}		z_{min}	Idler min dia (mm)
Glass cords	12		14	20

PULLEYS (for more details please see our pulleys catalogue)

N° of teeth	Dp	De	N° of teeth	Dp	De
12	7,76	7,25	28	18,11	17,60
13	8,41	7,90	30	19,40	18,89
14	9,06	8,55	32	20,70	20,19
15	9,70	9,19	34	21,99	21,48
16	10,35	9,84	36	23,29	22,78
17	11,00	10,49	40	25,87	25,36
18	11,64	11,13	42	27,17	26,66
19	12,29	11,78	44	28,46	27,95
20	12,94	12,43	48	31,05	30,54
21	13,58	13,07	60	38,81	38,30
22	14,23	13,72	65	42,04	41,53
24	15,52	15,01	72	46,57	46,06
26	16,82	16,30			

XL OPEN-END (SPIRAL CUT)

BELT CHARACTERISTICS

STANDARD WIDTHS (inch)	025	031	037
STANDARD WIDTHS (mm)	6,35	7,87	9,39
Weight (gr/m)	14,0	17,5	21,0

Standard compound: **Chloroprene 74 ± 4 ShA**
Standard tooth cover: **nylon fabric**
Standard cord: **glass**
Standard width tolerance: **-0,8/+0,4 mm**
Standard thickness tolerance: **± 0,25 mm**
Standard length tolerance: **± 0,8 mm/m**
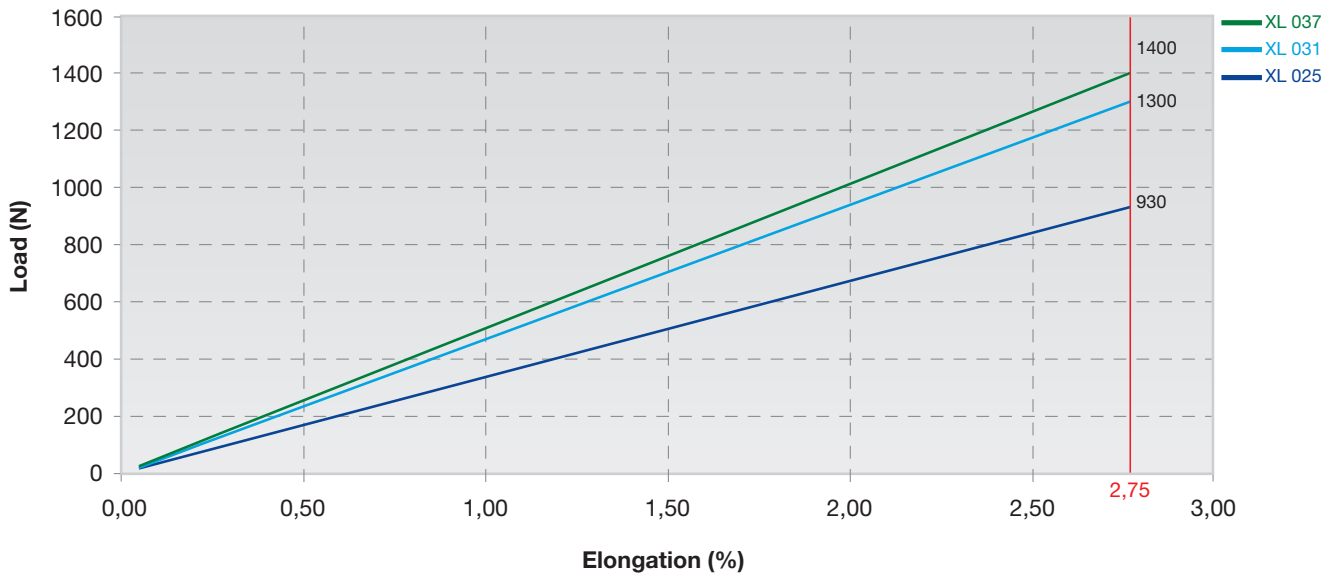Standard roll length: **50 ± 5 m**
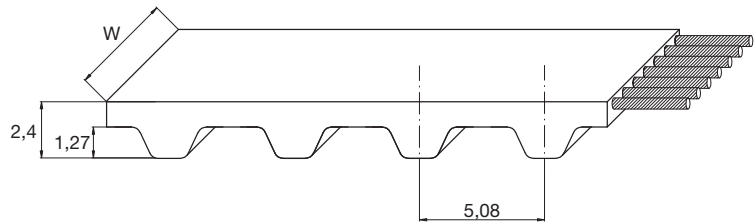
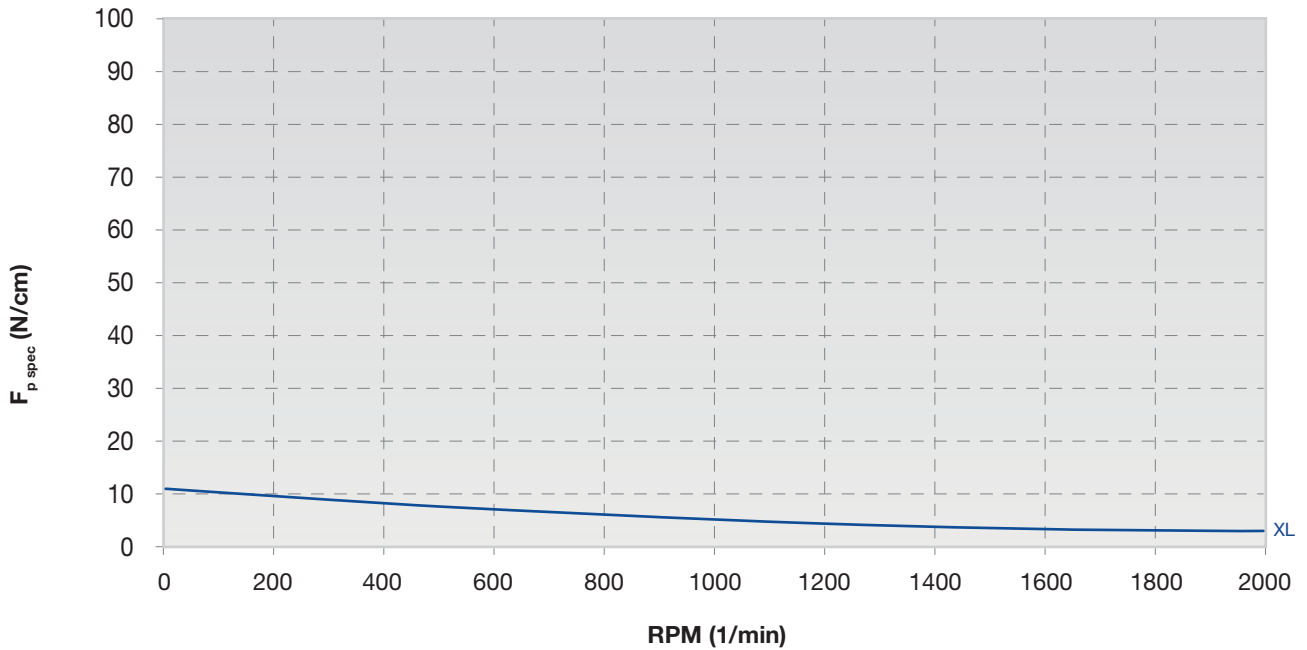## TRACTION RESISTANCE AND ELONGATION DATA

CALCULATION PARAMETERS

Belt Width (inch)	Breaking Strength (N)
025	930
031	1300
037	1400

BELT ELONGATION

TOOTH RESISTANCE

RPM (1/min)	0	10	50	100	200	500	1000	1500	2000
$F_{p\ spec}$ (N/cm)	10,0	9,8	9,5	9,0	8,0	7,3	6,5	6,0	5,8

FLEXION RESISTANCE

	z_{min}	z_{min}	Idler min dia (mm)
Glass cords	10	12	35

PULLEYS (for more details please see our pulleys catalogue)
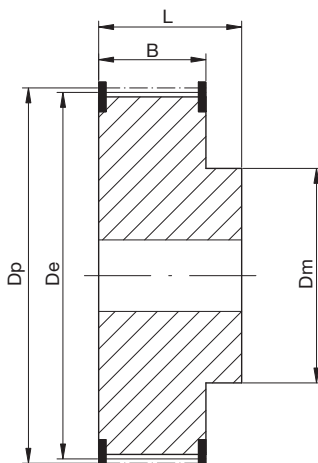
N° of teeth	Dp	De	N° of teeth	Dp	De
10	16,17	15,66	26	42,04	41,53
11	17,79	17,28	27	43,66	43,16
12	19,40	18,89	28	45,28	44,77
13	21,02	20,51	29	46,89	46,38
14	22,64	22,13	30	48,51	48,00
15	24,26	23,75	32	51,74	51,23
16	25,87	25,36	34	54,98	54,47
17	27,49	26,98	35	56,60	56,09
18	29,11	28,60	36	58,21	57,70
19	30,72	30,21	38	61,45	60,94
20	32,34	31,83	39	63,06	62,55
21	33,96	33,45	40	64,68	64,17
22	35,57	35,07	42	67,91	67,40
24	38,81	38,30	44	71,15	70,64

L OPEN-END (SPIRAL CUT)

BELT CHARACTERISTICS

STANDARD WIDTHS (inch)	050	075	100
STANDARD WIDTHS (mm)	12,70	19,05	25,40
Weight (gr/m)	42	62	84

Standard compound: **Chloroprene 74 ± 4 ShA**
Standard tooth cover: **nylon fabric**
Standard cord: **glass**
Standard width tolerance: **-0,8/+0,4 mm**
Standard thickness tolerance: **± 0,25 mm**
Standard length tolerance: **± 0,8 mm/m**
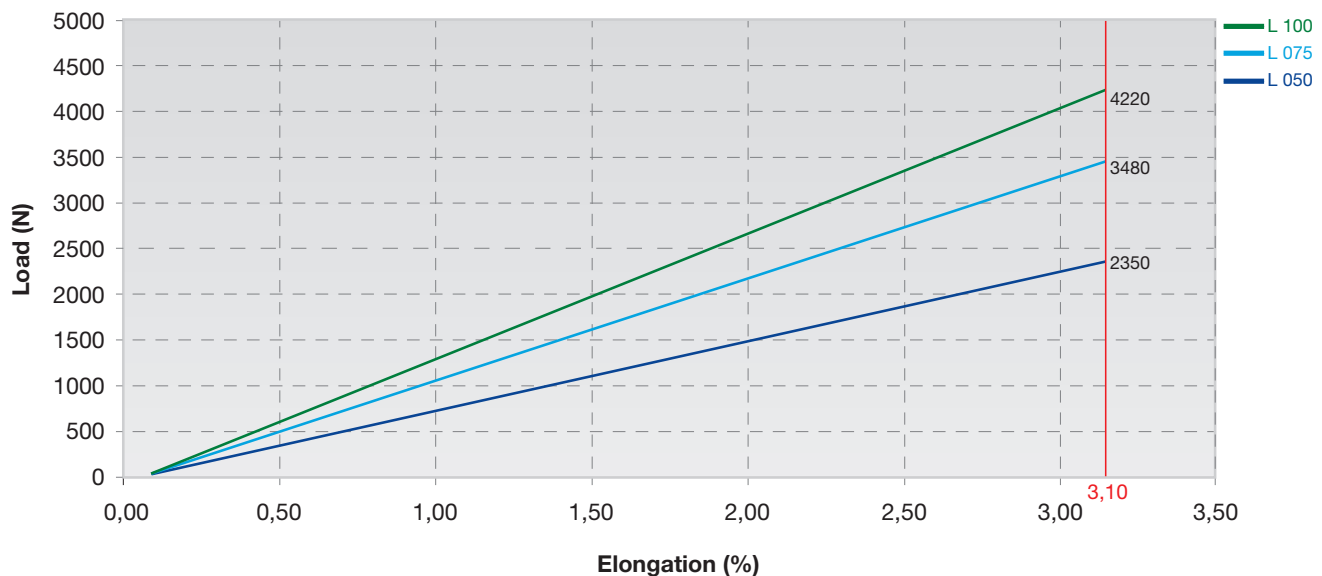Standard roll length: **45 -7/+5 m**
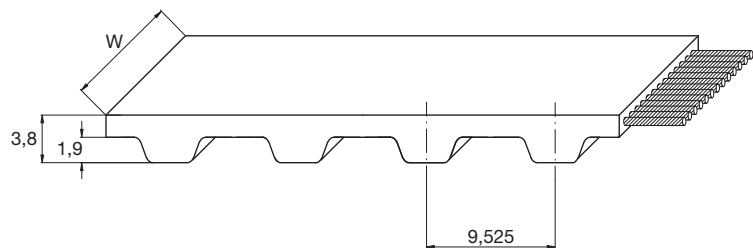
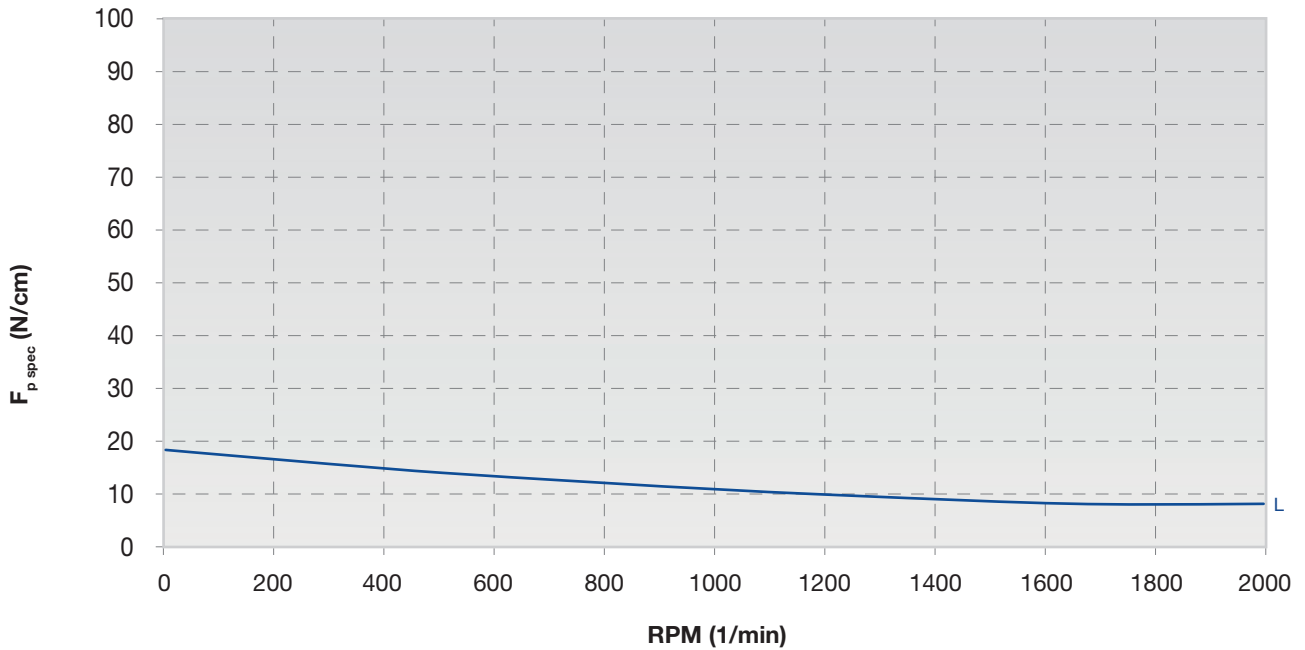## TRACTION RESISTANCE AND ELONGATION DATA

CALCULATION PARAMETERS

Belt Width (inch)	Breaking Strength (N)
050	2350
075	3480
100	4220

BELT ELONGATION

TOOTH RESISTANCE

RPM (1/min)	0	10	50	100	200	500	1000	1500	2000
$F_{p\,spec}$ (N/cm)	18	18	17	17	16	13	11	10	9

FLEXION RESISTANCE
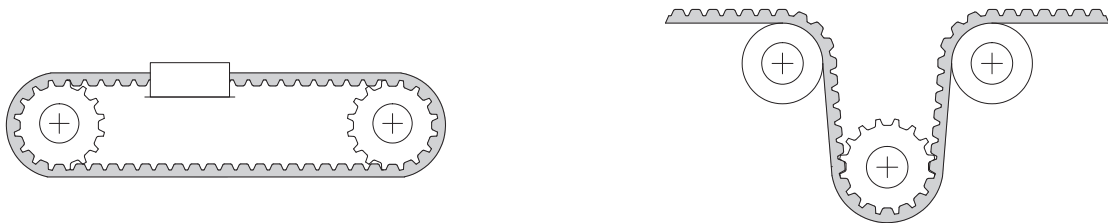
	z_{min}	z_{min}	Idler min dia (mm)
Glass cords	10	14	60

PULLEYS (for more details please see our pulleys catalogue)
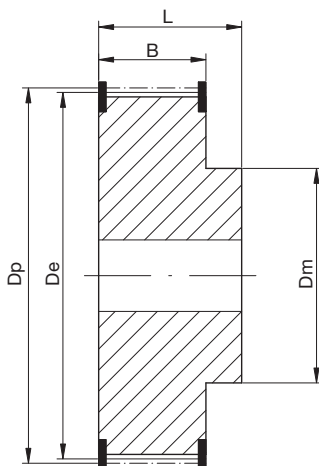
N° of teeth	Dp	De	N° of teeth	Dp	De
10	31,27	30,51	25	75,80	75,04
12	36,38	35,62	26	78,83	78,07
14	42,45	41,69	27	81,86	81,10
15	45,48	44,72	28	84,89	84,13
16	48,51	47,75	29	87,93	87,17
17	51,54	50,78	30	90,96	90,20
18	54,57	53,81	32	97,02	96,26
19	57,61	56,85	34	103,08	102,32
20	60,64	59,88	36	109,15	108,39
21	63,67	62,91	40	121,28	120,52
22	66,70	65,94	44	133,40	132,64
23	69,73	68,97	48	145,53	144,76
24	72,77	72,01			

H OPEN-END (STRAIGHT CUT)

BELT CHARACTERISTICS

STANDARD WIDTHS (inch)	050	075	100	150	200	300
STANDARD WIDTHS (mm)	12,70	19,05	25,40	38,10	50,80	76,20
Weight (gr/m)	55	82	110	165	220	330

Standard compound: **Chloroprene 74 ± 4 ShA**
Standard tooth cover: **nylon fabric**
Standard cord: **glass**
Standard width tolerance: **± 0,8 mm**
Standard thickness tolerance: **± 0,60 mm**
Standard length tolerance: **± 0,8 mm/m**
Standard roll length: **50 ± 5 m**
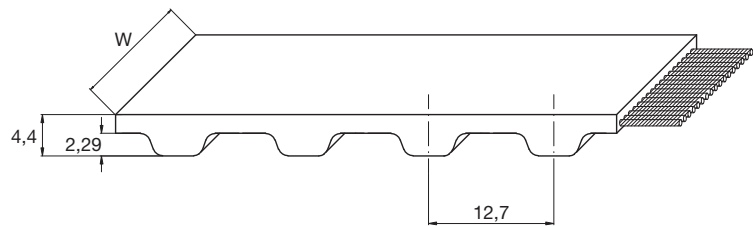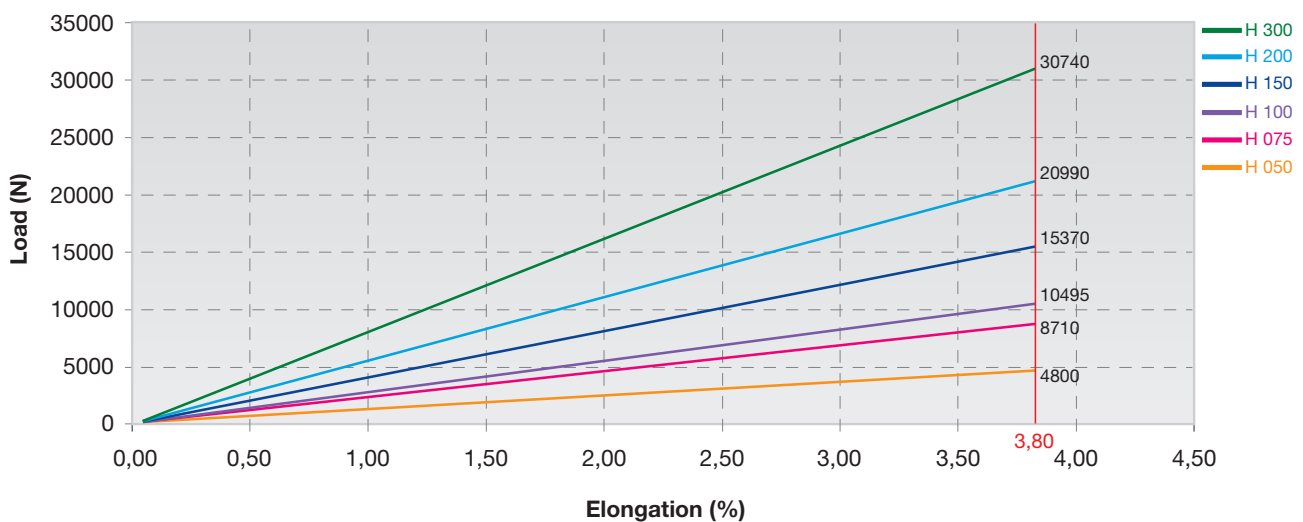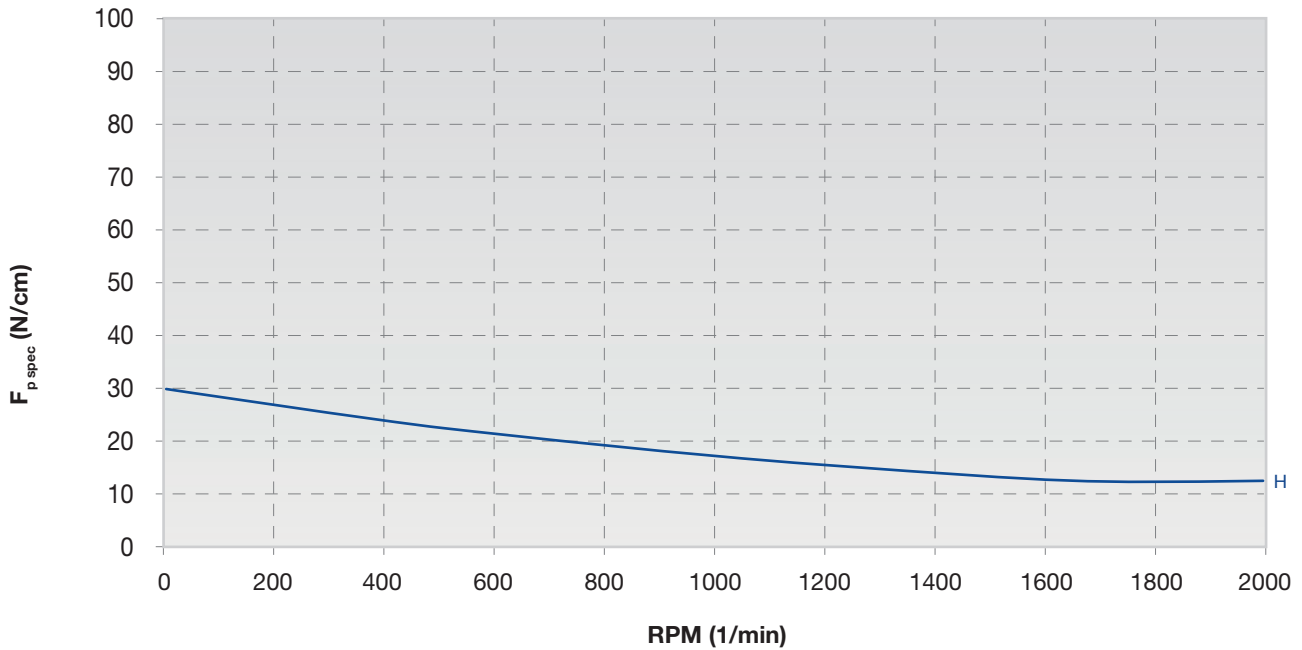
TRACTION RESISTANCE AND ELONGATION DATA

CALCULATION PARAMETERS

Belt Width (inch)	Breaking Strength (N)
050	4800
075	8710
100	10495
150	15370
200	20990
300	30740

BELT ELONGATION

TOOTH RESISTANCE

RPM (1/min)	0	10	50	100	200	500	1000	1500	2000
$F_{p\,spec}$ (N/cm)	30	29	28	27	25	22	18	16	14

FLEXION RESISTANCE
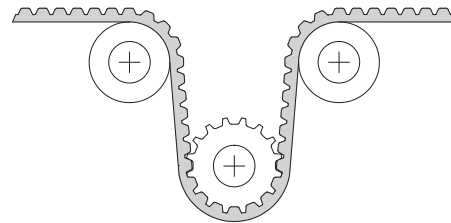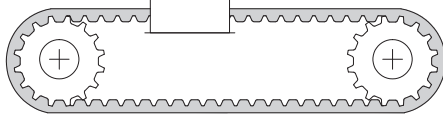
	z_{min}	z_{min}	Idler min dia (mm)
Glass cords	14	14	80

PULLEYS (for more details please see our pulleys catalogue)
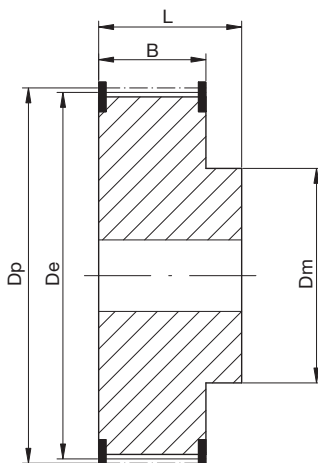
N° of teeth	Dp	De	N° of teeth	Dp	De
14	56,60	55,23	28	113,19	111,82
15	60,64	59,27	29	117,23	115,86
16	64,68	63,31	30	121,28	119,91
17	68,72	67,35	32	129,36	127,99
18	72,77	71,40	33	133,40	132,03
19	76,81	75,44	34	137,45	136,08
20	80,85	79,48	35	141,49	140,12
21	84,89	83,52	36	145,53	144,16
22	88,94	87,57	38	153,62	152,25
23	92,98	91,61	40	161,70	160,33
24	97,02	95,65	44	177,87	176,50
25	101,06	99,69	48	194,04	192,67
26	105,11	103,74	52	210,21	208,84
27	109,15	107,78	60	242,55	241,18

RPP3 OPEN-END (SPIRAL CUT)

BELT CHARACTERISTICS

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

Standard compound: **Chloroprene 74 ± 4 ShA**
Standard tooth cover: **nylon fabric**
Standard cord: **glass**
Standard width tolerance: **± 0,4 mm**
Standard thickness tolerance: **± 0,25 mm**
Standard length tolerance: **± 0,8 mm/m**
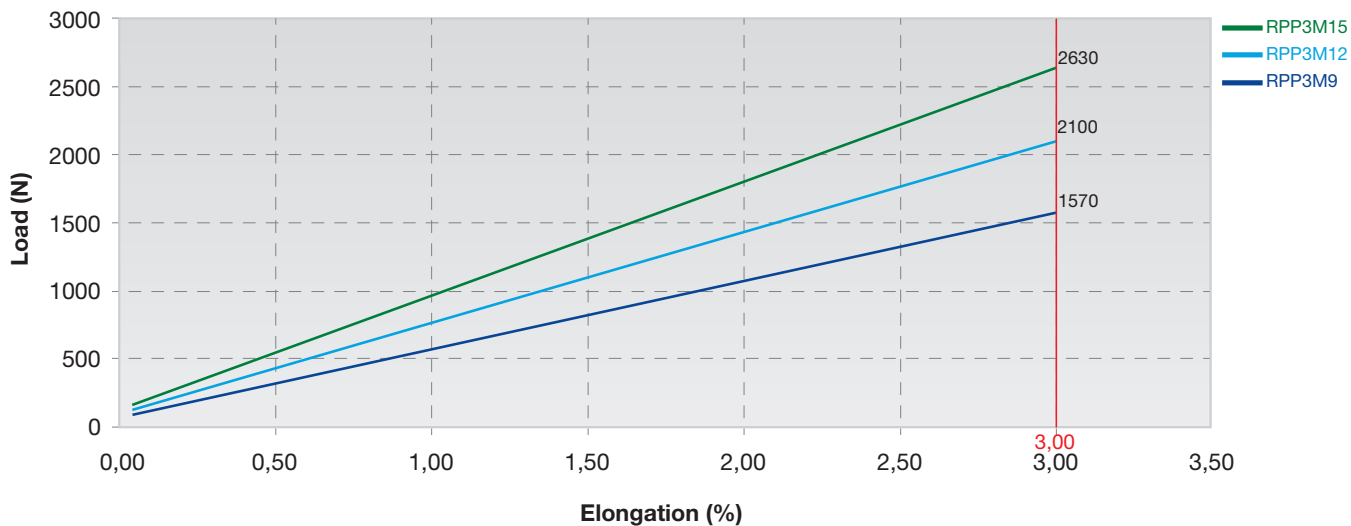Standard roll length: **50 ± 5 m**
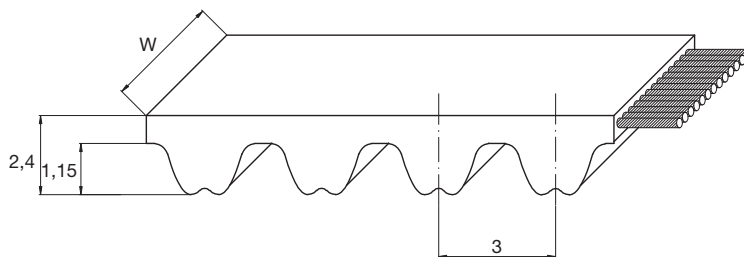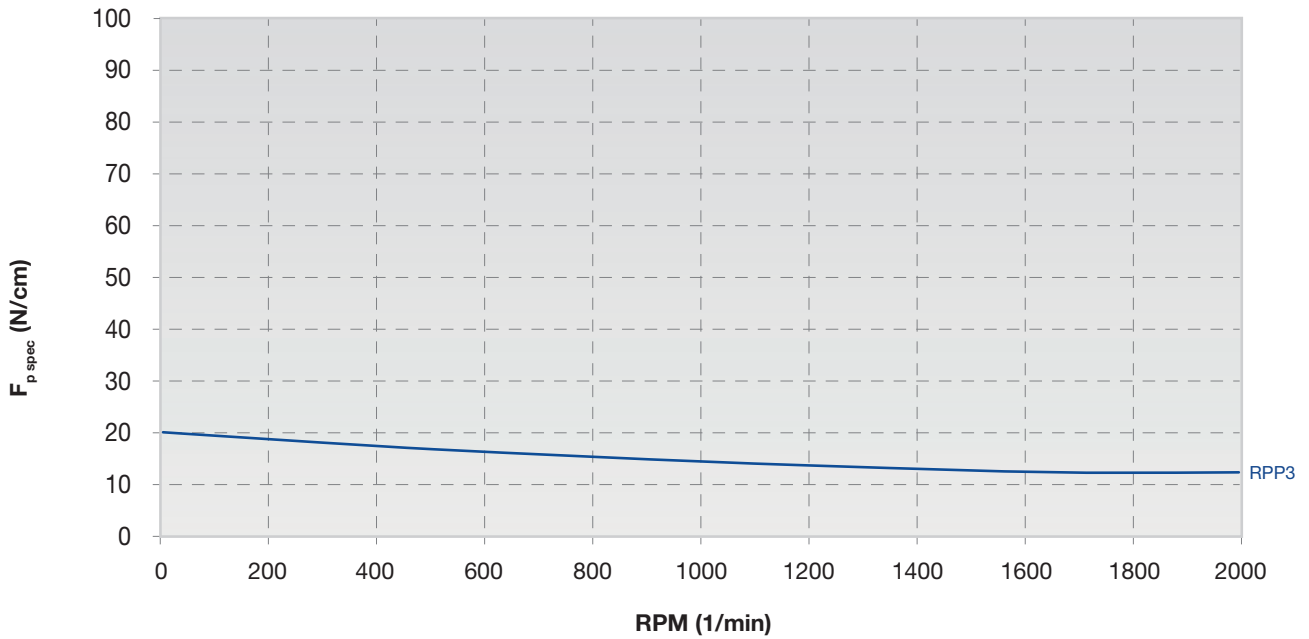
TRACTION RESISTANCE AND ELONGATION DATA

CALCULATION PARAMETERS

Belt Width (mm)	Breaking Strength (N)
9	1570
12	2100
15	2630

BELT ELONGATION

TOOTH RESISTANCE

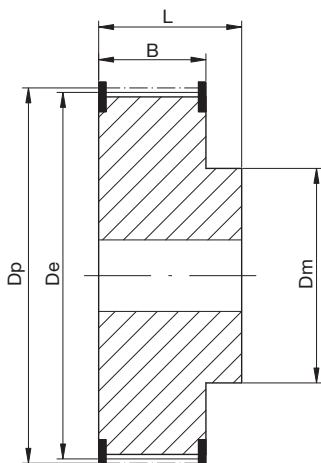| RPM (1/min)	0	10	50	100	200	500	1000	1500	2000
$F_{p\,spec}$ (N/cm)	21	21	20	20	19	17	15	14	13

Meshing Check is very suggested because of the belt's elasticity. To safeguard the correct meshing it might be possible that Meshing Check leads to a wider belt.

FLEXION RESISTANCE

	z_{min}	z_{min}	Idler min dia (mm)
Glass cords	10	14	30

PULLEYS (for more details please see our pulleys catalogue)

N° of teeth	Dp	De	N° of teeth	Dp	De
10	9,55	8,79	28	26,74	25,98
12	11,46	10,70	30	28,65	27,89
14	13,37	12,61	32	30,56	29,80
16	15,28	14,52	36	34,38	33,62
18	17,19	16,43	40	38,20	37,44
20	19,10	18,34	44	42,02	41,25
21	20,05	19,29	48	45,84	45,07
22	21,01	20,25	60	57,30	56,53
24	22,92	22,16	72	68,75	67,99
26	24,83	24,07			

RPP5 OPEN-END (STRAIGHT CUT)

BELT CHARACTERISTICS

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

Standard compound: **Chloroprene 74 ± 4 ShA**
Standard tooth cover: **nylon fabric**
Standard cord: **glass**
Standard width tolerance: **± 0,5 mm**
Standard thickness tolerance: **± 0,25 mm**
Standard length tolerance: **± 0,8 mm/m**
Standard roll length: **50 ± 5 m**
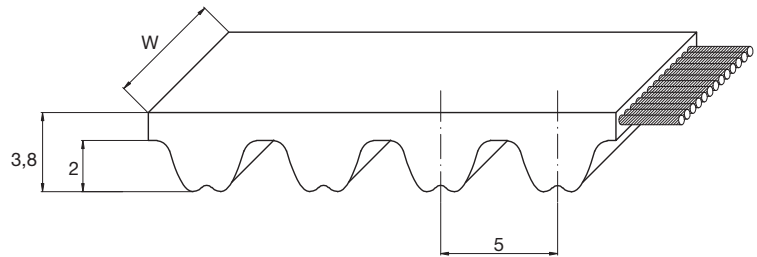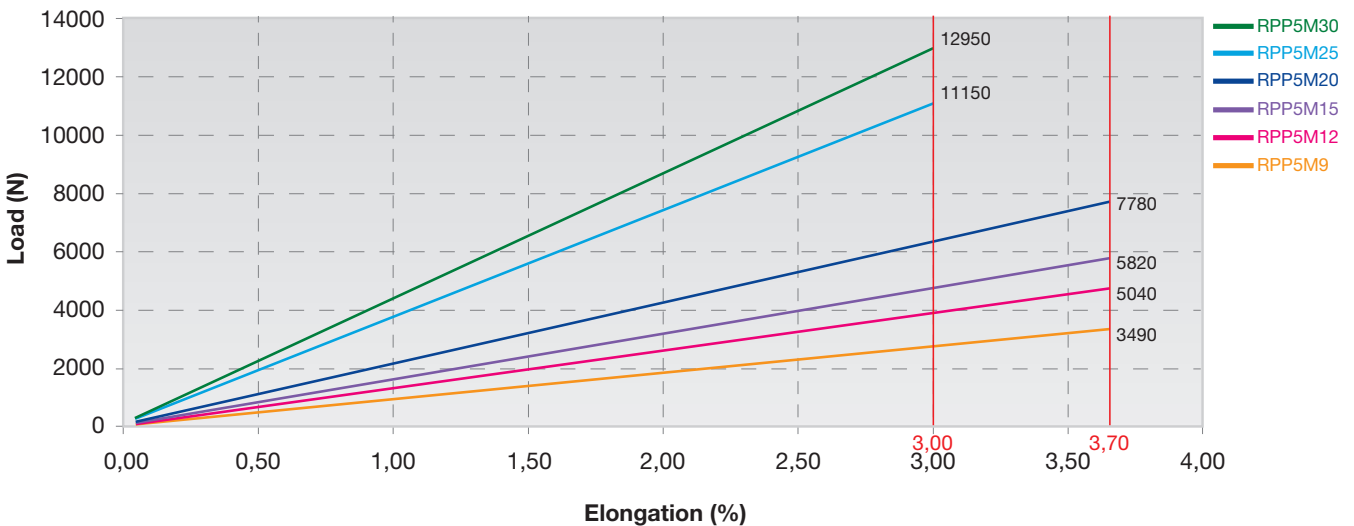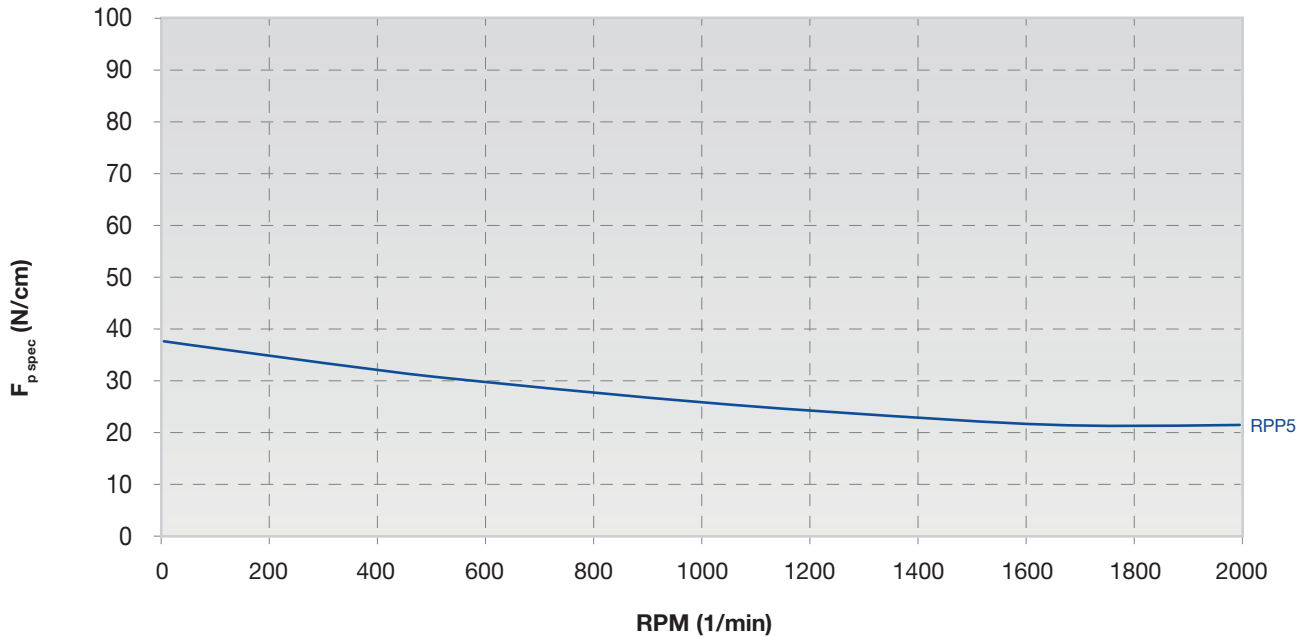
TRACTION RESISTANCE AND ELONGATION DATA

CALCULATION PARAMETERS

Belt Width (mm)	Breaking Strength (N)
9	3490
12	5040
15	5820
20	7780
25	11150
30	12950

BELT ELONGATION

TOOTH RESISTANCE

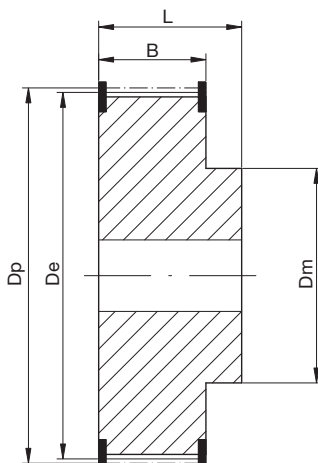| RPM (1/min)	0	10	50	100	200	500	1000	1500	2000
F$_{p\ spec}$ (N/cm)	**38**	**38**	**37**	**36**	**34**	**31**	**26**	**23**	**22**

Meshing Check is very suggested because of the belt's elasticity. To safeguard the correct meshing it might be possible that Meshing Check leads to a wider belt.

FLEXION RESISTANCE

	z$_{min}$	z$_{min}$	Idler min dia (mm)
Glass cords	12	16	50

PULLEYS (for more details please see our pulleys catalogue)

N° of teeth	Dp	De	N° of teeth	Dp	De
12	19,10	17,96	28	44,56	43,42
14	22,28	21,14	30	47,75	46,60
15	23,87	22,73	32	50,93	49,79
16	25,46	24,32	36	57,30	56,15
18	28,65	27,50	40	63,66	62,52
20	31,83	30,69	44	70,03	68,89
21	33,42	32,28	48	76,39	75,25
22	35,01	33,87	60	95,49	94,35
24	38,20	37,05	72	114,59	113,45
26	41,38	40,24			

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 74 ± 4 ShA**
Standard tooth cover: **nylon fabric**
Standard cord: **glass**
Standard width tolerance: **± 0,5 mm**
Standard thickness tolerance: **± 0,40 mm**
Standard length tolerance: **± 0,8 mm/m**
Standard roll length: **50 ± 5 m**
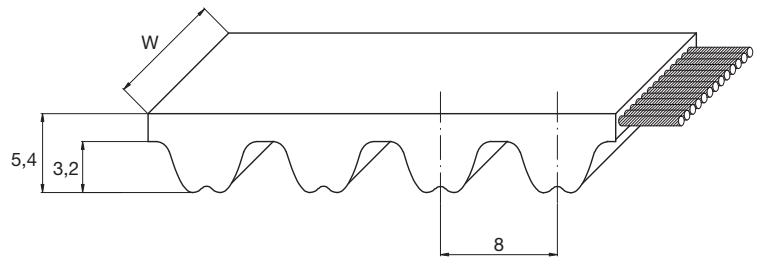
TRACTION RESISTANCE AND ELONGATION DATA

CALCULATION PARAMETERS

Belt Width (mm)	Breaking Strength (N)
10	4200
15	6650
20	7850
25	11100
30	14440
50	24100
85	40950

BELT ELONGATION
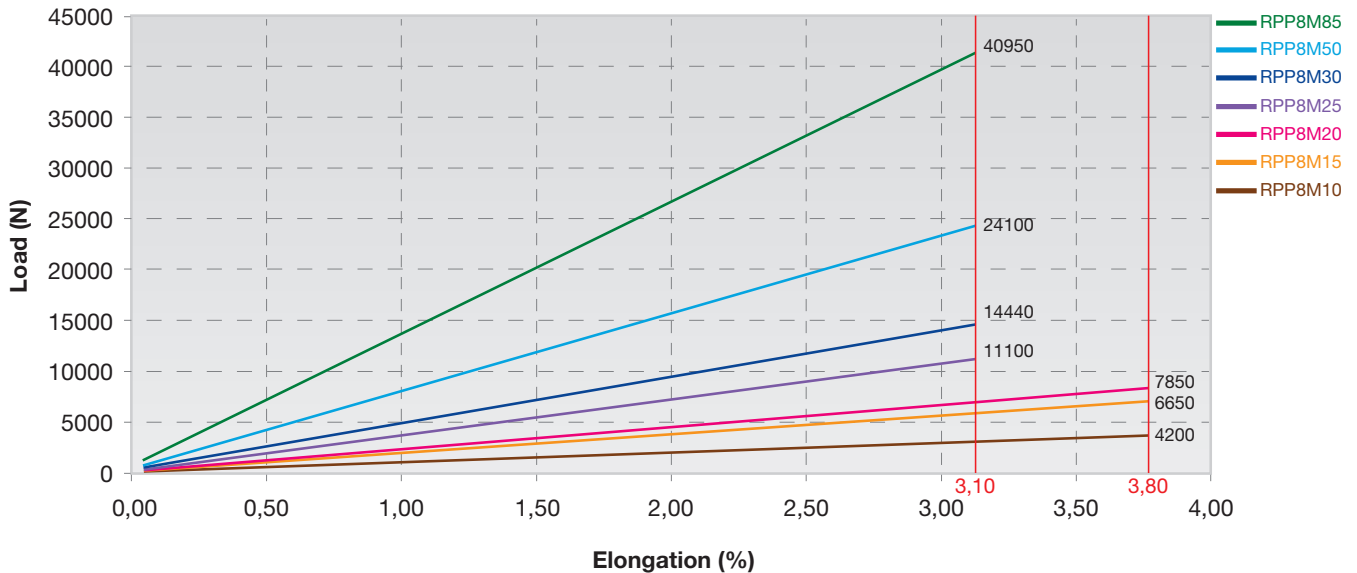
TOOTH RESISTANCE
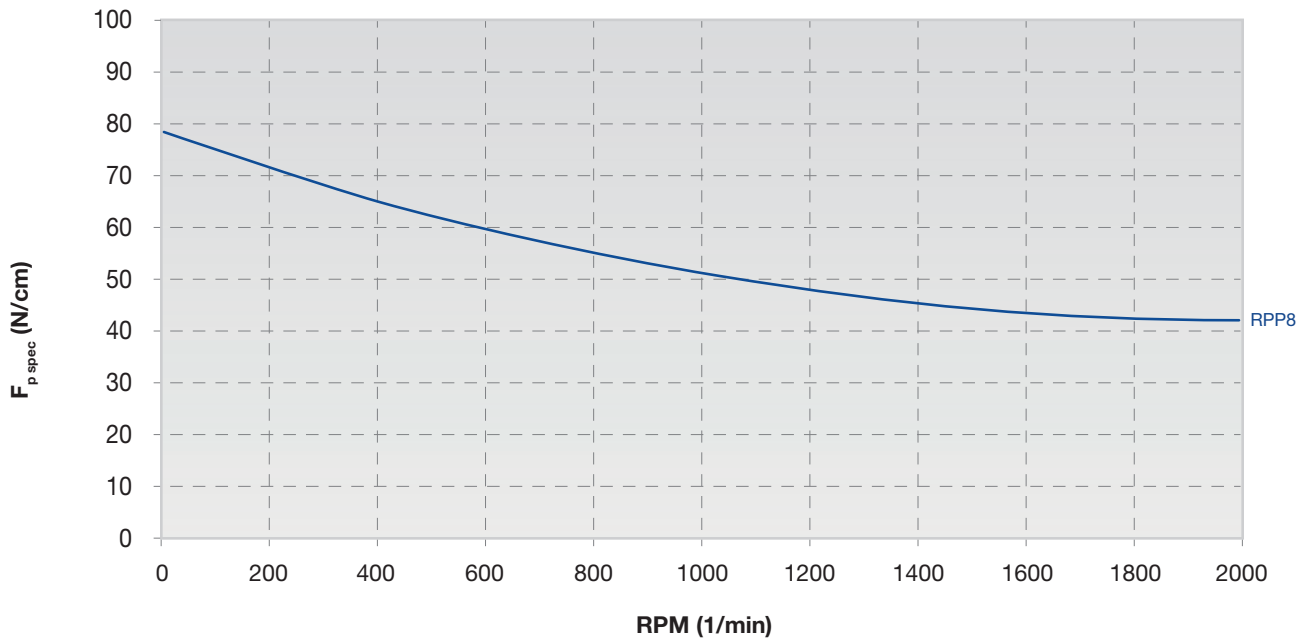
RPM (1/min)	0	10	50	100	200	500	1000	1500	2000
$F_{p\,spec}$ (N/cm)	**78**	**77**	**76**	**74**	**70**	**61**	**51**	**47**	**44**

Meshing Check is very suggested because of the belt's elasticity. To safeguard the correct meshing it might be possible that Meshing Check leads to a wider belt.

FLEXION RESISTANCE

	z_{min}	z_{min}	Idler min dia (mm)
Glass cords	22	22	100

PULLEYS (for more details please see our pulleys catalogue)
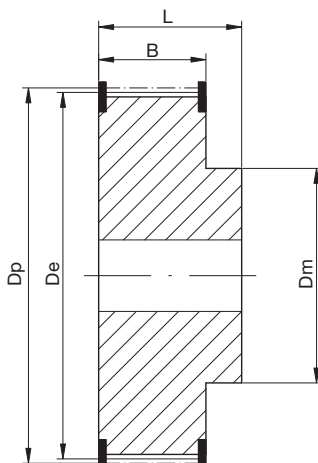
N° of teeth	Dp	De	N° of teeth	Dp	De
22	56,02	54,65	48	122,23	120,86
24	61,12	59,74	54	137,51	136,14
26	66,21	64,84	64	162,97	161,60
28	71,30	69,93	72	183,35	181,97
30	76,39	75,02	80	203,72	202,35
32	81,49	80,12	90	229,18	227,81
34	86,58	85,21	112	285,20	283,83
36	91,67	90,30	144	366,69	365,32
38	96,77	95,39	168	427,81	426,44
40	101,86	100,49	192	488,92	487,55
44	112,05	110,67			

SILVER5 OPEN-END (SPIRAL CUT)

BELT CHARACTERISTICS

STANDARD WIDTHS (mm)	15	25
Weight (gr/m)	67	112

Standard compound: **Chloroprene 90 ± 4 ShA**
Standard tooth cover: **nylon fabric**
Standard cord: **glass**
Standard width tolerance: **± 0,5 mm**
Standard thickness tolerance: **± 0,25 mm**
Standard length tolerance: **± 0,8 mm/m**
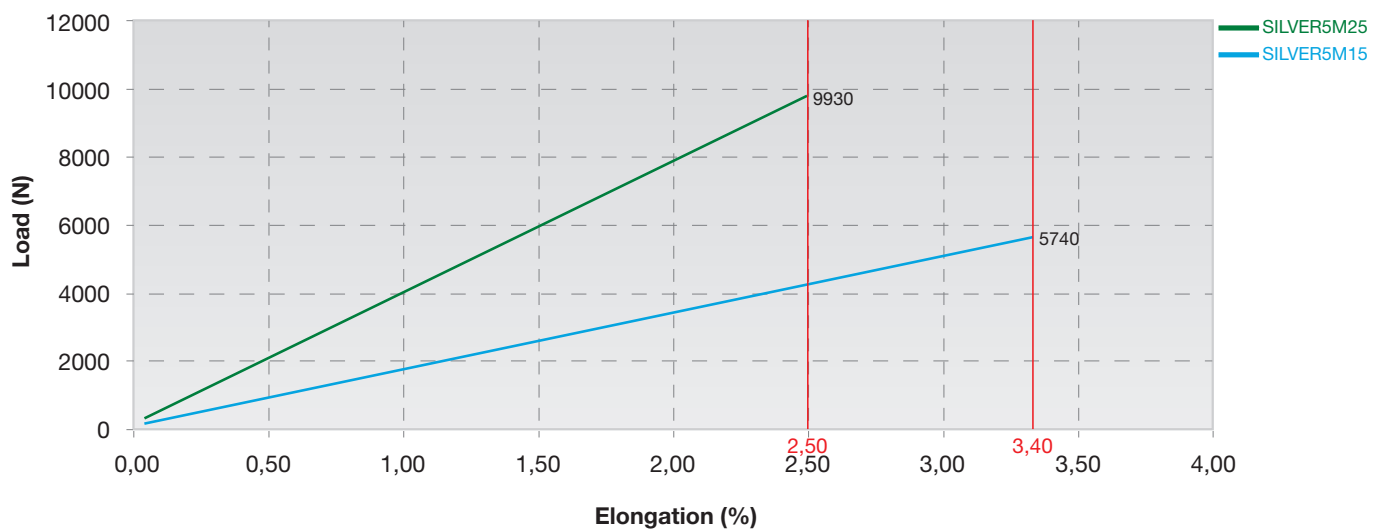Standard roll length: **60 m ± 5 m**
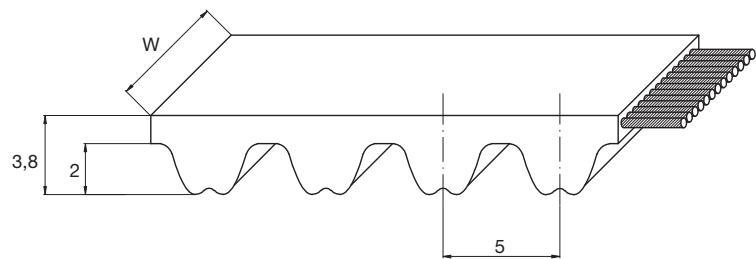
W

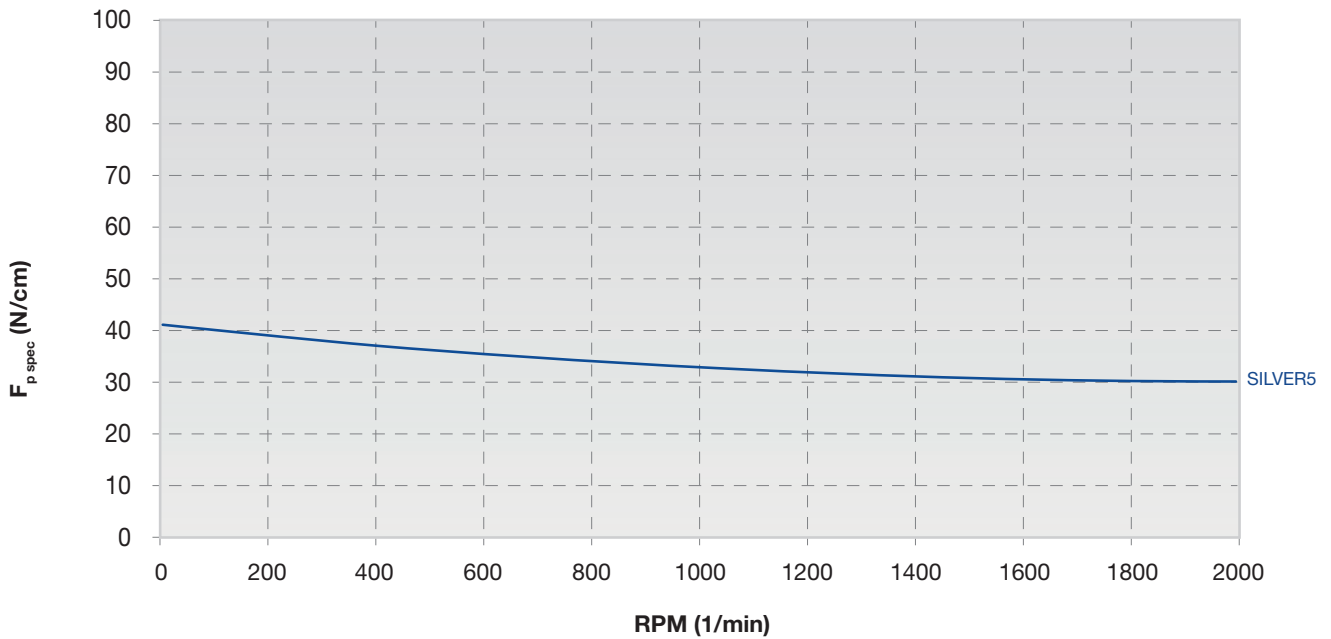3,8   2

5

TRACTION RESISTANCE AND ELONGATION DATA

CALCULATION PARAMETERS

Belt Width (mm)	Breaking Strength (N)
15	5740
25	9930

BELT ELONGATION

TOOTH RESISTANCE

RPM (1/min)	0	10	50	100	200	500	1000	1500	2000
$F_{p\ spec}$ (N/cm)	**43**	**43**	**42**	**41**	**40**	**36**	**32**	**30**	**28**

Meshing Check is very suggested because of the belt's elasticity. To safeguard the correct meshing it might be possible that Meshing Check leads to a wider belt.

FLEXION RESISTANCE

	z_{min}	z_{min}	Idler min dia (mm)
Glass cords	12	16	50

PULLEYS (for more details please see our pulleys catalogue)

N° of teeth	Dp	De	N° of teeth	Dp	De
12	19,10	17,96	28	44,56	43,42
14	22,28	21,14	30	47,75	46,60
15	23,87	22,73	32	50,93	49,79
16	25,46	24,32	36	57,30	56,15
18	28,65	27,50	40	63,66	62,52
20	31,83	30,69	44	70,03	68,89
21	33,42	32,28	48	76,39	75,25
22	35,01	33,87	60	95,49	94,35
24	38,20	37,05	72	114,59	113,45
26	41,38	40,24			

SILVER8 OPEN-END (SPIRAL CUT)

BELT CHARACTERISTICS

STANDARD WIDTHS (mm)	10	15	20	25
Weight (gr/m)	55	83	110	138

Standard compound: **Chloroprene 90 ± 4 ShA**
Standard tooth cover: **nylon fabric**
Standard cord: **glass**
Standard width tolerance: **± 0,5 mm**
Standard thickness tolerance: **± 0,40 mm**
Standard length tolerance: **± 0,8 mm/m**
Standard roll length: **50 ± 5 m**
Antistatic in standard version (according BS 2050)
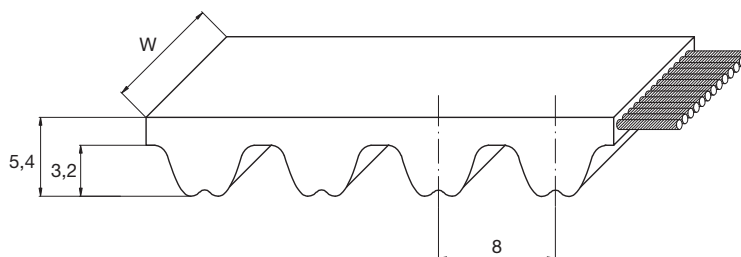
TRACTION RESISTANCE AND ELONGATION DATA

CALCULATION PARAMETERS

Belt Width (mm)	Breaking Strength (N)
10	5300
15	8265
20	11025
25	12250

BELT ELONGATION

TOOTH RESISTANCE

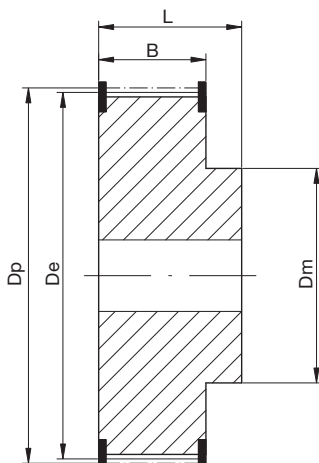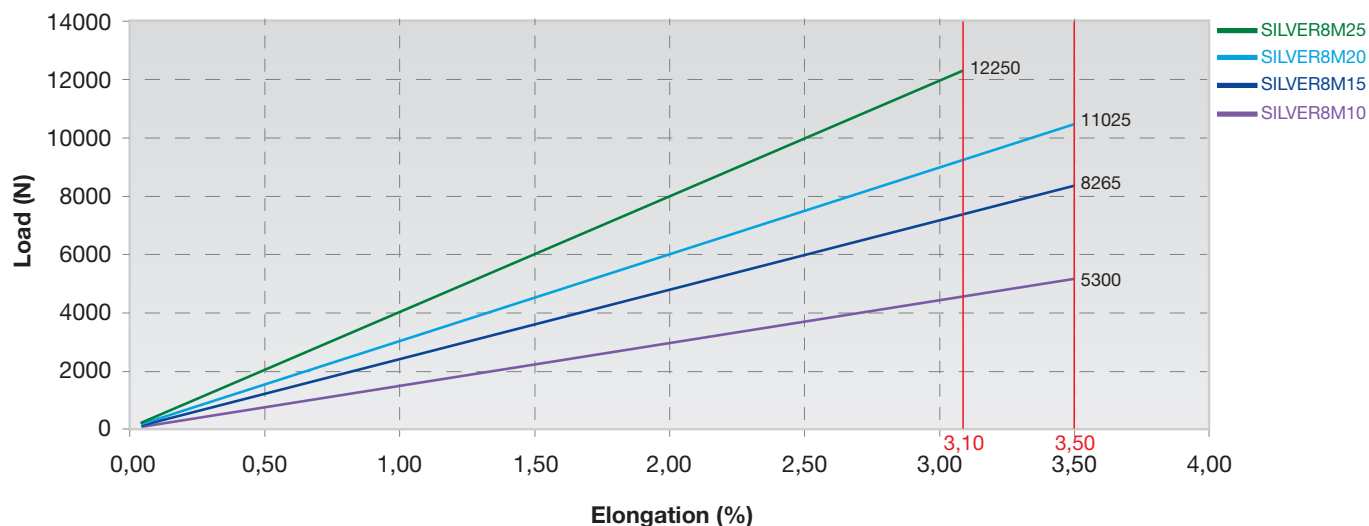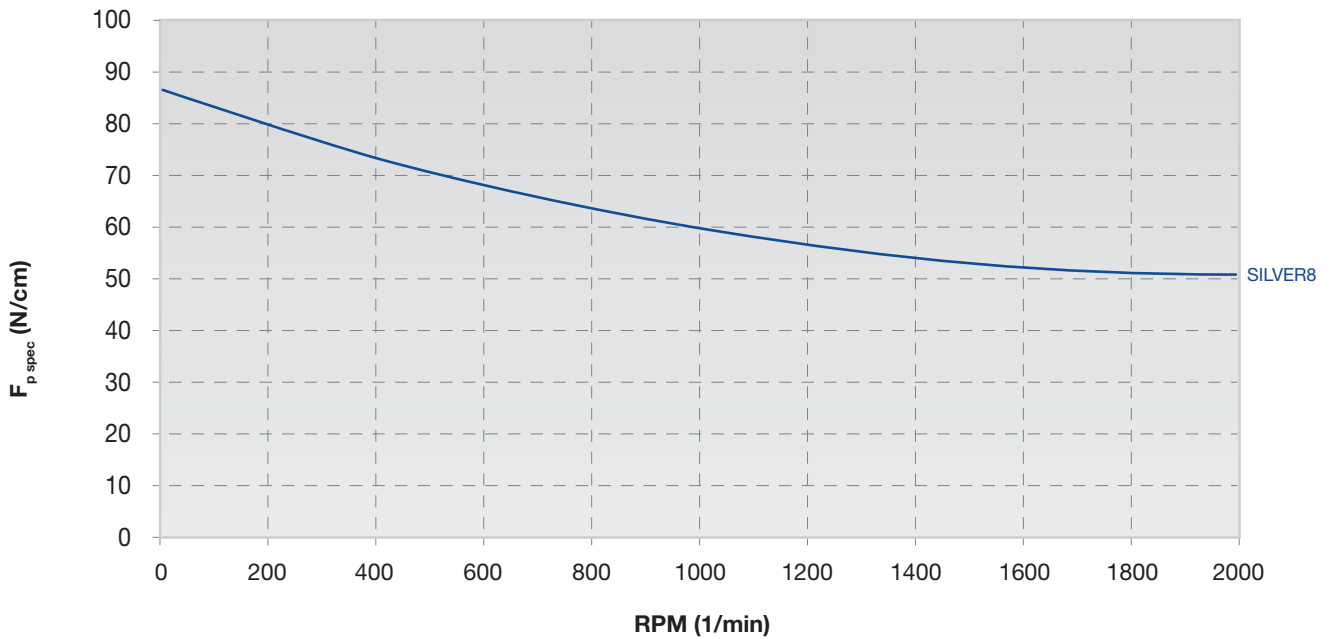| RPM (1/min)	0	10	50	100	200	500	1000	1500	2000
$F_{p\,spec}$ (N/cm)	87	86	82	81	79	68	59	55	51

Meshing Check is very suggested because of the belt's elasticity. To safeguard the correct meshing it might be possible that Meshing Check leads to a wider belt.

FLEXION RESISTANCE

	z_{min}		z_{min}	Idler min dia (mm)
Glass cords	22		22	100

PULLEYS (for more details please see our pulleys catalogue)

N° of teeth	Dp	De	N° of teeth	Dp	De
22	56,02	54,65	48	122,23	120,86
24	61,12	59,74	54	137,51	136,14
26	66,21	64,84	64	162,97	161,60
28	71,30	69,93	72	183,35	181,97
30	76,39	75,02	80	203,72	202,35
32	81,49	80,12	90	229,18	227,81
34	86,58	85,21	112	285,21	283,83
36	91,67	90,30	144	366,69	365,32
38	96,77	95,39	168	427,81	426,44
40	101,86	100,49	192	488,92	487,55
44	112,05	110,67			

STD8 OPEN-END (SPIRAL CUT)

BELT CHARACTERISTICS

STANDARD WIDTHS (mm)	10	12	15	20	25
Weight (gr/m)	55	66	83	110	138

Standard compound: **Chloroprene 74 ± 4 ShA**
Standard tooth cover: **nylon fabric**
Standard cord: **glass**
Standard width tolerance: **± 0,5 mm**
Standard thickness tolerance: **± 0,40 mm**
Standard length tolerance: **± 0,8 mm/m**
Standard roll length: **50 ± 5 m**
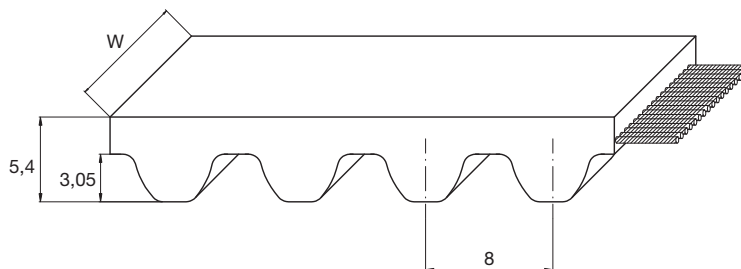
TRACTION RESISTANCE AND ELONGATION DATA

CALCULATION PARAMETERS

Belt Width (mm)	Breaking Strength (N)
10	4200
12	5040
15	6650
20	7850
25	8690

BELT ELONGATION

TOOTH RESISTANCE

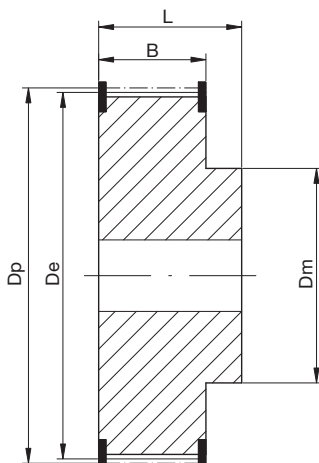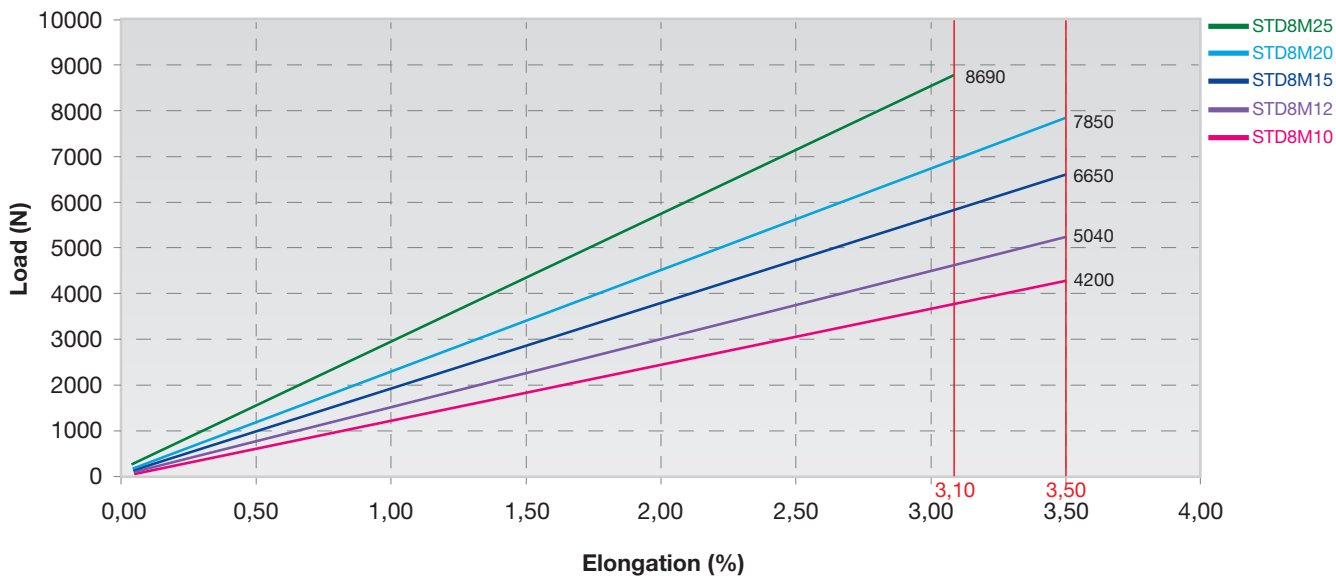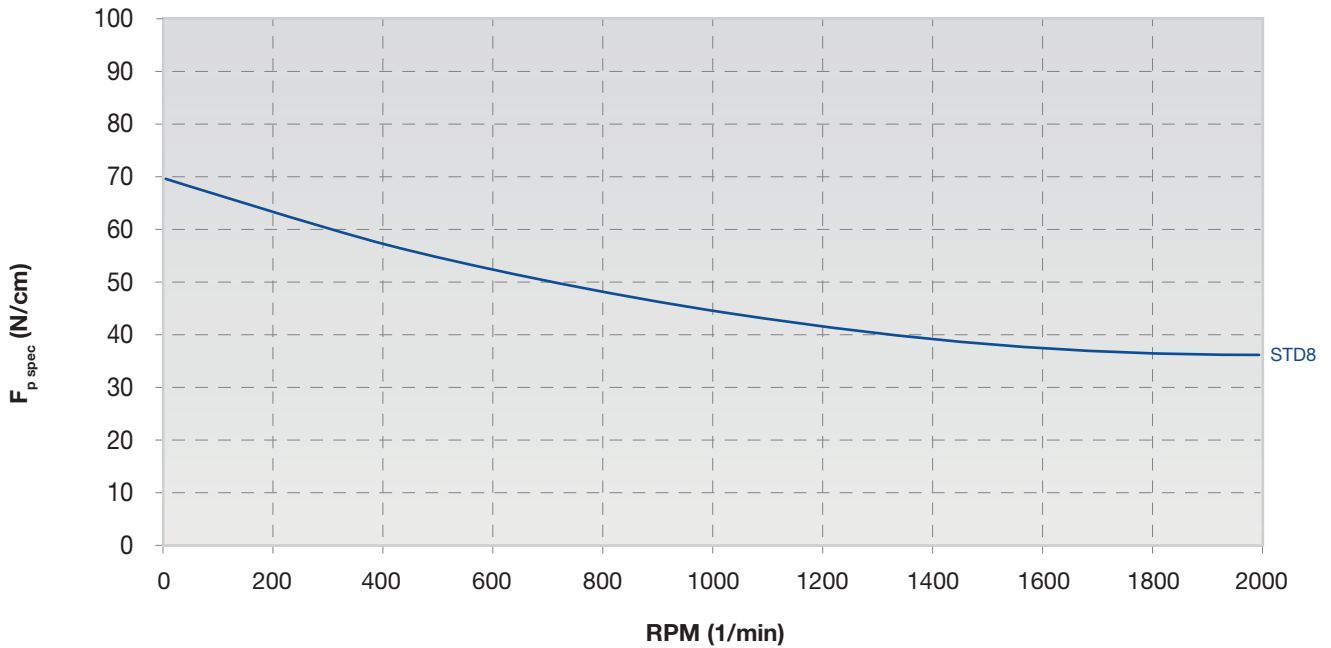| RPM (1/min)	0	10	50	100	200	500	1000	1500	2000
$F_{p\,spec}$ (N/cm)	**70**	**69**	**65**	**63**	**61**	**54**	**44**	**38**	**36**

Meshing Check is very suggested because of the belt's elasticity. To safeguard the correct meshing it might be possible that Meshing Check leads to a wider belt.

FLEXION RESISTANCE

	z_{min}	z_{min}	Idler min dia (mm)
Glass cords	22	22	100

PULLEYS (for more details please see our pulleys catalogue)
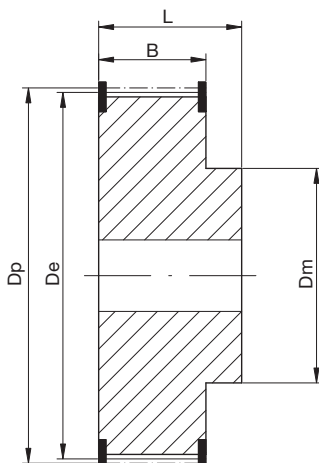
N° of teeth	Dp	De	N° of teeth	Dp	De
22	56,02	54,62	48	122,23	120,83
24	61,12	59,72	56	142,60	141,23
26	66,21	64,81	64	162,97	160,57
28	71,30	69,90	72	183,35	181,95
30	76,39	74,99	80	203,72	202,32
32	81,49	80,09	90	229,18	227,78
34	86,58	85,18	112	285,21	283,81
36	91,67	90,27	144	366,69	365,29
38	96,77	95,37	168	427,81	426,41
40	101,86	100,46	192	488,92	487,52
44	112,05	110,65			

SPECIAL EXECUTION FEASIBILITY

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

SUPER

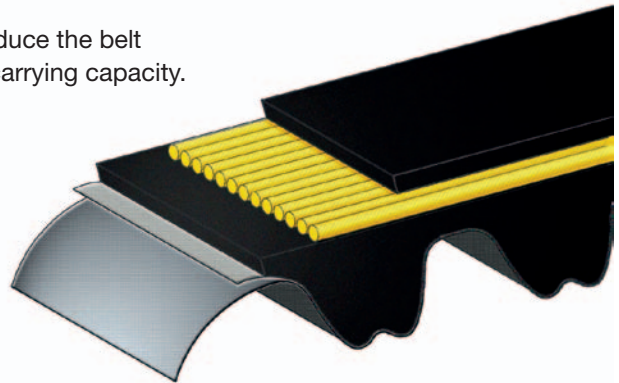On customer's request and with minimum quantity we can produce the belt with a double nylon fabric on teeth surface to improve torque carrying capacity.
The advantages are the following:
- Exceptional resistance to abrasion
- Low coefficient of friction
- Increased drive efficiency
- Increased belt and pulley life

From the table on this book, performances increase 10% by.

SPECIAL CONSTRUCTIONS

On customer's request and with minimum quantity we can produce GOLD5, GOLD8 and PLATINUM8 in open end version up to a width of 25 mm.

ANTISTATIC

On customer's request and with minimum quantity we can produce L, H, RPP5 and RPP8 belts in antistatic version (according to BS 2050). With minimum quantity Megadyne can also produce super-conductive belts overcoming BS 2050 parameters.

HIGH TEMPERATURE

On customer's request and with minimum quantity we can produce RPP8, STD8 and H belts suitable for temperatures up to 130°C.

SPECIAL BRANDING

On customer's request and with minimum quantity we can customize the belt's branding.

SPECIAL PACKAGING

On customer's request and with minimum quantity we can package the belts following some special indications.

SPECIAL WIDHT

On customer's request and with minimum quantity belts in special widths can be manufactured. For more information please check with our Application Department.

LOW NOISE

On customer's request and with minimum quantity we can produce soft compound belts (60 ± 3 ShA) to reduce noise problems. In this case the belt's performances will decrease by a 10% than a standard one.

The fixing plates are used to fix the tail of the open belts.
On the 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.
The Megadyne Technical Staff is ready to study special or particular applications.

XL   L   H

HTD   RPP
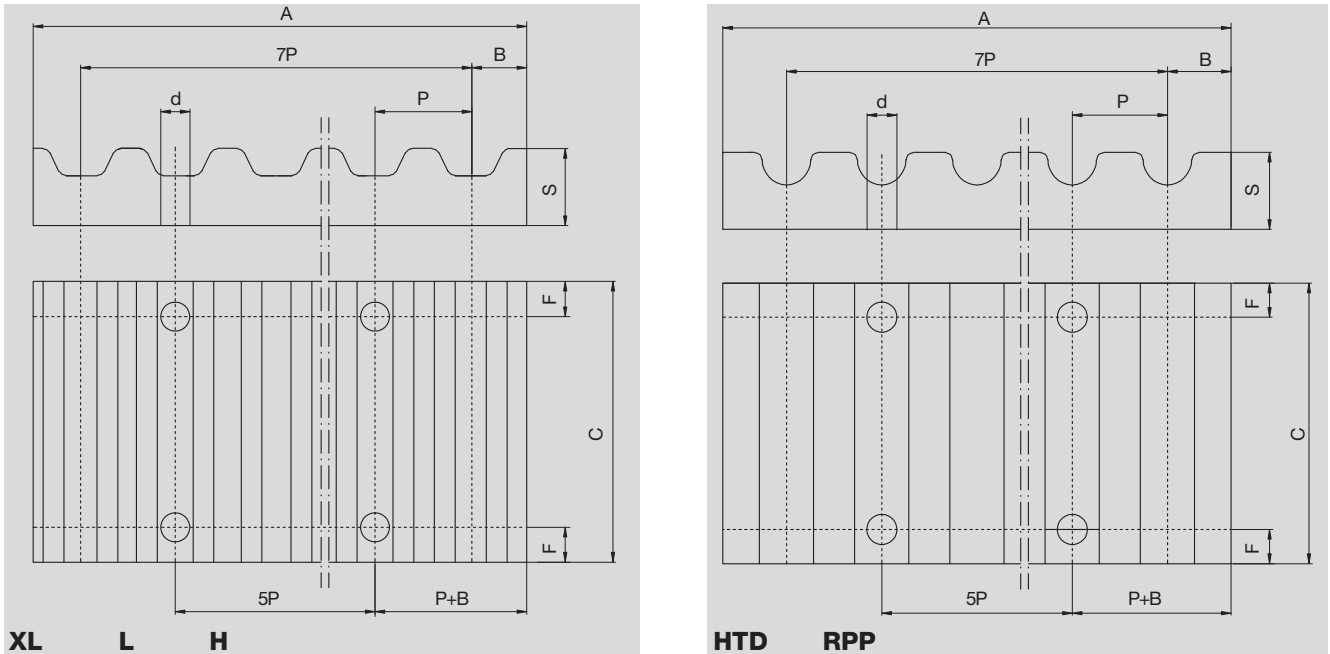
Order code example: AT10 pitch clamping plate for 25 mm width belt.

	Clamping plates for imperial pitch belts												
						Belt width (inches)							
	Pitch	F	d	B	A	S	025	037	050	075	100	150	200	300
							C							
Aluminium	• XL	6	5,5	3,5	42,5	8	25,5	28,5	32	–	–	–	–	–
	• L	8	9	5	76,5	15	–	–	39	45	51,5	–	–	–
	• H	10	11	9	106,9	22	–	–	45	51	57,5	70	83	108

	Clamping plates for HTD pitch belts												
						Belt width (mm)							
	Pitch	F	d	B	A	S	9	10	15	20	25	30	50	85
							C							
Aluminium	• 5M	6	5,5	3,25	41,5	8	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: peripheral speed (m/s)
n_1: rotation speed (RPM)
d_1: pulley diameter (mm)

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

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

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

FORCES AND TORQUE

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)

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

$$F_u = \frac{2000 \cdot M}{d_1}$$

$$F_u = \frac{P \cdot 10^3}{d_1}$$

$$M_t = \frac{P \cdot 9550}{n_1}$$

$$M_t = \frac{F_u \cdot d_1}{2000}$$

$$M_t = \frac{P \cdot d_1}{2 \cdot V}$$

SPEED

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

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

$$P = \frac{M_t \cdot n_1}{9550}$$

$$P = \frac{F_u \cdot V}{1000}$$

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
lbf	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

The data and information contained in the present catalogue are up-to-dated to the date of the catalogue's printing. Megadyne Spa reserves the right to modify the specifications, performances and other information relating to the belts described in the present catalogue, at any time at its own discretion, without any prior notice. For updating refer to our web site www.megadynegroup.com.

Technical specifications, performances and other information provided in the present catalogue are indicative and do not bound Megadyne unless such specifications, performances or other information are expressly agreed in the agreement with the customer.

We also recommend to read carefully the following documents in our web site www.megadynegroup.com:
- Megadyne General Conditions of Sale (comprising the warranty)
- Theoretical Belt Life
- Drive Components: Storage, Installation, Maintenance and Troubleshooting Handbook
- Belts standard use condition and temperature.

ISO 9001:2008 - ISO 14001:2004
MEGADYNE RUBBER S.A.

MEGADYNE

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