



ISORAN

Synchronous Timing Belt



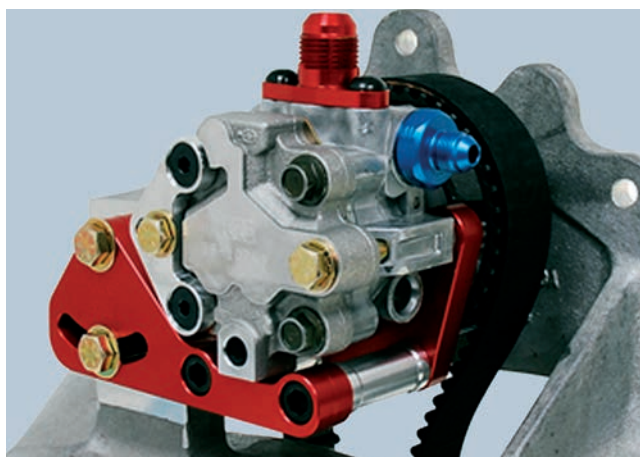
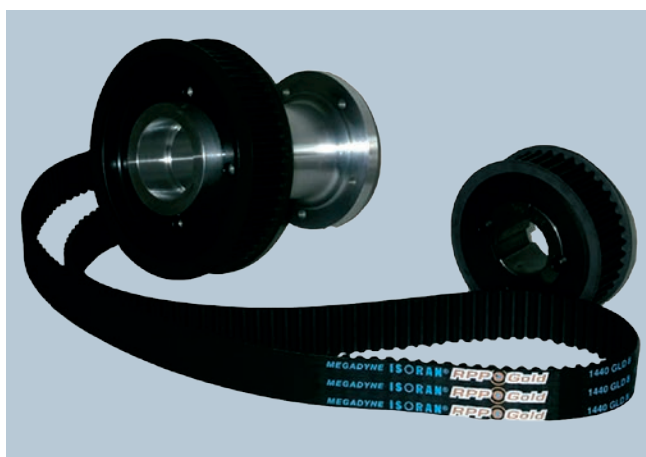
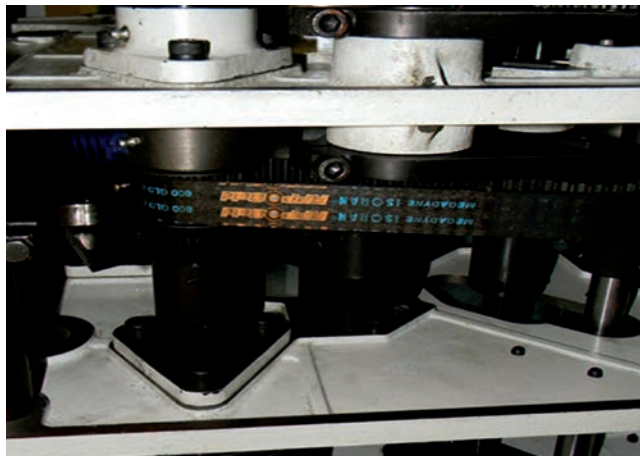
MEGADYNE

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INTRODUCTION TO ENDLESS RUBBER TIMING BELTS

In order to improve and make easier the designers' job, Megadyne has decided to simplify and reorganize most of the endless rubber timing belts in just one calculation handbook. In the following pages you will find all the needed information regarding technical calculation, sizes and data about Isoran, Isoran DD, Isoran RPP, Isoran RPP DD, Isoran Silver and Isoran Gold.

Our wide range of products with different power rates and several structures allows Megadyne always to find the best solution for a very wide spectrum of applications.



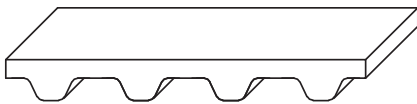
INTRODUCTION TO ENDLESS RUBBER TIMING BELTS

Thanks to their features, Megadyne's Endless Rubber Timing belts can be used in a very wide range of applications like power transmission (or conveyor) such as:

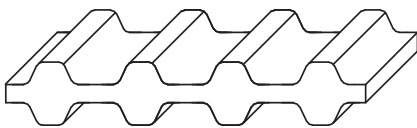
- appliances
- pellet extruder machines
- wood cutting machines
- doobby loom machines
- food mixers
- cooling systems
- radio controlled cars
- power wheelchair
- flexible packaging machines
- carton industry



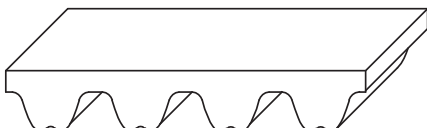
STANDARD RANGE



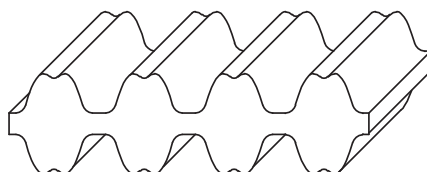
MXL XL L H XH XXH



XL DD L DD H DD



RPP3 RPP5 RPP8 RPP14 SILVER5 SILVER8 SILVER14
GOLD8 GOLD14



RPP5 DD RPP8 DD RPP14 DD

CLASSIFICATIONS

CLASSIFICATIONS

Megadyne's Isoran transmission belts are rubber chloroprene based belts with glass cord suited for a very wide range of application in power transmission field. This type of belts puts together the advantages of gears and V-belts minimizing the drawbacks of both.

These belts allow:

- synchronous transmission
- high and constant angular speeds
- high efficiency
- resistance to peak loads
- low noise transmission
- no lubrication
- no maintenance
- linear speed up to 30 m/s

1) The body is made of high quality chloroprene compound having:

- high fatigue resistance
- high resistance to heat and environmental agents
- good resistance to mineral oils
- total shape keeping by the time

Hardness changes according to the kind of belt:

- 74 ShA for Isoran, Isoran DD, Isoran RPP and Isoran RPP DD
- 90 ShA for Isoran Silver and Isoran Gold

Silver and Gold belts have higher quality and features compound each to get higher performances.

2) Tensile member made of high module fiberglass cords, S and Z twisted, which grant:

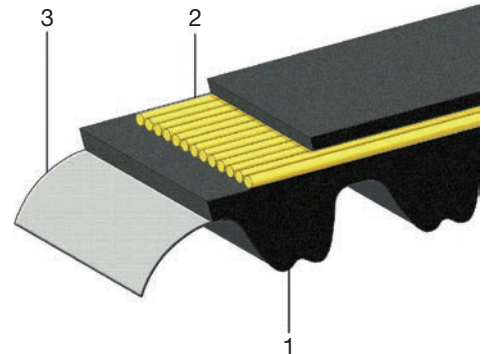
- high breaking strength
- very good resistance to stresses
- no elongation by the time
- very good adhesion with the belt body compound

Gold belts have special high power K-glass cords.

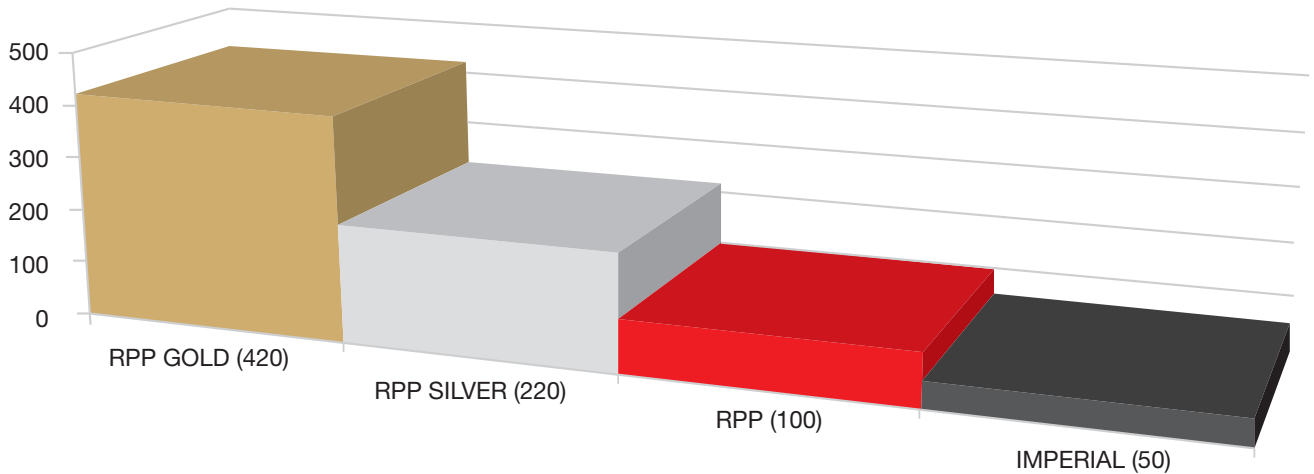
3) Nylon fabric on the teeth treated to improve lubrication during working; this allows:

- extreme abrasion resistance
- low friction coefficient
- high transmission efficiency
- long belt and pulley operational lifetime

Gold belts have two Nylon fabric plies to improve the above features.



PERFORMANCE COMPARISON INDEX



Please consider that the above graph is merely indicative.

COATING

Isoran can be manufactured with special coating on the back side. Please check with our Application Department for more details.

IDENTIFICATION CODE

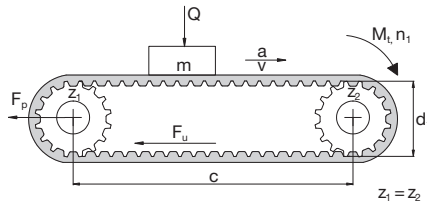
Using the information in the table below, it is possible to identify the correct belt for every application. The code is composed of letters and numbers as the following examples:

1	+	2	+	3	+	4
1400	+	GOLD	+	14	+	M55
510	+	H	+			075

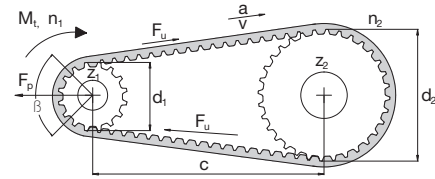
- 1) This number indicates the pitch length of the belt. The value is in mm for belts with a metric pitch while it's in tenth of inch for the imperial pitches (MXL are the only coded in hundreds of inches).
- 2) This code, composed by letters, indicates the belt profile.
- 3) This number indicates the standard pitch of the belt. It is expressed in mm, and it's used only for belts with a metric pitch.
- 4) This code, composed by letters and numbers, indicates the belt width. The value is in mm for belts with a metric pitch, while it's in hundreds of inches for the belts with imperial pitches.

TECHNICAL CALCULATION

CONVEYOR BELTS



POWER TRANSMISSION



Symbol	Unit	Definition	Symbol	Unit	Definition
b	mm	belt width	T_s	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_i	1/min	revs/min (RPM) on pulley i
a	m/s ²	acceleration	P	kW	drive power
v	m/s	belt speed	Q	N	force exerted by mass (m)
F_s	-	service factor	z₁		number of teeth on pulley i
g	m/s ²	gravity (9.81)	z_m		number of teeth in mesh on drive pulley
μ	-	coefficient of friction between belt and guide	z_c		number of belt teeth
p	-	belt pitch	i		speed ratio
MTL	N	Max Traction Load	z_L		number of teeth on largest pulley
		Max Traction Load is maximum acceptable traction on cords	BS	N	Breaking Strength
					Breaking Strength is the necessary load to break belt cord

DRIVE CALCULATION PROCEDURE

CALCULATION OF TRANSMITTED POWER

From Table 2 at page 7 select the appropriate service factor F_s according to:

- the type of the driven machine
- the engine class, depending on the ratio between the peak load over the rated load
- the service conditions (duty cycle category)

If you are designing a drive with a speed up ratio ($i = n_1 / n_2 < 1$) you need to consider into the above mentioned Service Factor F_s the correction factor C_m as reported in the following table:

TABLE 1 - C_m FACTOR

Speed ratio $i = n_1 / n_2$	C _m
1 ÷ 0,8	0
0,79 ÷ 0,58	+0,1
0,57 ÷ 0,40	+0,2
0,39 ÷ 0,28	+0,3
≤ 0,28	+0,4

The corrected service factor C_c will be:

$$C_c = F_s + C_m$$

The design power P_c is obtained multiplying the input power by the corrected service factor:

$$P_c = P \cdot C_c$$

TABLE 2 - SERVICE FACTOR F_s

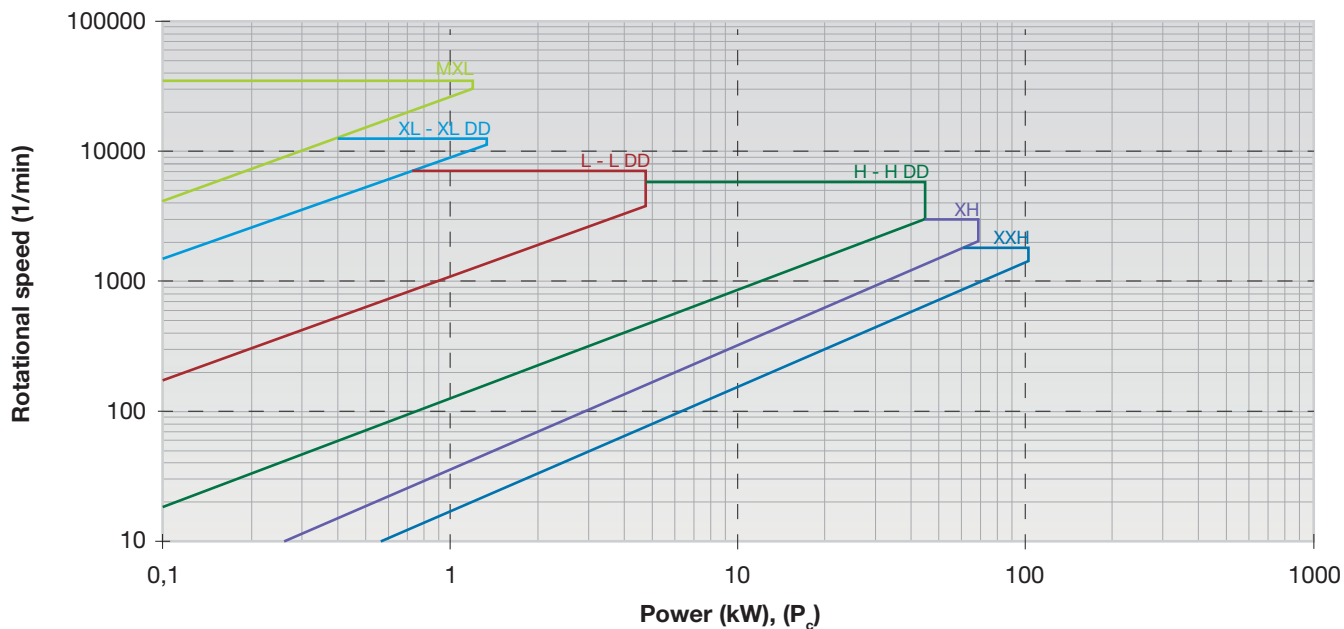
DRIVEN MACHINE	DRIVER MACHINE								
	Class A			Class B			Class C		
	Overload peak up to 149% of the rated load			Overload peak from 150% up to 249% of the rated load			Overload peak from 250% up to 400% of the rated load		
	- AC Motor: asynchronous Star-Delta starting - DC Motor: shunt wound - Internal combustion engines: 8 cyl. and up			- AC Motor: asynchronous direct switch starting - Synchronous: normal torque - DC Motor: compound wound - Internal combustion engines: 6 cyl.			- AC Motor: single phase; all asynchronous: double cage motors - Synchronous: high torque - DC Motor: series wound - Internal combustion engines: 4 cyl. - Hydraulic motors, line shafts		
DRIVEN MACHINE	Duty cycle category								
	Intermittent service	Normal service	Continuous service	Intermittent service	Normal service	Continuous service	Intermittent service	Normal service	Continuous service
	< 8 hours daily	8 to 16 hours daily	> 16 hours daily	< 8 hours daily	9 to 16 hours daily	> 16 hours daily	< 8 hours daily	10 to 16 hours daily	> 16 hours daily
Category 1: LOW UNIFORM LOAD/TORQUE Office equipment. Measuring equipment. Instrumentation. Display equipment. Laundry machinery (general). Line shaft. Agitators and mixers for liquids. Bakery machines. Conveyors: belt, light package, oven belt (ore, coal, sand).	1,3	1,4	1,5	1,5	1,6	1,7	1,7	1,8	1,9
Category 2: MEDIUM UNIFORM LOAD/TORQUE Light woodworking equipment: lathers, band saws. Agitators, mixers for semi-liquid. Screens: drum, conical. Machine tools: lathers, drill presses, screw machines.	1,4	1,5	1,6	1,6	1,7	1,8	1,8	1,9	2,0
Category 3: NOT UNIFORM LOAD/TORQUE Textile machinery: spinning frames, twistors warpers, warping machines. Heavy woodworking equipment: jointer, circular saws, planes. Laundry machinery: extractors, washers. Machinery for rubber processing. Machine tools: grinders, milling machines, shapers. Conveyors: apron, bucket, elevators, screw. Centrifugal compressors: hoist, elevators, generators and exciters. Printing machinery. Fans, blowers: centrifugal, induced, draft exhausters, propeller, mine fans.	1,5	1,6	1,7	1,7	1,8	1,9	1,9	2,0	2,1
Category 4: SHOCK LOAD/TORQUE Textile machinery: dobbies, looms. Hammer mills. Paper machinery. Positive fan blowers. Reciprocating compressors. Machinery for pottery and earthenware. Centrifuges.	1,7	1,8	1,9	1,9	2,0	2,1	2,1	2,2	2,3
Category 5: HIGH UNIFORM LOAD/TORQUE Crushers: roll, ball, jaw. Mills: ball, rod, pebble, etc. Reciprocating pumps. Saw mill equipment.	1,9	2,0	2,1	2,1	2,2	2,3	2,3	2,4	2,5
With reverse bending (eg. external idler)	+0,1								

NOTE: these service factors are adequate for most of belt drive applications. Service factors can be substituted only where the input data and the working conditions are exactly known. In this case service factors may be adjusted based upon an understanding of the severity of actual drive operating conditions.

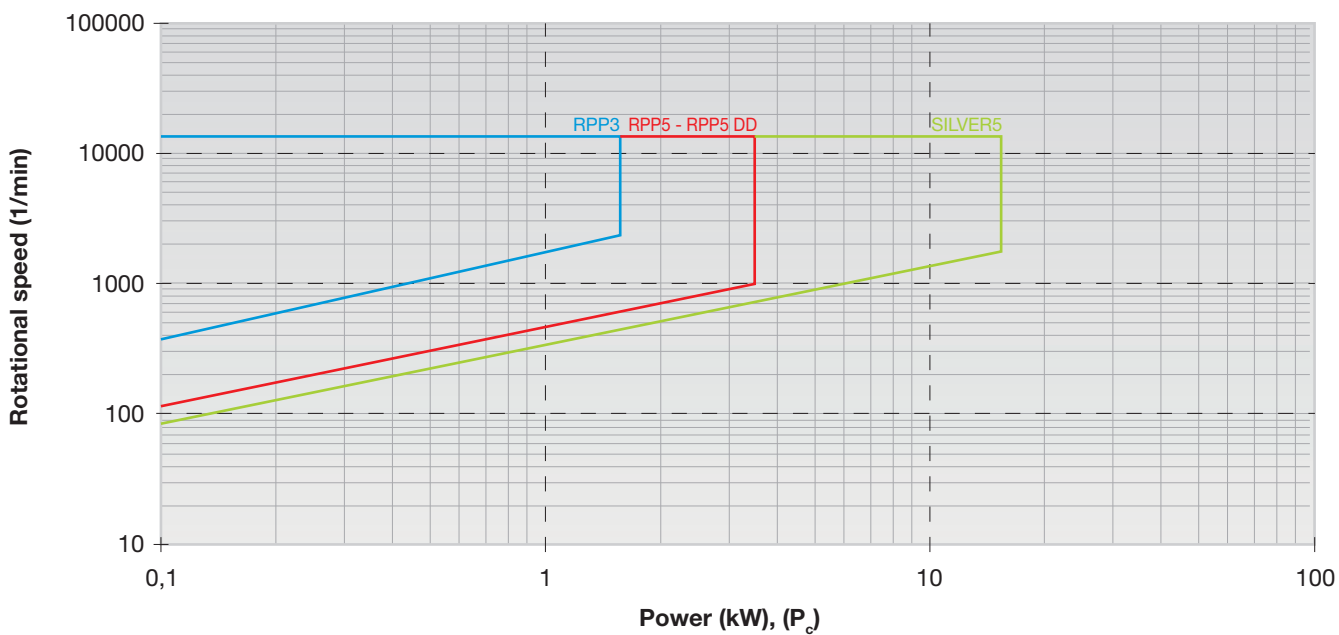
TECHNICAL CALCULATION

TABLE 3 - BELT PITCH SELECTION TABLES

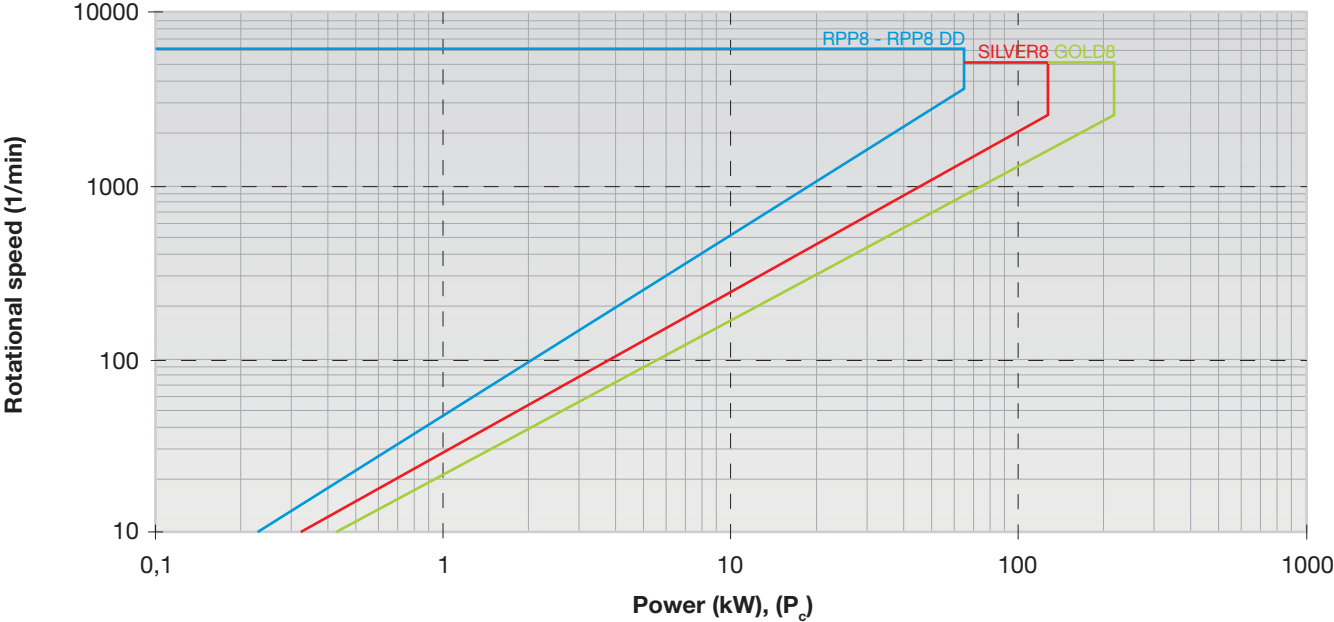
ISORAN AND ISORAN DD



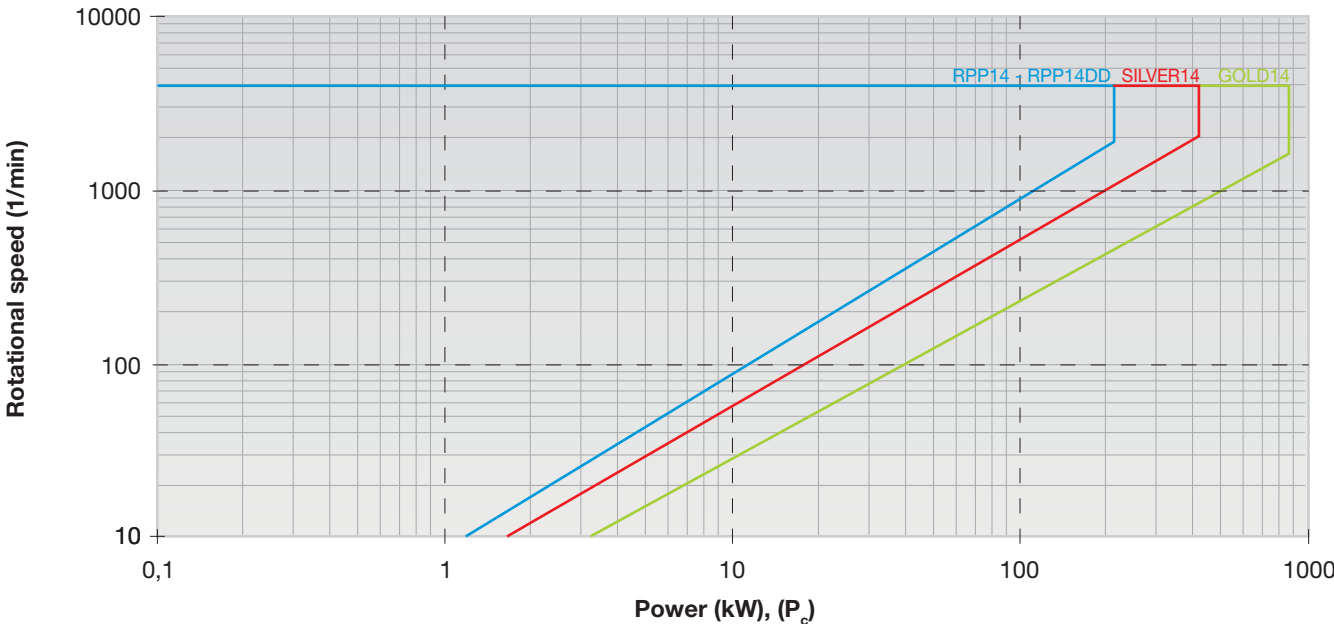
RPP3, RPP5, RPP5 DD AND SILVER5



RPP8, RPP8 DD, SILVER8 AND GOLD8



RPP14, RPP14 DD, SILVER14 AND GOLD14



TECHNICAL CALCULATION

CHOICE OF BELT TYPE AND PITCH

Several options are available, starting from Isoran and improving the belt's power rate getting up to Isoran RPP, Isoran Silver and eventually Isoran Gold, as shown on the graphs in the previous pages 8 and 9.

The graph has:

- design power P_c along the X-axis
- speed of the fastest shaft along the Y-axis.

With these input data you will locate an intersection point. The area surrounding this point indicates the pitch you should use for your design. As shown, the most powerful belt is the Isoran Gold. If it is not enough, we suggest to consult our Platinum calculation handbook.

If you wish, you can compare and design different options, both in terms of power rate and pitch. Then you might select the drive best matching your size requirements or the most economical one.

CHOICE OF PULLEY, BELT AND CENTRE DISTANCE

According to your space and speed ratio requirements, you might select the pulleys among those you can find in our Megapulley catalogue. To help you on the choice of the pulleys, you can use the below chart indicating a selection of possible pulleys that give you the needed speed ratio.

TABLE 4 - SPEED RATIO TABLES

Speed Ratio (approximate values) z_2/z_1	z_2/z_1					
1,06	38/36	36/34	34/32			
1,13	90/80	72/64	36/32	34/30		
1,17	56/48	34/29	28/24			
1,25	90/72	80/64	40/32	30/24		
1,33	64/48	48/36	40/30	32/24		
1,50	72/48	48/32	36/24			
1,75	112/64	56/32				
2,00	144/72	112/56	80/40	72/36	64/32	56/28
2,25	144/64	90/40	72/32			
2,33	112/48	80/34				
2,50	90/36	80/32				
2,67	192/72	80/30	64/24			
3,00	192/64	144/48	90/30	72/24		
3,27	144/44	72/22				
4,00	192/48	144/36	112/28			
4,36	192/44					
4,80	192/40	144/30				
5,33	192/36					
6,00	192/32	144/24				
7,38	192/26					
8,00	192/24					
8,73	192/22					

Please mind that the bigger is the pulley, the more will be the power the belt can transmit and the less will be the belt width; on the other side, a big pulley requires more space and will be heavier. Please mind that each pitch has its own minimum dimension; this value is given by the smallest available pulley in the corresponding Basic Performance table.

Speed ratio is: (1 refers to driver pulley: 2 refers to driven pulley)

$$i = \frac{n_1}{n_2} = \frac{z_2}{z_1}$$

- If speed ratio is equal to one, $z_1 = z_2$, belt length will be

$$L = 2c + \pi \cdot d_1$$

- If speed ratio is not equal to one and you have dimension limits on one of the two pulleys, you should consider this value and check on the Megapulley catalogue a pulley that can fit on your layout. Then, thanks to the formulas

$$z_1 = \frac{z_2}{i} \quad \text{and} \quad z_2 = z_1 \cdot i$$

you can also select the other pulley. Considering the centre distance c , the belt length L will approximately be:

$$L \approx 2c + 1,57(d_1 + d_2) + \frac{(d_2 - d_1)^2}{4c}$$

Once you find the needed belt length, both for speed ratio equal to one or not, you will proceed checking on our available belt lengths on belt data pages; you can choose both the closest longer or the closest shorter available belt. With the actual belt length value L_c you selected and the chosen pulleys you can find the new centre distance c_c as per shown below:

- If speed ratio is equal to one, the new centre distance will be

$$c_c = \frac{L_c - (\pi \times d_1)}{2}$$

- If speed ratio is not equal to one, you can use the following formula

$$c_c = \frac{1}{4} \left\{ L_c - \frac{p}{2} (z_1 + z_2) + \sqrt{\left[L_c - \frac{p}{2} (z_1 + z_2) \right]^2 - 2 \left[\frac{p}{\pi} (z_2 - z_1) \right]^2} \right\}$$

or you can use the centre distance table from page 24

In this table, you have:

- $z_c - z_1$ along the columns
- $z_2 - z_1$ along the rows

At the intersection of the given column and row you will find a number that is the centre distance in teeth number c_t ; so, multiplying this number by the pitch p you will get the actual centre distance:

$$c_c = p \cdot c_t$$

If one or both of the input values you have are out of the table's range, you should divide both values by two. Then, the calculated centre distance will be half than the real one, it means you need to multiply by two the found number to get the correct value of c_c .

We warmly suggest to check that the ratios between the belt's teeth number and the pulleys' teeth numbers are not integers. If this happens it is necessary to modify the drive wherever possible (centre distance, ratio, pulleys diameter) otherwise belt life could be massively reduced.

TECHNICAL CALCULATION

DETERMINATION OF THE ACTUAL POWER RATING P_{ba}

The actual power rating P_{ba} comes from the following formula:

$$P_{ba} = P_b \cdot C_d \cdot K_1$$

where:

- P_b is the belt's basic performance; each belt type and each pitch has its own basic performance table; you can find it in belt data pages. It depends on driver pulley's number of teeth and on driver pulley speed.
- C_d is the teeth in mesh correction factor. Because of power rating lists in this catalogue are based on a minimum of six teeth in mesh between the belt and the pulley, you have to consider this factor whenever you have less than six teeth in mesh because this will lead to an excessive tooth load. To determine the number of teeth in mesh on the smallest pulley you can use the following formula:

$$z_m = \left\{ 0,5 - \left[\frac{4 p}{79 c} \cdot (z_1 + z_s) \right] \right\} \cdot z_s$$

where z_1 is the number of teeth on the biggest pulley and z_s is the number of teeth on the smallest pulley.

Concerning z_m , always consider the bottom closest integer number. Based on this value, you will select the teeth in mesh correction factor C_d as per the following table:

TABLE 5 - C_d FACTOR

Number of teeth in mesh z_m	C_d
6 or more	1
5	0,80
4	0,60
3	0,40
2	0,20

- K_1 is the belt length correction factor. Because of power rating lists in this catalogue are based on specific belt lengths, you have to consider this factor and choose K_1 from the below Table, considering the actual belt length L_c you selected. For belt with imperial pitch, please use K_1 equal to 1.

TABLE 6 - K_1 FACTOR

RPP3		RPP5 - RPP5 DD SILVER5		RPP8 - RPP8 DD SILVER8 - GOLD8		RPP14 - RPP14 DD SILVER14 - GOLD14	
Belt length (mm)	K_1	Belt length (mm)	K_1	Belt length (mm)	K_1	Belt length (mm)	K_1
< 190	0,8	< 440	0,8	< 600	0,8	< 1190	0,80
191 - 260	0,9	441 - 560	0,9	601 - 800	0,9	1191 - 1610	0,90
261 - 400	1,0	561 - 800	1,0	881 - 1280	1,0	1611 - 1890	0,95
401 - 600	1,1	801 - 1100	1,1	1281 - 1760	1,1	1891 - 2450	1,00
> 600	1,2	> 1100	1,2	> 1760	1,2	2451 - 3150	1,05
						> 3150	1,10

DETERMINATION OF BELT WIDTH

To find out the belt width we will find the width coefficient C_w first:

$$C_w = \frac{P_c}{P_{ba}}$$

Then, you can get the appropriate belt width b from the following tables. It is recommended to select the next higher standard width on the below tables. In this way you will get the needed belt width.

TABLE 7 - BELT WIDTH FACTOR C_w , listed

Belt width ISORAN and ISORAN DD			C_w , listed
Code	mm	inch	
012	3,0	1/8	0,09
019	4,8	3/16	0,14
025	6,4	1/4	0,18
031	7,9	5/16	0,23
037	9,5	3/8	0,30
044	11,1	7/16	0,37
050	12,7	1/2	0,45
062	15,9	5/8	0,60
075	19,1	3/4	0,72
088	22,2	7/8	0,80
100	25,4	1	1,02
125	31,8	1 1/4	1,31
150	38,1	1 1/2	1,58
175	44,5	1 3/4	1,87
200	50,8	2	2,17
250	63,5	2 1/2	2,77
300	76,2	3	3,41
350	88,9	3 1/2	4,16
400	101,6	4	4,84
500	127,0	5	6,25
600	152,4	6	7,68
700	177,8	7	9,16
800	203,2	8	10,67
900	228,6	9	12,19
1000	254,0	10	13,77

Widths in bold are standard widths, we suggest to choose among these.

Once the belt width is defined, it is possible to calculate the drive safety factor σ , the ratio between the actual belt power rating and the design power:

$$\sigma = \frac{\text{Actual Belt Power Rating}}{\text{Design Power}} = \frac{P_{ba} \cdot C_{w, \text{listed}}}{P_c}$$

This value will be higher than one if you choose the next higher standard width; it gives an indication of the maximum extra load that the belt can tolerate.

Belt width (mm)	C_w , listed			
	RPP3	RPP5 RPP5 DD	RPP8 RPP8 DD	RPP14 RPP14 DD
5	0,76			
6	1,00	0,53		
9	1,71	1,00	0,37	
15	3,14	1,93	0,71	
20	4,33	2,71	1,00	
25	5,52	3,48	1,29	0,56
30		4,26	1,58	0,71
40			2,16	1,00
50			2,74	1,29
55			3,03	1,44
75			4,19	2,03
85			4,77	2,32
100				2,76
115				3,21
170				4,82

Belt width (mm)	C_w , listed		
	SILVER5	SILVER8 GOLD8	SILVER14 GOLD14
6	0,666		
9	1,000		
10	1,111	0,500	
15	1,666	0,750	
20	2,222	1,000	0,500
25	2,778	1,250	0,625
30	3,333	1,500	0,750
40		2,000	1,000
50		2,500	1,250
55		2,750	1,375
75		3,750	1,875
85		4,250	2,125
100			2,500
115			2,875
170			4,250

TECHNICAL CALCULATION

PRE-TENSIONING

Pre-tensioning is needed to have a good belt running. If pretension F_p is too low, tooth jump can occur under the most sever load conditions; if it is too high it will increase the noise levels, reduce the belt life and may damage bearings, pulleys and other transmission parts.

The right pretension is obtained by the following formula:

$$F_p = \frac{500 \cdot P \cdot K_m}{v} + (m_1 \cdot v^2)$$

where:

- F_p is the needed pretension on the pulleys' axes;
- K_m is the factor of motor class, that considers the influence of motor peak torque; see the value in the below table:

TABLE 8 - K_m FACTOR

CLASS A	CLASS B	CLASS C
1,35	1,50	1,75

- v is the belt linear speed you can calculate with the following formula:

$$v = \frac{d_i \cdot n_i}{19100}$$

where diameter d_i is in mm and rotational speed n_i is in 1/min.

- m_1 is the mass per length unit; it changes according to the belt type and pitch. See the following table 9. For unusual, shock or pulsating loads we suggest to consult our Application Department for guidance. Axial load on bearings F_a will be equal to F_p when speed ration is equal to one. Otherwise, F_a will be:

$$F_a = 2 \cdot F_p \cdot \sin \frac{\beta}{2}$$

where β is the angle of wrap as per Image 1 page 15.

In transmission with two pulleys, you can calculate β with the following formula:

$$\beta = 180^\circ + \arcsin \left(\frac{d_2 - d_1}{2c_c} \right)$$

TABLE 9 - BELT MASS PER UNIT LENGTH (kg/m)

Belt width		MXL	XL	L	H	XH	XXH	XL DD	L DD	H DD
(inches)	[mm]									
012	3,05	0.004								
019	4,83	0.007								
025	6,35	0.009	0.014					0,016		
031	7,90		0.017					0,019		
037	9,40		0.020					0,023		
050	12,70			0,041					0,047	
075	19,05			0,062	0,081				0,070	0,091
100	25,40			0,083	0,108				0,093	0,122
150	38,10				0,163					0,183
200	50,80				0,217	0,636	0,752			0,244
300	76,20				0,325	0,954	1,128			0,366
400	101,60					1,272	1,504			
500	127,00						1,880			

TABLE 9 - BELT MASS PER UNIT LENGTH (kg/m)

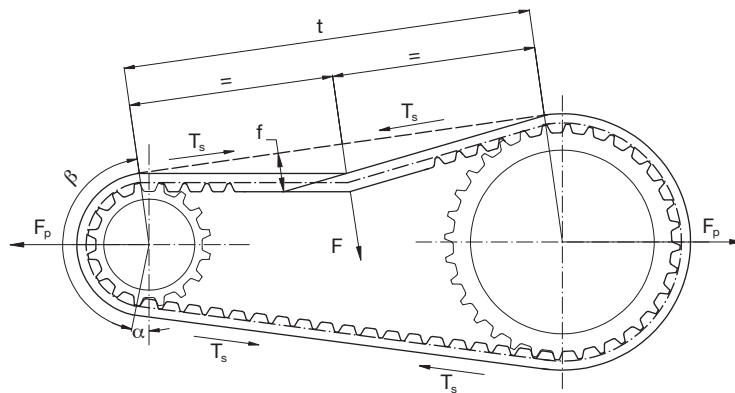
Belt width (mm)	RPP3	RPP5	SLV5	RPP8	SLV8	GLD8	RPP14	SLV14	GLD14	RPP5 DD	RPP8 DD	RPP14 DD
6	0,016											
9	0,025	0,039	0,036							0,043		
15	0,041	0,065	0,060							0,072		
20				0,114	0,113	0,110					0,138	
25		0,108	0,100							0,120		
30				0,171	0,169	0,165					0,207	
40							0,463	0,400	0,404			0,492
50				0,284	0,282	0,275					0,345	
55							0,637	0,550	0,556			0,676
85				0,484	0,480	0,467	0,984	0,850	0,858		0,586	1,045
115							1,332	1,150	1,161			1,414
170							1,969	1,700	1,717			2,091

STATIC TENSION CHECK

There are two methods to measure the correct static tension:

- a) The elongation method, based on measuring the force needed to deflect one span of the belt by a given amount (see below image).

Image 1



The force F to apply to deflect the belt F has to be:

$$\frac{F_p}{16} < F < \frac{1,5 \cdot F_p}{16} \quad (a)$$

The length of the free span t of belt where we will apply this force can be calculated as per below:

$$t = \sqrt{c^2 - \left(\frac{d_2 - d_1}{2}\right)^2}$$

The deflection distance f will be:

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

TECHNICAL CALCULATION

With the belt installed on the drive and tensioned to remove all the slacks in the system (snug fit), you can begin the tensioning procedure. Put a force F on the centre of the free span t and deflect the belt up to a deflection f as per above calculation. Be sure that both pulleys are free to rotate. For belts wider than 50 mm put a rigid stuff like a key stock as wide as the belt and across it and apply the force through the rigid stuff to prevent belt distortion and to get a good result.

Once you get the right deflection f , measure the deflection force F and compare it with the formula (a) page 15:

- If the value is inside the range, pretension is right;
- If the value is higher than the maximum, the belt is too tight, the belt should be slightly slackened;
- If the value is lower than the minimum, the belt has not enough tension and has to be tightened.

If the value is out of range, please repeat this procedure until you will not get an inside range value.

- b) The vibration method, based on the use of a belt tension gauging equipment. 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 F_p and the frequency of vibration f may be calculated using the following formula:

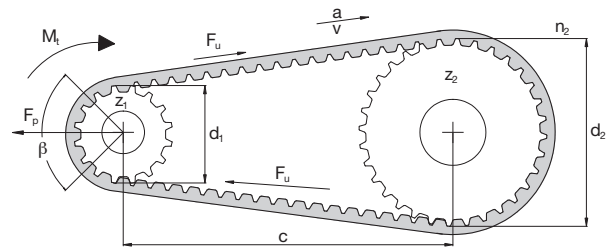
$$f = \frac{1}{2t} \cdot \sqrt{\frac{F_p}{m_l}} \quad \text{or} \quad F_p = 4 \cdot m_l \cdot t^2 \cdot f^2$$



CALCULATION EXAMPLE

MACHINE DATA

$P = 25 \text{ kW}$
 $n_1 = 1000 \text{ rpm}$
 $n_2 = 500 \text{ rpm}$
 $d_{2,\max} = 250 \text{ mm}$
 Motor class: C
 Application: textile
 Type of driven machine: Not uniform torque (Cat 3)
 Working hours: 8-16 h/day
 Approximate centre distance: 650 mm



CALCULATION OF TRANSMITTED POWER

According to the type of driven machine, the engine class and the service conditions we can find that the suggested service factor F_s is 2.0 according to table 2 page 7.

Because of the value of n_1 and n_2 , $i = \frac{n_1}{n_2} = \frac{1000}{500} = 2$, $C_m = 0$

This means that corrected safety factor is:

$$C_c = F_s + C_m = 2 + 0 = 2$$

The design power is:

$$P_c = P \cdot C_c = 25 \cdot 2 = 50 \text{ kW}$$

CHOICE OF BELT TYPE AND PITCH

Using the tables at page 8 and 9, having:

- $P_c = 50 \text{ kW}$
- Speed of the fastest shaft $n_1 = 1000 \text{ 1/min}$

We will find that possible pitches are: XXH, RPP14, SILVER14, GOLD14 or even a GOLD8. All these belts are possible alternatives, to choose an higher power belt as Silver or even a Gold means to get a narrower belt than a less performing one.

We can choose the GOLD8.

CHOICE OF PULLEY, BELT AND CENTRE DISTANCE (GOLD8)

Because of the maximum allowed pulley dimension, $z_{2,\max}$ we can choose is

$$z_{2,\max} = \frac{d_{2,\max} \cdot \pi}{p} = \frac{250 \cdot 3,14}{8} \approx 98$$

Selecting from table at page 10, considering $i = 2$, a good combination option can be to use $z_1 = 40$ and $z_2 = 80$, that is less than $z_{2,\max}$, with respectively $d_1 = 101,86$ and $d_2 = 203,72$ mm.

Because centre distance has to be close to 650 mm, we will firstly calculate the approximate belt length:

$$\begin{aligned}
 L &\approx 2c + 1,57(d_1 + d_2) + \frac{(d_2 - d_1)^2}{4c} = \\
 &= 2 \cdot 650 + 1,57 \cdot (101,86 + 203,72) + \frac{(203,72 - 101,86)^2}{4 \cdot 650} = 1783,75 \text{ mm}
 \end{aligned}$$

In our range we have 1760 and 1800 mm long available lengths. If you have layout problems, you might choose the shortest belt. Otherwise we can also choose the longest one, the 1800 mm long belt, with 225 teeth, that we choose; anyway both options are valid. We call this length L_c .

CALCULATION EXAMPLE

The actual centre distance can be calculated:

- By the formula

$$c = \frac{1}{4} \left\{ L_c - \frac{p}{2} (z_1 + z_2) + \sqrt{\left[L_c - \frac{p}{2} (z_1 + z_2) \right]^2 - 2 \left[\frac{p}{\pi} (z_2 - z_1) \right]^2} \right\} =$$

$$= \frac{1}{4} \left\{ 1800 - \frac{8}{2} (40 + 80) + \sqrt{\left[1800 - \frac{8}{2} (40 + 80) \right]^2 - 2 \left[\frac{8}{\pi} (80 - 40) \right]^2} \right\} = 658,029 \text{ mm}$$

- Using the tables from page 24. Had chosen a 225 teeth belt, it means that the corresponding $z_c - z_1$ is 185, and having $z_2 - z_1 = 80 - 40 = 40$, we have a c_t of 82.254 (page 34). Multiplying this value by the pitch length, we will have the centre distance:

$$c = p \cdot c_t = 8 \cdot 82,254 = 658,032 \text{ mm}$$

Now we must check if the belt's number of teeth is not an integer multiple of the pulleys' number of teeth:

$$z_c / z_1 = 225 / 40 = 5,625 \quad z_c / z_2 = 225 / 80 = 2,8125$$

These numbers are not integer, so they are acceptable.

DETERMINATION OF THE ACTUAL POWER RATING (GOLD8)

To get P_{ba} we have to find out:

- $P_b = 11.20 \text{ kW}$ from table at page 73 knowing z_1 (40) and n_1 (1000 1/min).
- C_d comes from the teeth in mesh number:

$$z_m = \left\{ 0,5 - \left[\frac{4 p}{79 c} \cdot (z_1 + z_2) \right] \right\} \cdot z_s =$$

$$= \left\{ 0,5 - \left[\frac{4 \cdot 8}{79 \cdot 658,032} \cdot (80 - 40) \right] \right\} \cdot 40 = 19,01$$

This means that there are more than 6 teeth mesh, so we can consider $C_d = 1$.

- K_1 comes from the belt length; because the chosen belt is 1800 mm long and has pitch 8 mm, K_1 is 1,20 (table 6 page 12).

So:
$$P_{ba} = P_b \cdot C_d \cdot K_1 = 11,20 \cdot 1 \cdot 1,20 = 13,44 \text{ kW}$$

DETERMINATION OF BELT WIDTH (GOLD8)

Now we can find the width coefficient C_w :

$$C_w = \frac{P_c}{P_{ba}} = \frac{50}{13,44} = 3,72$$

The closest upper value in table $C_{w,listed}$ is 4,25, (table 7 page 13) corresponding to 85 mm of width.

The final belt will be 1800GOLD8M85, with driver pulley's number of teeth equal to 40 and driven pulley's number of teeth equal to 80. The calculated centre distance is 658,032 mm.

The "Drive Safety Factor" can be calculated with the following formula:

$$\sigma = \frac{P_{ba} \cdot C_{w,listed}}{P_c} = \frac{13,44 \cdot 4,25}{50} = 1,14$$

PRE-TENSIONING (GOLD8)

To get the right pretension on this belt we need to know:

- $K_m = 1,75$ because engine class is C;
- $v = \frac{d_1 \cdot n_1}{19100} = \frac{101,86 \cdot 1000}{19100} = 5,33 \text{ m/s}$;
- m_1 is listed according to kind of belt, pitch and width; in this case it is $0,467 \text{ kg/m}$ (table 9 page 15).

Because of these values, we will have:

$$F_p = \frac{500 \cdot P \cdot K_m}{v} + (m_1 \cdot v^2) = \frac{500 \cdot 25 \cdot 1,75}{5,33} + (0,467 \cdot 5,33^2) = 4117 \text{ N}$$

SECOND OPTION

As previously written, it can be useful to compare more than one option. For example, choosing a GOLD14 we expect a narrower belt.

CHOICE OF PULLEY, BELT AND CENTRE DISTANCE (GOLD14)

Because of the maximum allowed pulley dimension, $z_{2, \max}$ we can choose is

$$z_{2, \max} = \frac{d_{2, \max} \cdot \pi}{p} = \frac{250 \cdot 3,14}{14} \approx 56$$

Selecting from table at page 10, considering $i = 2$, a good combination option can be to use $z_1 = 28$ and $z_2 = 56$, that is less than $z_{2, \max}$, with respectively $d_1 = 124,78$ and $d_2 = 249,55$ mm.

Because centre distance has to be 650 mm, we will firstly calculate the approximate belt length:

$$\begin{aligned} L &\approx 2c + 1,57(d_1 + d_2) + \frac{(d_2 - d_1)^2}{4c} = \\ &= 2 \cdot 650 + 1,57 \cdot (124,78 + 249,55) + \frac{(249,55 - 124,78)^2}{4 \cdot 650} = 1893,69 \text{ mm} \end{aligned}$$

In our range we have 1890 mm long available length L_c , that is very close to the needed one. It has 135 teeth. The actual centre distance can be calculated:

- By the formula

$$\begin{aligned} c &= \frac{1}{4} \left\{ L_c - \frac{p}{2}(z_1 + z_2) + \sqrt{\left[L_c - \frac{p}{2}(z_1 + z_2) \right]^2 - 2 \left[\frac{p}{\pi}(z_2 - z_1) \right]^2} \right\} = \\ &= \frac{1}{4} \left\{ 1890 - \frac{14}{2}(28 + 56) + \sqrt{\left[1890 - \frac{14}{2}(28 + 56) \right]^2 - 2 \left[\frac{14}{\pi}(56 - 28) \right]^2} \right\} = 647,997 \text{ mm} \end{aligned}$$

- Using the tables from page 24. Had chosen a 135 teeth belt, it means that the chosen $z_c - z_1$ is 107, and having $z_2 - z_1 = 56 - 28 = 28$, we have c_i of 46.286 (page 29). Multiplying this value by the pitch length, we will have the centre distance:

$$c = p \cdot c_i = 14 \cdot 46,286 = 648,004 \text{ mm}$$

Now we must check if the belt's number of teeth is not an integer multiple of the pulleys' number of teeth:

$$z_c / z_1 = 135 / 28 = 4,82 \qquad z_c / z_2 = 135 / 56 = 2,41$$

These numbers are not integer, so they are acceptable.

CALCULATION EXAMPLE

DETERMINATION OF THE ACTUAL POWER RATING (GOLD14)

To get P_{ba} we have to find out:

- $P_b = 48,56$ kW from table at page 74 knowing z_1 (28) and n_1 (1000 1/min).
- C_d comes from the teeth in mesh number:

$$z_m = \left\{ 0,5 - \left[\frac{4 p}{79 c} (z_1 - z_s) \right] \right\} \cdot z_s = \left\{ 0,5 - \left[\frac{4 \cdot 14}{79 \cdot 648,004} \cdot (56 - 28) \right] \right\} \cdot 28 = 13,14$$

This means that there are more than 6 teeth mesh, so we can consider $C_d = 1$

- K_1 comes from the belt length; because the chosen belt is 1890 mm long and has pitch 14 mm, K_1 is 0,95 (table 6 page 12).

So:
$$P_{ba} = P_b \cdot C_d \cdot K_1 = 48,56 \cdot 1 \cdot 0,95 = 46,13 \text{ kW}$$

DETERMINATION OF BELT WIDTH (GOLD14)

Now we can find the width coefficient C_w :

$$C_w = \frac{P_c}{P_{ba}} = \frac{50}{46,13} = 1,08$$

The closest upper value $C_{w, \text{listed}}$ is 1,375 (table 7 page 13), corresponding to 55 mm of width.

The final belt will be 1890GOLD14M55, with driver pulley's number of teeth equal to 28 and driven pulley's number of teeth equal to 56. The calculated centre distance is 648.004 mm.

The "Drive Safety Factor" can be calculated with the following formula:

$$\sigma = \frac{P_{ba} \cdot C_{w, \text{listed}}}{P_c} = \frac{46,13 \cdot 1,375}{50} = 1,26$$

PRE-TENSIONING (GOLD14)

To get the right pretension on this belt we need to know:

- $K_m = 1,75$ because engine class is C;
- $v = \frac{d_1 \cdot n_1}{19100} = \frac{124,78 \cdot 1000}{19100} = 6,53$ m/s
- m_1 is listed according to kind of belt, pitch and width; in this case it is 0,556 kg/m (table 9 page 15).

Because of these values, we will have:

$$F_p = \frac{500 \cdot P \cdot K_m}{v} + (m_1 \times v^2) = \frac{500 \cdot 25 \cdot 1,75}{6,53} + (0,556 \cdot 6,53^2) = 3374 \text{ N}$$

THIRD OPTION

Now we just want to evaluate a SILVER14, that has a smaller power rating than GOLD14.

Geometrics and layout are the same as per GOLD14, so we can choose the same pulleys, the same belt length and the same centre distance already chosen for GOLD14. The main difference is about the power rating P_b .

DETERMINATION OF THE ACTUAL POWER RATING (SILVER14)

To get P_{ba} we have to find out:

- $P_b = 24,96$ kW from table at page 68 knowing z_1 and n_1 .
- $C_d = 1$ as per GOLD14.
- K_1 is 0,95 as per GOLD14.

So:
$$P_{ba} = P_b \cdot C_d \cdot K_1 = 24,96 \cdot 1 \cdot 0,95 = 23,71 \text{ kW}$$

DETERMINATION OF BELT WIDTH (SILVER14)

Now we can find the width coefficient C_w :

$$C_w = \frac{P_c}{P_{ba}} = \frac{50}{23,71} = 2,11$$

The closest upper value $C_{w, \text{listed}}$ is 2,125 (table 7 page 13), corresponding to 85 mm of width.

The final belt will be 1890SILVER14M85, with driver pulley's number of teeth equal to 28 and driven pulley's number of teeth equal to 56. The calculated centre distance is 648,004 mm.

The "Drive Safety Factor" can be calculated with the following formula:

$$\sigma = \frac{P_{ba} \cdot C_{w, \text{listed}}}{P_c} = \frac{23,71 \cdot 2,125}{50} = 1,007$$

PRE-TENSIONING (SILVER14)

To get the right pretension on this belt we need to know:

- $K_m = 1,75$ because engine class is C;
- $v = 6,53$ m/s as per GOLD14
- m_1 is listed according to kind of belt, pitch and width; in this case it is 0,850 kg/m.

Because of these values, we will have:

$$F_p = \frac{500 \cdot P \cdot K_m}{v} (+ m_1 \cdot v^2) = \frac{500 \cdot 25 \cdot 1,75}{6,53} + (0,850 \cdot 6,53^2) = 3386 \text{ N}$$

THREE OPTIONS COMPARISON

The three options can grant similar performances even with different features.

GOLD14 will grant a narrower belt, that means narrower pulleys and less noise. Moreover, in this case we can also appreciate a smaller required tensioning compared to GOLD8, that will stress less all the machine components (shafts, bearings, etc.) or can allow a "lighter" sizing of them. This is also due to the fact that pulleys have bigger diameters. On the other side GOLD8 can be fitted on smaller pulleys (even in our example it is not an issue).

If we compare GOLD14 and SILVER14, we can see how wider than GOLD14 a SILVER14 has to be to get the same result. So SILVER14 will require wider pulleys and will give more noise than a GOLD14 because of the different widths. All of these options will also have different cost levels.

For more details or any assistance, please contact our offices.

BELT INSTALLATION

To correctly install the belts, you have to reduce the centre distance between the pulleys' axes or to loose the idler. If this axes are fixed or there is not enough idler's run, you have to take apart the pulleys, then to put the pulley inside the inner part of the belt and, finally, re-install the pulleys. Sometimes, to take apart just one pulley could be enough. Moreover, it is important to follow the following rules:

- Pulleys are properly aligned and axes very parallel;
- Avoid to force the belt on the pulley, even using tools; it might lead to cord cracks, that could be not visible.
- Be sure that axes are properly set up to avoid variation on the centre distance, pulley misalignment or not parallelism between the axes themselves.
- Install the belt with the proper tension.

Always mind that a low tensioned belt could lead to teeth jump, early wearing and vibrations; an over-tensioned belt could lead to early wearing and high noise.

FORCES ON AXES AND BEARINGS

FORCES ON AXES AND BEARINGS

The dynamic axial load is obtained by a vector addition between the tension in the tight span T_1 and the one in the slack span T_2 as shown in the below image 2. To calculate the dynamic axial load $F_{a, dyn}$ you can use the following formula:

$$F_{a, dyn} = \sqrt{T_1^2 + T_2^2 - 2 T_1 T_2 \cos \beta} = \sqrt{\frac{T_e^2}{2} + F_p^2 - 2 \cos \beta \left(F_p^2 - \frac{T_e^2}{4} \right)}$$

where:

- $T_e = \frac{1000 \cdot P}{v}$ with P the engine power in kW and v the belt speed in m/s;
- F_p is the belt's pretension as previously calculated (page 14);
- β is the wrap angle as previously calculated (page 14).

Knowing the load on the axis, it is now possible to calculate the load on the bearings according to the following formulas:

- If you have a system like image 3, where pulley is set outside the bearing's support:

$$F_1 = \frac{L_1 - L_2}{L_2} \cdot F_{a, dyn} \quad F_2 = \frac{L_1}{L_2} \cdot F_{a, dyn}$$

- If you have a system like image 4, where the pulley is between the two bearings:

$$F_1 = \frac{L_2 - L_1}{L_2} \cdot F_{a, dyn} \quad F_2 = \frac{L_1}{L_2} \cdot F_{a, dyn}$$

where:

- F_1 and F_2 are the loads in N on the two bearings;
- L_1 is the distance between the pulley and the bearing;
- L_2 is the distance between the two bearings;

Symbol	Unit	Definition	Symbol	Unit	Definition
α	°	Free span length angle	L_2	mm	Distance between the bearings
β	°	Wrap angle on small pulley	M_1	Nm	Motor torque
d_1	mm	Driver pulley pitch diameter	M_2	Nm	Absorbed torque
d_2	mm	Driven pulley pitch diameter	P	kW	Motor power
$F_{a, dyn}$	N	Dynamic axial load	P_a	kW	Absorberd power
F_1	N	Load on bearing 1	T_1	N	Tight span tension
F_2	N	Load on bearing 2	T_2	N	Slack span tension
L_1	mm	Distance between bearing and pulley			

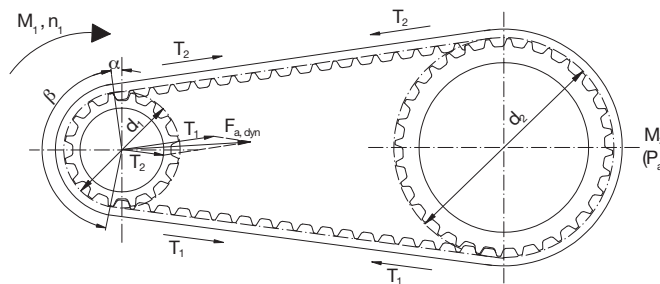


Image 2

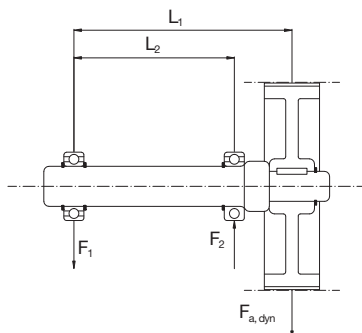


Image 3

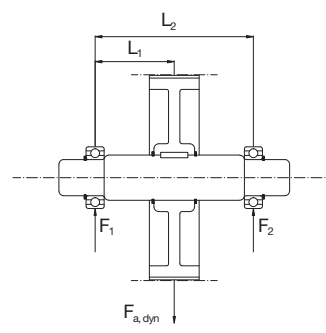


Image 4

CAUSES OF BELT FAILURE

To ensure that the performance and durability of a toothed belt drive will fully meet the requirements of particular application, it is necessary firstly to accurately select the drive and then to make sure the drive is correctly installed. If this procedure is not followed, the drive life and efficiency may be considerably reduced. The most frequent problems encountered, together with their probable causes, are listed in the table below. We hope that this will serve as a useful quick-reference guide, but if the drive problems persist or they are not identified in the following list please consult Megadine's Application Department

Problems	Causes	Corrective action	
Abnormal wear of the belt 1. On side of tooth	<ul style="list-style-type: none"> Belt excessively taut Excessive overloading Incorrect contour or diameter of pulley 	<ul style="list-style-type: none"> Reduce centre distance Use a wider belt Replace pulley after checking contour or diameter 	
	2. On the bottom of the tooth	<ul style="list-style-type: none"> Excessive installation tension 	<ul style="list-style-type: none"> Reduce centre distance
	3. At the tooth root	<ul style="list-style-type: none"> Incorrect diameter of pulley 	<ul style="list-style-type: none"> Replace pulley after checking diameter
4. On the side of the belt	<ul style="list-style-type: none"> Incorrect contour or diameter of pulley Misalignment or wrong setting of pulley Oscillation of axes and/or of bearing Flanges bent 	<ul style="list-style-type: none"> Replace pulley after checking diameter Replace pulley after checking diameter Correct the positioning of the pulley and reinforce the bearing Straighten flanges 	
Failure through traction or laceration of teeth	<ul style="list-style-type: none"> Diameter of small pulley i.e. below the minimum Excessive moisture 	<ul style="list-style-type: none"> Increase the diameter of the pulley or use belt and pulleys of smaller pitch Eliminate the moisture 	
Laceration of the belt	<ul style="list-style-type: none"> Number of teeth in mesh less than six Excessive load 	<ul style="list-style-type: none"> Increase the number of teeth in mesh or use belts and pulley of smaller pitch Use a wider belt 	
Rupture of tensile member	<ul style="list-style-type: none"> Excessive load Diameter of pulley below minimum 	<ul style="list-style-type: none"> Use a wider belt Increase the diameter of the pulleys 	
Breaks or cracks in the top surface of the belt	<ul style="list-style-type: none"> Exposure to excessive low temperatures (below -25°C) 	<ul style="list-style-type: none"> Eliminate the low temperature 	
Softening of the surface of the belt	<ul style="list-style-type: none"> Exposure to excessive temperatures (over +85°C) or operation with excessive amount of oil present 	<ul style="list-style-type: none"> Eliminate the high temperature or reduce the amount of oil present 	
Apparent elongation of the belt	<ul style="list-style-type: none"> Reduction of centre distance due to bearings not being firmly fixed 	<ul style="list-style-type: none"> Restore the initial centre distance and strengthen the bearings 	
Belt overriding the flanges	<ul style="list-style-type: none"> Faulty installation of the flanges Misalignment of pulley 	<ul style="list-style-type: none"> Reinstall the flanges properly Align pulley 	
Excessive wear of pulley teeth	<ul style="list-style-type: none"> Excessive overloading Belt excessively taut Pulley material insufficiently hard 	<ul style="list-style-type: none"> Use a wider belt Reduce the centre distance Harden the pulley surface 	
Drive excessively noisy	<ul style="list-style-type: none"> Pulley out of line Excessive installation tension Excessive load Diameter of pulley below minimum 	<ul style="list-style-type: none"> Align pulley Reduce the centre distance Harden the pulley surface Increase the diameter of the pulleys 	

CENTRE DISTANCE TABLE

		$z_c - z_1$															
		7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
$z_2 - z_1$	1	3,247	3,747	4,248	4,747	5,248	5,748	6,248	6,749	7,249	7,749	8,249	8,749	9,249	9,749	10,249	
	2		3,486	3,988	4,489	4,990	5,491	5,992	6,493	6,993	7,494	7,994	8,495	8,995	9,495	9,995	
	3			3,720	4,223	4,726	5,229	5,731	6,232	6,734	7,235	7,736	8,237	8,737	9,238	9,739	
	4				3,949	4,455	4,960	5,463	5,966	6,469	6,971	7,473	7,975	8,477	8,978	9,479	
	5					4,174	4,682	5,189	5,694	6,199	6,703	7,206	7,709	8,212	8,714	9,216	
	6						4,396	4,907	5,416	5,923	6,429	6,934	7,439	7,943	8,446	8,949	
	7							4,615	5,128	5,610	6,149	6,657	7,164	7,669	8,174	8,679	
	8								4,311	4,831	5,348	5,861	6,372	6,882	7,391	7,898	8,404
	9									4,521	5,045	5,565	6,080	6,594	7,106	7,615	8,124
	10										4,730	5,257	5,779	6,298	6,814	7,327	7,838
	11											4,936	5,467	5,993	6,514	7,031	7,546
	12												5,141	5,676	6,204	6,728	7,247
	13													5,345	5,883	6,414	6,940
	14														5,547	6,088	6,622
	15															5,747	6,292
	16																5,946

		$z_c - z_1$															
		22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	
$z_2 - z_1$	1	10,749	11,249	11,749	12,249	12,749	13,250	13,750	14,250	14,750	15,250	15,750	16,250	16,750	17,250	17,750	
	2	10,496	10,996	11,496	11,996	12,496	12,997	13,497	13,997	14,497	14,997	15,497	15,997	16,497	16,997	17,498	
	3	10,239	10,740	11,240	11,741	12,241	12,742	13,242	13,742	14,242	14,743	15,243	15,743	16,243	16,744	17,244	
	4	9,980	10,481	10,982	11,483	11,984	12,484	12,985	13,485	13,986	14,486	14,987	15,487	15,988	16,488	16,989	
	5	9,718	10,219	10,721	11,222	11,723	12,225	12,726	13,227	13,727	14,228	14,729	15,230	15,730	16,231	16,731	
	6	9,452	9,955	10,457	10,959	11,461	11,962	12,464	12,965	13,467	13,968	14,469	14,970	15,471	15,972	16,473	
	7	9,183	9,689	10,190	10,692	11,195	11,697	12,200	12,702	13,203	13,705	14,207	14,708	15,210	15,711	16,212	
	8	8,909	9,414	9,919	10,423	10,926	11,429	11,932	12,435	12,938	13,440	13,942	14,444	14,946	15,448	15,950	
	9	8,631	9,138	9,644	10,149	10,654	11,158	11,662	12,166	12,669	13,173	13,675	14,178	14,681	15,183	15,685	
	10	8,348	8,857	9,365	9,872	10,378	10,884	11,389	11,894	12,398	12,902	13,406	13,909	14,413	14,916	15,418	
	11	8,060	8,571	9,081	9,590	10,098	10,606	11,112	11,618	12,124	12,629	13,134	13,638	14,142	14,646	15,149	
	12	7,764	8,279	8,792	9,304	9,814	10,323	10,832	11,339	11,846	12,353	12,858	13,364	13,869	14,373	14,878	
	13	7,462	7,981	8,497	9,012	9,525	10,036	10,547	11,056	11,565	12,073	12,580	13,087	13,593	14,098	14,604	
	14	7,150	7,675	8,196	8,714	9,230	9,745	10,258	10,769	11,280	11,789	12,298	12,806	13,314	13,820	14,327	
	15	6,829	7,360	7,886	8,409	8,929	9,447	9,963	10,477	10,990	11,502	12,012	12,522	13,031	13,539	14,047	
	16	6,495	7,034	7,568	8,097	8,622	9,144	9,663	10,180	10,696	11,210	11,723	12,234	12,745	13,225	13,764	
	17	6,145	6,696	7,239	7,775	8,306	8,833	9,356	9,878	10,396	10,913	11,429	11,943	12,455	12,967	13,478	
	18		6,342	6,896	7,442	7,981	8,514	9,043	9,568	10,091	10,611	11,130	11,646	12,161	12,675	13,188	
	19			6,537	7,095	7,644	8,185	8,720	9,251	9,779	10,303	10,825	11,345	11,863	12,379	12,894	
	20				6,732	7,294	7,845	8,388	8,926	9,459	9,988	10,515	11,038	11,559	12,079	12,596	
	21					6,348	6,927	7,491	8,045	8,591	9,131	9,666	10,198	10,725	11,250	11,773	12,293
	22						6,538	7,120	7,688	8,245	8,793	9,335	9,873	10,406	10,935	11,461	11,985
	23							6,727	7,313	7,884	8,443	8,994	9,539	10,078	10,613	11,144	11,672
	24								6,915	7,505	8,079	8,641	9,195	9,742	10,282	10,819	11,352
	25									7,103	7,697	8,273	8,839	9,395	9,943	10,486	11,024
	26										7,291	7,887	8,468	9,035	9,593	10,144	10,689
	27											7,477	8,078	8,661	9,231	9,791	10,344
	28												7,664	8,267	8,853	9,426	9,989
	29													7,850	8,456	9,045	9,620
	30														8,035	8,645	9,236
	31															8,219	8,833
	32																8,404

CENTRE DISTANCE TABLE

		$Z_c - Z_1$														
		37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
$Z_2 - Z_1$	1	18,250	18,750	19,250	19,750	20,250	20,750	21,250	21,750	22,250	22,750	23,250	23,750	24,250	24,750	25,250
	2	17,998	18,498	18,998	19,498	19,998	20,498	20,998	21,498	21,998	22,498	22,998	23,498	23,998	24,498	24,998
	3	17,744	18,244	18,744	19,245	19,745	20,245	20,745	21,245	21,745	22,245	22,745	23,246	23,746	24,246	24,746
	4	17,489	17,989	18,489	18,990	19,490	19,990	20,491	20,991	21,491	21,991	22,491	22,992	23,492	23,992	24,492
	5	17,232	17,733	18,233	18,734	19,234	19,734	20,235	20,735	21,236	21,736	22,236	22,737	23,237	23,737	24,237
	6	16,974	17,474	17,975	18,476	18,976	19,477	19,978	20,478	20,979	21,479	21,980	22,480	22,981	23,481	23,981
	7	16,713	17,214	17,715	18,216	18,717	19,218	19,719	20,220	20,721	21,221	21,722	22,223	22,723	23,224	23,724
	8	16,451	16,953	17,454	17,955	18,457	18,958	19,459	19,960	20,461	20,962	21,463	21,964	22,464	22,965	23,466
	9	16,187	16,689	17,191	17,692	18,194	18,696	19,197	19,698	20,200	20,701	21,202	21,703	22,204	22,705	23,206
	10	15,921	16,423	16,926	17,428	17,930	18,432	18,934	19,435	19,937	20,438	20,940	21,441	21,943	22,444	22,945
	11	15,652	16,156	16,658	17,161	17,664	18,166	18,668	19,170	19,673	20,174	20,676	21,178	21,680	22,181	22,683
	12	15,382	15,886	16,389	16,892	17,396	17,898	18,401	18,904	19,406	19,909	20,411	20,913	21,415	21,917	22,419
	13	15,109	15,613	16,117	16,622	17,125	17,629	18,132	18,635	19,139	19,641	20,144	20,647	21,149	21,652	22,154
	14	14,833	15,338	15,844	16,348	16,853	17,357	17,861	18,365	18,869	19,372	19,875	20,379	20,881	21,384	21,887
	15	14,554	15,061	15,567	16,073	16,578	17,083	17,588	18,093	18,597	19,101	19,605	20,109	20,612	21,115	21,618
	16	14,273	14,781	15,288	15,795	16,301	16,807	17,313	17,818	18,323	18,828	19,333	19,837	20,341	20,845	21,348
	17	13,988	14,497	15,006	15,514	16,021	16,529	17,035	17,541	18,047	18,553	19,058	19,563	20,068	20,572	21,077
	18	13,700	14,211	14,721	15,230	15,739	16,247	16,755	17,262	17,769	18,275	18,782	19,287	19,793	20,298	20,803
	19	13,408	13,921	14,433	14,943	15,454	15,963	16,472	16,980	17,488	17,996	18,503	19,009	19,516	20,022	20,527
	20	13,112	13,627	14,141	14,653	15,165	15,676	16,186	16,696	17,205	17,714	18,222	18,729	19,236	19,743	20,250
	21	12,812	13,329	13,845	14,360	14,873	15,386	15,898	16,409	16,919	17,429	17,938	18,447	18,955	19,463	19,970
	22	12,507	13,027	13,545	14,062	14,578	15,092	15,606	16,119	16,630	17,142	17,652	18,162	18,671	19,180	19,688
	23	12,197	12,720	13,241	13,761	14,279	14,795	15,311	15,825	16,339	16,851	17,363	17,874	18,385	18,895	19,404
	24	11,881	12,408	12,932	13,455	13,975	14,494	15,012	15,528	16,044	16,558	17,071	17,584	18,096	18,607	19,118
	25	11,559	12,090	12,618	13,143	13,667	14,189	14,709	15,228	15,745	16,261	16,776	17,291	17,804	18,317	18,828
	26	11,229	11,765	12,297	12,827	13,354	13,879	14,402	14,923	15,443	15,961	16,478	16,994	17,509	18,023	18,537
	27	10,891	11,433	11,971	12,505	13,036	13,564	14,090	14,614	15,136	15,657	16,176	16,694	17,211	17,727	18,242
	28	10,544	11,093	11,636	12,175	12,711	13,243	13,773	14,300	14,826	15,349	15,871	16,391	16,910	17,428	17,944
	29	10,186	10,743	11,293	11,839	12,380	12,917	13,451	13,981	14,510	15,036	15,561	16,084	16,605	17,125	17,643
	30	9,814	10,382	10,941	11,494	12,041	12,583	13,122	13,657	14,189	14,719	15,247	15,772	16,296	16,818	17,339
	31	9,427	10,008	10,577	11,139	11,693	12,242	12,766	13,326	13,863	14,396	14,927	15,456	15,983	16,507	17,031
	32	9,020	9,617	10,200	10,772	11,336	11,892	12,443	12,989	13,530	14,068	14,603	15,135	15,665	16,193	16,719
	33	8,587	9,207	9,807	10,392	10,966	11,532	12,090	12,642	13,190	13,733	14,273	14,809	15,342	15,873	16,402
	34		8,770	9,393	9,996	10,584	11,160	11,728	12,288	12,842	13,392	13,936	14,477	15,014	15,549	16,081
	35			8,953	9,579	10,185	10,775	11,354	11,923	12,485	13,042	13,592	14,138	14,680	15,219	15,755
	36				9,136	9,765	10,373	10,966	11,547	12,118	12,683	13,240	13,792	14,340	14,883	15,423
	37					9,318	9,950	10,561	11,156	11,739	12,313	12,879	13,438	13,992	14,541	15,086
	38						9,500	10,135	10,749	11,346	11,932	12,508	13,075	13,636	14,191	14,741
	39							9,682	10,320	10,936	11,536	12,124	12,701	13,270	13,833	14,390
	40								9,863	10,504	11,123	11,725	12,315	12,894	13,465	14,030
	41									10,044	10,688	11,310	11,914	12,506	13,087	13,660
	42										10,225	10,872	11,496	12,102	12,696	13,279
	43											10,406	11,055	11,681	12,290	12,886
	44												10,586	11,238	11,867	12,478
	45													10,765	11,420	12,052
	46														10,945	11,603
	47															11,124
	48															

CENTRE DISTANCE TABLE

		$z_c - z_1$														
		67	68	69	70	71	72	73	74	75	76	77	78	79	80	81
$z_2 - z_1$	61	14,976	15,623	16,253	16,870	17,477	18,074	18,663	19,245	19,821	20,392	20,959	21,521	22,079	22,634	23,187
	62	14,486	15,156	15,805	16,438	17,057	17,664	18,263	18,854	19,437	20,015	20,587	21,154	21,717	22,277	22,833
	63	13,964	14,665	15,337	15,988	16,622	17,243	17,852	18,452	19,044	19,629	20,208	20,781	21,349	21,914	22,474
	64	13,396	14,140	14,843	15,517	16,170	16,806	17,428	18,040	18,641	19,234	19,820	20,400	20,975	21,544	22,110
	65		13,569	14,315	15,021	15,698	16,352	16,990	17,614	18,227	18,830	19,424	20,011	20,593	21,168	21,739
	66			13,742	14,491	15,199	15,878	16,534	17,174	17,800	18,414	19,018	19,614	20,202	20,785	21,361
	67				13,915	14,667	15,377	16,058	16,717	17,358	17,985	18,600	19,206	19,803	20,393	20,977
	68					14,088	14,842	15,554	16,238	16,898	17,541	18,170	18,787	19,394	19,992	20,583
	69						14,260	15,017	15,732	16,417	17,080	17,724	18,355	18,973	19,581	20,181
	70							14,433	15,193	15,910	16,597	17,261	17,907	18,539	19,159	19,769
	71								14,606	15,368	16,087	16,776	17,442	18,090	18,723	19,345
	72									14,778	15,542	16,264	16,955	17,623	18,272	18,907
	73										14,950	15,717	16,441	17,134	17,803	18,455
	74											15,123	15,892	16,617	17,312	17,984
	75												15,294	16,066	16,794	17,490
	76													15,466	16,240	16,970
	77														15,638	16,414
	78															15,809
	79															

		$z_c - z_1$														
		82	83	84	85	86	87	88	89	90	91	92	93	94	95	96
$z_2 - z_1$	61	23,736	24,282	24,827	25,369	25,909	26,448	26,984	27,519	28,053	28,585	29,116	29,646	30,175	30,702	31,229
	62	23,386	23,936	24,484	25,029	25,572	26,113	26,652	27,189	27,725	28,259	28,792	29,324	29,854	30,384	30,912
	63	23,031	23,585	24,136	24,685	25,231	25,774	26,316	26,856	27,394	27,931	28,466	28,999	29,531	30,062	30,592
	64	22,671	23,229	23,784	24,336	24,885	25,432	25,977	26,519	27,060	27,598	28,136	28,671	29,205	29,738	30,270
	65	22,305	22,868	23,427	23,982	24,535	25,085	25,633	26,178	26,722	27,263	27,803	28,340	28,877	29,412	29,945
	66	21,933	22,501	23,064	23,624	24,181	24,734	25,285	25,834	26,380	26,924	27,466	28,006	28,545	29,082	29,617
	67	21,554	22,127	22,696	23,260	23,821	24,379	24,933	25,485	26,034	26,581	27,126	27,669	28,210	28,749	29,287
	68	21,168	21,747	22,321	22,891	23,456	24,018	24,577	25,132	25,685	26,235	26,782	27,328	27,872	28,413	28,953
	69	20,774	21,360	21,940	22,515	23,085	23,652	24,215	24,774	25,330	25,884	26,435	26,983	27,530	28,074	28,616
	70	20,370	20,964	21,551	22,132	22,708	23,280	23,847	24,411	24,971	25,528	26,083	26,634	27,184	27,731	28,276
	71	19,956	20,558	21,153	21,742	22,324	22,901	23,474	24,042	24,607	25,168	25,726	26,281	26,834	27,384	27,932
	72	19,530	20,143	20,747	21,343	21,932	22,516	23,094	23,668	24,237	24,803	25,365	25,924	26,480	27,033	27,584
	73	19,091	19,716	20,330	20,935	21,532	22,123	22,708	23,287	23,862	24,432	24,998	25,561	26,121	26,678	27,232
	74	18,637	19,275	19,901	20,516	21,123	21,721	22,313	22,899	23,479	24,055	24,626	25,194	25,758	26,318	26,876
	75	18,164	18,818	19,458	20,085	20,702	21,310	21,910	22,503	23,090	23,672	24,248	24,821	25,389	25,954	26,515
	76	17,669	18,344	19,000	19,642	20,270	20,888	21,498	22,099	22,693	23,281	23,863	24,441	25,014	25,584	26,149
	77	17,146	17,847	18,524	19,182	19,825	20,455	21,075	21,685	22,287	22,883	23,472	24,055	24,634	25,208	25,778
	78	16,588	17,323	18,025	18,704	19,363	20,008	20,640	21,261	21,872	22,476	23,072	23,662	24,247	24,827	25,402
	79	15,981	16,762	17,499	18,203	18,884	19,545	20,191	20,824	21,446	22,059	22,664	23,261	23,852	24,438	25,019
	80		16,152	16,936	17,675	18,381	19,063	19,727	20,374	21,008	21,632	22,246	22,852	23,450	24,043	24,629
	81			16,324	17,110	17,850	18,559	19,243	19,908	20,556	21,192	21,817	22,432	23,039	23,639	24,232
	82				16,495	17,283	18,026	18,737	19,422	20,088	20,739	21,376	22,002	22,618	23,227	23,828
	83					16,666	17,457	18,202	18,914	19,601	20,269	20,921	21,559	22,187	22,805	23,414
84						16,837	17,631	18,378	19,091	19,780	20,450	21,103	21,743	22,372	22,991	
85							17,009	17,804	18,553	19,269	19,959	20,630	21,285	21,926	22,556	
86								17,180	17,977	18,728	19,446	20,138	20,810	21,467	22,109	
87									17,351	18,150	18,903	19,623	20,317	20,991	21,648	
88										17,522	18,323	19,078	19,799	20,495	21,171	
89											17,692	18,496	19,253	19,976	20,673	
90												17,862	18,669	19,427	20,152	
91													18,033	18,841	19,602	
92														18,203	19,014	
93															18,374	

CENTRE DISTANCE TABLE

		$z_c - z_1$										
		101	102	103	104	105	106	107	108	109	110	111
$z_2 - z_1$	61	33,848	34,370	34,891	35,411	35,931	36,450	36,968	37,486	38,003	38,520	39,037
	62	33,538	34,061	34,583	35,104	35,625	36,145	36,664	37,183	37,702	38,219	38,737
	63	33,226	33,750	34,273	34,796	35,317	35,838	36,359	36,879	37,398	37,917	38,435
	64	32,911	33,437	33,961	34,485	35,008	35,530	36,052	36,573	37,093	37,613	38,132
	65	32,595	33,121	33,647	34,172	34,696	35,220	35,743	36,265	36,786	37,307	37,827
	66	32,276	32,804	33,331	33,858	34,383	34,908	35,432	35,955	36,477	36,999	37,520
	67	31,954	32,484	33,013	33,541	34,068	34,594	35,119	35,643	36,167	36,690	37,212
	68	31,630	32,162	32,692	33,221	33,750	34,277	34,804	35,329	35,854	36,378	36,902
	69	31,304	31,837	32,369	32,900	33,430	33,959	34,487	35,014	35,540	36,065	36,590
	70	30,974	31,510	32,043	32,576	33,108	33,638	34,167	34,696	35,223	35,750	36,276
	71	30,642	31,179	31,715	32,250	32,783	33,315	33,846	34,376	34,905	35,433	35,960
	72	30,307	30,846	31,384	31,921	32,456	32,989	33,522	34,054	34,584	35,113	35,642
	73	29,969	30,510	31,050	31,589	32,126	32,661	33,196	33,729	34,261	34,792	35,322
	74	29,627	30,171	30,713	31,254	31,793	32,331	32,867	33,402	33,935	34,468	34,999
	75	29,282	29,829	30,373	30,916	31,457	31,997	32,535	33,072	33,607	34,142	34,675
	76	28,933	29,482	30,030	30,575	31,119	31,660	32,201	32,739	33,277	33,813	34,348
	77	28,580	29,133	29,683	30,231	30,777	31,321	31,863	32,404	32,944	33,482	34,018
	78	28,223	28,779	29,332	29,883	30,431	30,978	31,523	32,066	32,607	33,147	33,686
	79	27,862	28,421	28,977	29,531	30,082	30,632	31,179	31,725	32,268	32,810	33,351
	80	27,496	28,059	28,618	29,175	29,730	30,282	30,832	31,380	31,926	32,471	33,013
	81	27,125	27,692	28,255	28,815	29,373	29,928	30,481	31,032	31,581	32,127	32,672
	82	26,748	27,319	27,887	28,451	29,012	29,571	30,127	30,680	31,232	31,781	32,329
	83	26,366	26,942	27,514	28,082	28,647	29,209	29,768	30,325	30,879	31,431	31,981
	84	25,977	26,558	27,135	27,708	28,277	28,843	29,405	29,965	30,523	31,078	31,631
	85	25,582	26,169	26,750	27,328	27,901	28,471	29,038	29,602	30,162	30,721	31,276
	86	25,179	25,772	26,360	26,942	27,521	28,095	28,666	29,233	29,798	30,359	30,918
	87	24,768	25,368	25,962	26,550	27,134	27,713	28,289	28,860	29,428	29,994	30,556
	88	24,348	24,956	25,557	26,151	26,741	27,325	27,906	28,482	29,054	29,623	30,189
	89	23,918	24,534	25,143	25,745	26,341	26,931	27,517	28,098	28,675	29,248	29,818
	90	23,476	24,103	24,721	25,330	25,933	26,530	27,121	27,708	28,290	28,868	29,442
	91	23,022	23,660	24,288	24,906	25,517	26,121	26,719	27,321	27,899	28,482	29,060
	92	22,554	23,205	23,844	24,472	25,092	25,704	26,309	26,908	27,501	28,090	28,673
	93	22,068	22,735	23,387	24,027	24,657	25,278	25,891	26,497	27,097	27,691	28,280
	94	21,563	22,248	22,916	23,569	24,210	24,841	25,463	26,078	26,685	27,285	27,881
	95	21,034	21,741	22,427	23,096	23,751	24,393	25,026	25,649	26,264	26,872	27,474
	96	20,474	21,210	21,919	22,606	23,277	23,933	24,576	25,210	25,834	26,450	27,059
	97	19,876	20,649	21,386	22,096	22,785	23,457	24,114	24,759	25,394	26,019	26,636
	98	19,225	20,049	20,823	21,561	22,273	22,964	23,637	24,296	24,942	25,577	26,204
	99		19,395	20,221	20,997	21,737	22,450	23,142	23,817	24,477	25,124	25,761
	100			19,565	20,393	21,170	21,913	22,628	23,321	23,997	24,658	25,307
	101				19,735	20,564	21,344	22,088	22,805	23,499	24,177	24,839
	102					19,904	20,736	21,518	22,263	22,981	23,678	24,356
	103						20,074	20,908	21,691	22,438	23,158	23,855
	104							20,243	21,079	21,864	22,613	23,334
	105								20,413	21,251	22,038	22,788
	106									20,582	21,422	22,211
	107										20,752	21,594
	108											20,921
	109											
	110											
	111											
	112											
	113											
	114											
	115											
	116											
	117											
	118											
	119											
	120											

CENTRE DISTANCE TABLE

		$z_c - z_1$														
		142	143	144	145	146	147	148	149	150	151	152	153	154	155	156
$z_2 - z_1$	61	54,890	55,398	55,905	56,413	56,920	57,428	57,935	58,442	58,949	59,456	59,963	60,469	60,976	61,482	61,989
	62	54,606	55,115	55,623	56,131	56,639	57,146	57,654	58,161	58,669	59,176	59,683	60,190	60,697	61,203	61,710
	63	54,322	54,831	55,340	55,848	56,356	56,864	57,372	57,880	58,387	58,895	59,402	59,909	60,417	60,923	61,430
	64	54,038	54,547	55,055	55,564	56,073	56,581	57,089	57,597	58,105	58,613	59,121	59,628	60,136	60,643	61,150
	65	53,752	54,261	54,771	55,280	55,789	56,297	56,806	57,314	57,823	58,331	58,839	59,346	59,854	60,362	60,869
	66	53,465	53,975	54,485	54,994	55,503	56,013	56,522	57,030	57,539	58,047	58,556	59,064	59,572	60,080	60,588
	67	53,178	53,688	54,198	54,708	55,218	55,727	56,236	56,746	57,255	57,763	58,272	58,781	59,289	59,797	60,305
	68	52,889	53,400	53,910	54,421	54,931	55,441	55,950	56,460	56,969	57,479	57,988	58,496	59,005	59,514	60,022
	69	52,600	53,111	53,622	54,133	54,643	55,154	55,664	56,174	56,683	57,193	57,702	58,211	58,721	59,229	59,738
	70	52,310	52,821	53,333	53,844	54,355	54,865	55,376	55,886	56,396	56,906	57,416	57,926	58,435	58,944	59,454
	71	52,018	52,530	53,042	53,554	54,065	54,576	55,087	55,598	56,109	56,619	57,129	57,639	58,149	58,659	59,168
	72	51,726	52,238	52,751	53,263	53,775	54,286	54,798	55,309	55,820	56,331	56,841	57,352	57,862	58,372	58,882
	73	51,433	51,946	52,459	52,971	53,483	53,996	54,507	55,019	55,531	56,042	56,553	57,064	57,574	58,085	58,595
	74	51,138	51,652	52,165	52,678	53,191	53,704	54,216	54,728	55,240	55,752	56,263	56,774	57,285	57,796	58,307
	75	50,843	51,357	51,871	52,385	52,898	53,411	53,924	54,436	54,949	55,461	55,973	56,484	56,995	57,507	58,018
	76	50,546	51,061	51,575	52,090	52,604	53,117	53,631	54,144	54,656	55,169	55,681	56,194	56,705	57,217	57,729
	77	50,249	50,764	51,279	51,794	52,308	52,822	53,336	53,850	54,363	54,876	55,389	55,902	56,414	56,926	57,438
	78	49,950	50,466	50,981	51,497	52,012	52,527	53,041	53,555	54,069	54,583	55,096	55,609	56,122	56,634	57,147
	79	49,650	50,166	50,683	51,199	51,714	52,230	52,745	53,259	53,774	54,288	54,802	55,315	55,829	56,342	56,854
	80	49,349	49,866	50,383	50,899	51,416	51,932	52,447	52,962	53,477	53,992	54,506	55,021	55,534	56,048	56,561
81	49,046	49,564	50,082	50,599	51,116	51,633	52,149	52,665	53,180	53,695	54,210	54,725	55,239	55,753	56,267	
82	48,743	49,261	49,780	50,298	50,815	51,332	51,849	52,366	52,882	53,398	53,913	54,428	54,943	55,458	55,972	
83	48,438	48,957	49,476	49,995	50,513	51,031	51,548	52,066	52,582	53,099	53,615	54,130	54,648	55,161	55,676	
84	48,132	48,652	49,172	49,691	50,210	50,728	51,247	51,764	52,282	52,799	53,315	53,832	54,348	54,863	55,379	
85	47,824	48,345	48,866	49,386	49,905	50,425	50,943	51,462	51,980	52,498	53,015	53,532	54,048	54,565	55,081	
86	47,515	48,037	48,558	49,079	49,600	50,120	50,639	51,158	51,677	52,195	52,713	53,231	53,748	54,265	54,781	
87	47,205	47,727	48,250	48,771	49,293	49,813	50,334	50,853	51,373	51,892	52,410	52,929	53,447	53,964	54,481	
88	46,893	47,417	47,940	48,462	48,984	49,506	50,027	50,547	51,068	51,587	52,107	52,625	53,144	53,662	54,180	
89	46,580	47,104	47,628	48,152	48,674	49,197	49,719	50,240	50,761	51,281	51,801	52,321	52,840	53,359	53,877	
90	46,265	46,790	47,315	47,840	48,363	48,887	49,409	49,931	50,453	50,974	51,495	52,015	52,535	53,055	53,574	
91	45,948	46,475	47,001	47,526	48,051	48,575	49,098	49,621	50,144	50,666	51,187	51,709	52,229	52,749	53,269	
92	45,630	46,158	46,685	47,211	47,737	48,262	48,786	49,310	49,833	50,356	50,879	51,400	51,922	52,443	52,963	
93	45,311	45,839	46,367	46,895	47,421	47,947	48,473	48,997	49,522	50,045	50,568	51,091	51,613	52,135	52,656	
94	44,989	45,519	46,048	46,576	47,104	47,631	48,157	48,683	49,208	49,733	50,257	50,780	51,303	51,826	52,348	
95	44,666	45,197	45,727	46,257	46,785	47,313	47,841	48,367	48,893	49,419	49,944	50,468	50,992	51,515	52,038	
96	44,341	44,873	45,405	45,935	46,465	46,994	47,522	48,050	48,577	49,104	49,629	50,155	50,679	51,203	51,727	
97	44,014	44,548	45,080	45,612	46,143	46,673	47,203	47,731	48,259	48,787	49,314	49,840	50,365	50,890	51,415	
98	43,685	44,220	44,754	45,287	45,819	46,351	46,881	47,411	47,940	48,468	48,996	49,523	50,050	50,576	51,101	
99	43,354	43,891	44,426	44,960	45,494	46,026	46,558	47,089	47,619	48,149	48,677	49,205	49,733	50,260	50,786	
100	43,021	43,559	44,096	44,631	45,166	45,700	46,233	46,765	47,296	47,827	48,357	48,886	49,415	49,942	50,470	
101	42,686	43,226	43,764	44,301	44,837	45,372	45,906	46,440	46,972	47,504	48,035	48,566	49,095	49,623	50,152	
102	42,349	42,890	43,429	43,968	44,505	45,042	45,578	46,112	46,646	47,179	47,711	48,242	48,773	49,303	49,832	
103	42,009	42,552	43,093	43,633	44,172	44,710	45,247	45,783	46,318	46,852	47,386	47,918	48,450	48,981	49,511	
104	41,667	42,212	42,754	43,296	43,837	44,376	44,914	45,452	45,988	46,524	47,058	47,592	48,125	48,657	49,188	
105	41,323	41,869	42,414	42,957	43,499	44,040	44,580	45,119	45,656	46,193	46,729	47,264	47,798	48,331	48,864	
106	40,976	41,524	42,070	42,615	43,159	43,702	44,243	44,784	45,323	45,861	46,398	46,934	47,470	48,004	48,538	
107	40,626	41,176	41,724	42,271	42,817	43,361	43,904	44,446	44,987	45,527	46,065	46,603	47,140	47,675	48,210	
108	40,273	40,825	41,376	41,925	42,472	43,018	43,563	44,107	44,649	45,190	45,730	46,269	46,807	47,344	47,881	
109	39,918	40,472	41,025	41,576	42,125	42,673	43,220	43,765	44,309	44,852	45,393	45,934	46,473	47,012	47,549	
110	39,559	40,116	40,671	41,224	41,775	42,325	42,874	43,421	43,966	44,511	45,054	45,596	46,137	46,677	47,216	
111	39,197	39,757	40,314	40,869	41,423	41,975	42,525	43,074	43,622	44,168	44,713	45,256	45,799	46,340	46,881	
112	38,832	39,394	39,954	40,511	41,067	41,622	42,174	42,725	43,274	43,822	44,369	44,914	45,459	46,001	46,543	
113	38,464	39,028	39,591	40,151	40,709	41,265	41,820	42,373	42,925	43,475	44,023	44,570	45,116	45,661	46,204	
114	38,091	38,659	39,224	39,787	40,348	40,906	41,463	42,019	42,572	43,124	43,674	44,223	44,771	45,317	45,862	
115	37,715	38,286	38,854	39,420	39,983	40,544	41,104	41,661	42,217	42,771	43,323	43,874	44,424	44,972	45,518	
116	37,335	37,909	38,480	39,049	39,615	40,179	40,741	41,301	41,859	42,415	42,970	43,523	44,074	44,624	45,172	
117	36,950	37,528	38,102	38,674	39,243	39,810	40,375	40,937	41,498	42,056	42,613	43,168	43,722	44,273	44,824	
118	36,561	37,143	37,721	38,296	38,868	39,438	40,005	40,571	41,134	41,695	42,254	42,811	43,366	43,920	44,473	
119	36,167	36,753	37,334	37,913	38,489	39,062	39,632	40,200	40,766	41,330	41,891	42,451	43,009	43,565	44,119	
120	35,768	36,358	36,944	37,526	38,106	38,682	39,256	39,827	40,395	40,961	41,526	42,088	42,648	43,206	43,763	

CENTRE DISTANCE TABLE

		$z_c - z_1$														
		157	158	159	160	161	162	163	164	165	166	167	168	169	170	171
$z_2 - z_1$	61	62,495	63,001	63,507	64,013	64,519	65,024	65,530	66,036	66,541	67,046	67,552	68,057	68,562	69,067	69,572
	62	62,216	62,723	63,229	63,735	64,241	64,747	65,253	65,759	66,264	66,770	67,275	67,781	68,286	68,792	69,297
	63	61,937	62,444	62,950	63,457	63,963	64,469	64,975	65,481	65,987	66,493	66,999	67,504	68,010	68,515	69,021
	64	61,657	62,164	62,671	63,178	63,684	64,191	64,697	65,203	65,709	66,215	66,721	67,227	67,733	68,239	68,744
	65	61,377	61,884	62,391	62,898	63,405	63,911	64,418	64,924	65,431	65,937	66,443	66,950	67,456	67,962	68,467
	66	61,095	61,603	62,110	62,617	63,124	63,631	64,138	64,645	65,152	65,658	66,165	66,671	67,178	67,684	68,190
	67	60,813	61,321	61,829	62,336	62,844	63,351	63,858	64,365	64,872	65,379	65,886	66,392	66,899	67,405	67,912
	68	60,530	61,038	61,546	62,054	62,562	63,070	63,577	64,084	64,592	65,099	65,606	66,113	66,619	67,126	67,633
	69	60,247	60,755	61,264	61,772	62,280	62,788	63,295	63,803	64,311	64,818	65,325	65,832	66,339	66,846	67,353
	70	59,962	60,471	60,980	61,488	61,997	62,505	63,013	63,521	64,029	64,536	65,044	65,551	66,059	66,566	67,073
	71	59,677	60,187	60,695	61,204	61,713	62,222	62,730	63,238	63,746	64,254	64,762	65,270	65,777	66,285	66,792
	72	59,391	59,901	60,410	60,919	61,428	61,937	62,446	62,955	63,463	63,971	64,480	64,988	65,495	66,003	66,511
	73	59,105	59,615	60,124	60,634	61,143	61,652	62,161	62,670	63,179	63,688	64,196	64,705	65,213	65,721	66,229
	74	58,817	59,328	59,838	60,348	60,857	61,367	61,876	62,385	62,894	63,403	63,912	64,421	64,929	65,438	65,946
	75	58,529	59,040	59,550	60,060	60,570	61,080	61,590	62,100	62,609	63,118	63,627	64,136	64,645	65,154	65,662
	76	58,240	58,751	59,262	59,772	60,283	60,793	61,303	61,813	62,323	62,833	63,342	63,851	64,360	64,869	65,378
	77	57,950	58,461	58,972	59,484	59,994	60,505	61,016	61,526	62,036	62,546	63,056	63,565	64,075	64,584	65,093
	78	57,659	58,171	58,682	59,194	59,705	60,216	60,727	61,238	61,748	62,259	62,769	63,279	63,789	64,298	64,808
	79	57,367	57,879	58,391	58,903	59,415	59,927	60,438	60,949	61,460	61,971	62,481	62,991	63,502	64,012	64,521
	80	57,074	57,587	58,100	58,612	59,124	59,636	60,148	60,659	61,171	61,682	62,193	62,703	63,214	63,724	64,234
81	56,781	57,294	57,807	58,320	58,832	59,345	59,857	60,369	60,880	61,392	61,903	62,414	62,925	63,436	63,947	
82	56,486	57,000	57,513	58,027	58,540	59,052	59,565	60,077	60,589	61,101	61,613	62,125	62,636	63,147	63,658	
83	56,190	56,705	57,219	57,732	58,246	58,759	59,272	59,785	60,298	60,810	61,322	61,834	62,346	62,857	63,369	
84	55,894	56,409	56,923	57,437	57,951	58,465	58,979	59,492	60,005	60,518	61,030	61,543	62,055	62,567	63,078	
85	55,596	56,112	56,627	57,141	57,656	58,170	58,684	59,198	59,711	60,225	60,738	61,250	61,763	62,275	62,787	
86	55,298	55,814	56,329	56,844	57,359	57,874	58,389	58,903	59,417	59,931	60,444	60,957	61,470	61,983	62,496	
87	54,998	55,515	56,031	56,547	57,062	57,577	58,092	58,607	59,121	59,636	60,150	60,663	61,177	61,690	62,203	
88	54,697	55,214	55,731	56,248	56,764	57,279	57,795	58,310	58,825	59,340	59,854	60,368	60,882	61,396	61,909	
89	54,396	54,913	55,431	55,948	56,464	56,981	57,497	58,012	58,528	59,043	59,558	60,073	60,587	61,101	61,615	
90	54,093	54,611	55,129	55,646	56,164	56,681	57,197	57,714	58,230	58,745	59,261	59,776	60,291	60,805	61,320	
91	53,789	54,308	54,826	55,344	55,862	56,380	56,897	57,414	57,930	58,447	58,963	59,478	59,994	60,509	61,024	
92	53,483	54,003	54,522	55,041	55,560	56,078	56,596	57,113	57,630	58,147	58,663	59,180	59,696	60,211	60,726	
93	53,177	53,697	54,217	54,737	55,256	55,775	56,293	56,811	57,329	57,846	58,363	58,880	59,396	59,913	60,428	
94	52,869	53,390	53,911	54,431	54,951	55,470	55,990	56,508	57,027	57,545	58,062	58,579	59,095	59,613	60,130	
95	52,560	53,082	53,604	54,125	54,645	55,165	55,685	56,204	56,723	57,242	57,760	58,278	58,795	59,313	59,830	
96	52,250	52,773	53,295	53,817	54,338	54,859	55,379	55,899	56,419	56,938	57,457	57,975	58,493	59,011	59,529	
97	51,939	52,462	52,985	53,507	54,029	54,551	55,072	55,593	56,113	56,633	57,152	57,672	58,190	58,709	59,227	
98	51,626	52,150	52,674	53,197	53,720	54,242	54,764	55,285	55,806	56,327	56,847	57,367	57,886	58,405	58,924	
99	51,312	51,837	52,361	52,885	53,409	53,932	54,455	54,977	55,498	56,020	56,540	57,061	57,581	58,101	58,620	
100	50,996	51,522	52,048	52,572	53,097	53,621	54,144	54,667	55,189	55,711	56,233	56,754	57,275	57,795	58,315	
101	50,679	51,206	51,732	52,258	52,783	53,308	53,832	54,356	54,879	55,402	55,924	56,446	56,967	57,488	58,009	
102	50,361	50,888	51,416	51,942	52,468	52,994	53,519	54,043	54,567	55,091	55,614	56,136	56,658	57,180	57,701	
103	50,040	50,569	51,098	51,625	52,152	52,679	53,204	53,730	54,254	54,779	55,303	55,826	56,349	56,871	57,393	
104	49,719	50,249	50,778	51,307	51,835	52,362	52,889	53,415	53,940	54,465	54,990	55,514	56,038	56,561	57,083	
105	49,396	49,927	50,457	50,986	51,515	52,044	52,571	53,098	53,625	54,151	54,676	55,201	55,725	56,249	56,773	
106	49,071	49,603	50,134	50,665	51,195	51,724	52,253	52,781	53,308	53,835	54,361	54,887	55,412	55,937	56,461	
107	48,744	49,277	49,810	50,342	50,873	51,403	51,932	52,461	52,990	53,517	54,045	54,571	55,097	55,623	56,148	
108	48,416	48,950	49,484	50,017	50,549	51,080	51,611	52,141	52,670	53,199	53,727	54,254	54,781	55,307	55,833	
109	48,086	48,621	49,156	49,690	50,223	50,756	51,288	51,818	52,349	52,878	53,407	53,936	54,463	54,991	55,517	
110	47,754	48,291	48,827	49,362	49,896	50,430	50,963	51,495	52,026	52,557	53,087	53,616	54,145	54,673	55,200	
111	47,420	47,958	48,496	49,032	49,568	50,102	50,636	51,169	51,702	52,233	52,764	53,295	53,824	54,353	54,882	
112	47,084	47,624	48,162	48,700	49,237	49,773	50,308	50,842	51,376	51,909	52,441	52,972	53,503	54,033	54,562	
113	46,746	47,287	47,827	48,367	48,905	49,442	49,978	50,514	51,048	51,582	52,115	52,648	53,179	53,710	54,241	
114	46,406	46,949	47,490	48,031	48,570	49,109	49,647	50,183	50,719	51,254	51,788	52,322	52,855	53,387	53,918	
115	46,064	46,608	47,151	47,693	48,234	48,774	49,313	49,851	50,388	50,924	51,460	51,994	52,528	53,061	53,594	
116	45,720	46,265	46,810	47,354	47,896	48,437	48,978	49,517	50,055	50,593	51,130	51,665	52,200	52,734	53,268	
117	45,373	45,920	46,467	47,012	47,556	48,099	48,640	49,181	49,721	50,260	50,798	51,335	51,871	52,406	52,940	
118	45,024	45,573	46,121	46,668	47,214	47,758	48,301	48,843	49,384	49,925	50,464	51,002	51,539	52,076	52,611	
119	44,672	45,223	45,773	46,322	46,869	47,415	47,960	48,503	49,046	49,588	50,128	50,668	51,206	51,744	52,281	
120	44,318	44,871	45,423	45,973	46,522	47,070	47,616	48,161	48,706	49,249	49,790	50,331	50,871	51,410	51,948	

CENTRE DISTANCE TABLE

		$z_c - z_1$														
		172	173	174	175	176	177	178	179	180	181	182	183	184	185	186
$z_2 - z_1$	61	70,077	70,582	71,086	71,591	72,096	72,600	73,105	73,609	74,114	74,618	75,122	75,626	76,131	76,635	77,139
	62	69,802	70,307	70,812	71,317	71,822	72,326	72,831	73,336	73,840	74,345	74,849	75,353	75,858	76,362	76,866
	63	69,526	70,031	70,537	71,042	71,547	72,052	72,557	73,061	73,566	74,071	74,575	75,080	75,584	76,089	76,593
	64	69,250	69,755	70,261	70,766	71,271	71,776	72,282	72,787	73,292	73,796	74,301	74,806	75,311	75,815	76,320
	65	68,973	69,479	69,984	70,490	70,995	71,501	72,006	72,511	73,016	73,521	74,026	74,531	75,036	75,541	76,046
	66	68,696	69,202	69,708	70,213	70,719	71,224	71,730	72,235	72,741	73,246	73,751	74,256	74,761	75,266	75,771
	67	68,418	68,924	69,430	69,936	70,442	70,948	71,453	71,959	72,464	72,970	73,475	73,981	74,486	74,991	75,496
	68	68,139	68,646	69,152	69,658	70,164	70,670	71,176	71,682	72,188	72,693	73,199	73,704	74,210	74,715	75,221
	69	67,860	68,367	68,873	69,379	69,886	70,392	70,898	71,404	71,910	72,416	72,922	73,428	73,933	74,439	74,944
	70	67,580	68,087	68,594	69,100	69,607	70,113	70,620	71,126	71,632	72,138	72,644	73,150	73,656	74,162	74,668
	71	67,300	67,807	68,314	68,821	69,327	69,834	70,341	70,847	71,354	71,860	72,366	72,873	73,379	73,885	74,391
	72	67,018	67,526	68,033	68,540	69,047	69,554	70,061	70,568	71,075	71,581	72,088	72,594	73,100	73,607	74,113
	73	66,737	67,244	67,752	68,259	68,767	69,274	69,781	70,288	70,795	71,302	71,808	72,315	72,822	73,328	73,834
	74	66,454	66,962	67,470	67,978	68,485	68,993	69,500	70,007	70,515	71,022	71,529	72,036	72,542	73,049	73,556
	75	66,171	66,679	67,187	67,695	68,203	68,711	69,219	69,726	70,234	70,741	71,248	71,755	72,262	72,769	73,276
	76	65,887	66,396	66,904	67,412	67,921	68,429	68,937	69,444	69,952	70,460	70,967	71,474	71,982	72,489	72,996
	77	65,602	66,111	66,620	67,129	67,637	68,146	68,654	69,162	69,670	70,178	70,685	71,193	71,701	72,208	72,715
	78	65,317	65,826	66,335	66,844	67,353	67,862	68,370	68,879	69,387	69,895	70,403	70,911	71,419	71,926	72,434
	79	65,031	65,541	66,050	66,559	67,068	67,577	68,086	68,595	69,103	69,612	70,120	70,628	71,136	71,644	72,152
	80	64,744	65,254	65,764	66,274	66,783	67,292	67,801	68,310	68,819	69,328	69,837	70,345	70,853	71,362	71,870
81	64,457	64,967	65,477	65,987	66,497	67,006	67,516	68,025	68,534	69,043	69,552	70,061	70,570	71,078	71,587	
82	64,169	64,679	65,190	65,700	66,210	66,720	67,230	67,739	68,249	68,758	69,267	69,776	70,285	70,794	71,303	
83	63,880	64,391	64,901	65,412	65,922	66,433	66,943	67,453	67,963	68,472	68,982	69,491	70,000	70,509	71,018	
84	63,590	64,101	64,612	65,123	65,634	66,145	66,655	67,165	67,676	68,186	68,695	69,205	69,715	70,224	70,733	
85	63,299	63,811	64,323	64,834	65,345	65,856	66,367	66,877	67,388	67,898	68,408	68,918	69,428	69,938	70,448	
86	63,008	63,520	64,032	64,544	65,055	65,567	66,078	66,589	67,100	67,610	68,121	68,631	69,141	69,651	70,161	
87	62,716	63,228	63,741	64,253	64,765	65,276	65,788	66,299	66,810	67,321	67,832	68,343	68,853	69,364	69,874	
88	62,423	62,936	63,448	63,961	64,473	64,985	65,497	66,009	66,521	67,032	67,543	68,054	68,565	69,076	69,586	
89	62,129	62,642	63,155	63,668	64,181	64,693	65,206	65,718	66,230	66,742	67,253	67,765	68,276	68,787	69,298	
90	61,834	62,348	62,861	63,375	63,888	64,401	64,914	65,426	65,938	66,451	66,963	67,474	67,986	68,497	69,008	
91	61,538	62,052	62,567	63,080	63,594	64,107	64,621	65,133	65,646	66,159	66,671	67,183	67,695	68,207	68,719	
92	61,242	61,756	62,270	62,785	63,299	63,813	64,327	64,840	65,353	65,866	66,379	66,891	67,404	67,916	68,428	
93	60,944	61,459	61,974	62,489	63,004	63,518	64,032	64,546	65,059	65,573	66,086	66,599	67,112	67,624	68,136	
94	60,646	61,161	61,677	62,192	62,707	63,222	63,736	64,251	64,765	65,278	65,792	66,305	66,819	67,331	67,844	
95	60,348	60,863	61,379	61,894	62,410	62,925	63,440	63,955	64,469	64,983	65,497	66,011	66,525	67,038	67,551	
96	60,046	60,563	61,079	61,596	62,112	62,627	63,143	63,658	64,173	64,688	65,202	65,716	66,230	66,744	67,257	
97	59,745	60,262	60,779	61,296	61,812	62,329	62,845	63,360	63,876	64,391	64,906	65,420	65,935	66,449	66,963	
98	59,442	59,960	60,478	60,995	61,512	62,029	62,545	63,062	63,577	64,093	64,608	65,124	65,638	66,153	66,667	
99	59,139	59,657	60,176	60,693	61,211	61,728	62,245	62,762	63,278	63,795	64,310	64,826	65,341	65,856	66,371	
100	58,834	59,354	59,872	60,391	60,909	61,427	61,944	62,462	62,979	63,495	64,011	64,528	65,043	65,559	66,074	
101	58,529	59,049	59,568	60,087	60,606	61,124	61,642	62,160	62,678	63,195	63,712	64,228	64,745	65,261	66,776	
102	58,222	58,743	59,263	59,782	60,302	60,821	61,339	61,858	62,376	62,893	63,411	63,928	64,445	64,961	65,478	
103	57,915	58,436	58,956	59,477	59,997	60,516	61,035	61,554	62,073	62,591	63,109	63,627	64,144	64,661	65,178	
104	57,606	58,127	58,649	59,170	59,690	60,211	60,730	61,250	61,769	62,288	62,806	63,325	63,842	64,360	64,877	
105	57,296	57,818	58,340	58,862	59,383	59,904	60,424	60,945	61,464	61,984	62,503	63,022	63,540	64,058	64,576	
106	56,984	57,508	58,030	58,553	59,075	59,596	60,117	60,638	61,159	61,678	62,198	62,717	63,236	63,755	64,273	
107	56,672	57,196	57,720	58,243	58,765	59,287	59,809	60,331	60,852	61,372	61,892	62,412	62,932	63,451	63,970	
108	56,358	56,883	57,407	57,931	58,455	58,977	59,500	60,022	60,544	61,064	61,586	62,106	62,626	63,146	63,666	
109	56,043	56,569	57,094	57,619	58,143	58,666	59,189	59,712	60,235	60,757	61,278	61,799	62,320	62,840	63,360	
110	55,727	56,254	56,779	57,305	57,830	58,354	58,878	59,401	59,924	60,447	60,969	61,491	62,012	62,533	63,054	
111	55,410	55,937	56,464	56,990	57,515	58,040	58,565	59,089	59,613	60,136	60,659	61,182	61,704	62,225	62,747	
112	55,091	55,619	56,146	56,673	57,200	57,726	58,251	58,776	59,301	59,825	60,348	60,871	61,394	61,916	62,438	
113	54,770	55,299	55,828	56,356	56,883	57,410	57,936	58,462	58,987	59,512	60,036	60,560	61,083	61,606	62,129	
114	54,449	54,979	55,508	56,037	56,565	57,092	57,619	58,146	58,672	59,198	59,723	60,247	60,771	61,295	61,818	
115	54,125	54,656	55,187	55,716	56,245	56,774	57,302	57,829	58,356	58,882	59,408	59,933	60,458	60,983	61,507	
116	53,801	54,332	54,864	55,394	55,924	56,454	56,983	57,511	58,039	58,566	59,092	59,618	60,144	60,669	61,194	
117	53,474	54,007	54,540	55,071	55,602	56,132	56,662	57,191	57,720	58,248	58,775	59,302	59,828	60,354	60,880	
118	53,146	53,680	54,214	54,746	55,278	55,810	56,340	56,870	57,400	57,929	58,457	58,985	59,512	60,038	60,565	
119	52,817	53,352	53,887	54,420	54,953	55,485	56,017	56,548	57,078	57,608	58,137	58,666	59,194	59,721	60,248	
120	52,486	53,022	53,559	54,092	54,626	55,160	55,692	56,224	56,756	57,286	57,816	58,346	58,875	59,403	59,931	

CENTRE DISTANCE TABLE

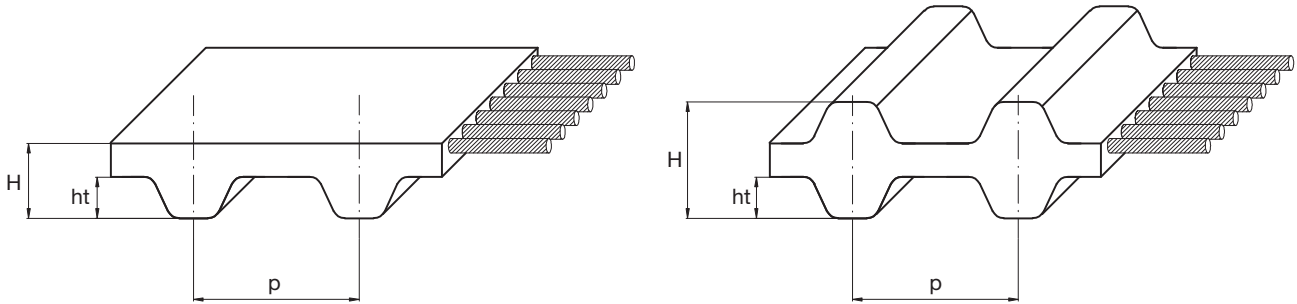
		$Z_c - Z_1$														
		187	188	189	190	191	192	193	194	195	196	197	198	199	200	201
$Z_2 - Z_1$	61	77,643	78,147	78,650	79,154	79,658	80,162	80,666	81,169	81,673	82,176	82,680	83,183	83,687	84,190	84,693
	62	77,370	77,874	78,378	78,882	79,386	79,890	80,394	80,898	81,402	81,905	82,409	82,913	83,416	83,920	84,423
	63	77,098	77,602	78,106	78,610	79,114	79,618	80,122	80,626	81,130	81,634	82,138	82,641	83,145	83,649	84,152
	64	76,824	77,329	77,833	78,337	78,842	79,346	79,850	80,354	80,858	81,362	81,866	82,370	82,874	83,377	83,881
	65	76,550	77,055	77,560	78,064	78,568	79,073	79,577	80,081	80,585	81,090	81,594	82,098	82,602	83,106	83,610
	66	76,276	76,781	77,285	77,790	78,295	78,799	79,304	79,808	80,313	80,817	81,321	81,825	82,329	82,834	83,338
	67	76,001	76,506	77,011	77,516	78,021	78,525	79,030	79,535	80,039	80,544	81,048	81,552	82,057	82,561	83,065
	68	75,726	76,231	76,736	77,241	77,746	78,251	78,756	79,260	79,765	80,270	80,774	81,279	81,783	82,288	82,792
	69	75,450	75,955	76,460	76,966	77,471	77,976	78,481	78,986	79,491	79,995	80,500	81,005	81,510	82,014	82,519
	70	75,173	75,679	76,184	76,690	77,195	77,700	78,206	78,711	79,216	79,721	80,226	80,731	81,235	81,740	82,245
	71	74,896	75,402	75,908	76,413	76,919	77,424	77,930	78,435	78,940	79,445	79,951	80,456	80,961	81,465	81,970
	72	74,619	75,125	75,631	76,136	76,642	77,148	77,653	78,159	78,664	79,170	79,675	80,180	80,685	81,190	81,695
	73	74,341	74,847	75,353	75,859	76,365	76,871	77,377	77,882	78,388	78,893	79,399	79,904	80,410	80,915	81,420
	74	74,062	74,568	75,075	75,581	76,087	76,593	77,099	77,605	78,111	78,617	79,122	79,628	80,133	80,639	81,144
	75	73,783	74,289	74,796	75,302	75,809	76,315	76,821	77,327	77,833	78,339	78,845	79,351	79,857	80,362	80,868
	76	73,503	74,010	74,517	75,023	75,530	76,036	76,543	77,049	77,555	78,061	78,568	79,074	79,579	80,085	80,591
	77	73,222	73,730	74,237	74,744	75,250	75,757	76,264	76,770	77,277	77,783	78,289	78,796	79,302	79,808	80,314
	78	72,942	73,449	73,956	74,463	74,970	75,477	75,984	76,491	76,998	77,504	78,011	78,517	79,023	79,530	80,036
	79	72,660	73,167	73,675	74,182	74,690	75,197	75,704	76,211	76,718	77,225	77,731	78,238	78,745	79,251	79,757
	80	72,378	72,885	73,393	73,901	74,408	74,916	75,423	75,930	76,438	76,945	77,452	77,958	78,465	78,972	79,478
81	72,095	72,603	73,111	73,619	74,127	74,634	75,142	75,649	76,157	76,664	77,171	77,678	78,185	78,692	79,199	
82	71,811	72,320	72,828	73,336	73,844	74,352	74,860	75,368	75,875	76,383	76,890	77,398	77,905	78,412	78,919	
83	71,527	72,036	72,544	73,053	73,561	74,069	74,577	75,085	75,593	76,101	76,609	77,116	77,624	78,131	78,638	
84	71,242	71,751	72,260	72,769	73,277	73,786	74,294	74,803	75,311	75,819	76,327	76,834	77,342	77,850	78,357	
85	70,957	71,466	71,975	72,484	72,993	73,502	74,011	74,519	75,027	75,536	76,044	76,552	77,060	77,568	78,075	
86	70,671	71,180	71,690	72,199	72,708	73,217	73,726	74,235	74,744	75,252	75,761	76,269	76,777	77,285	77,793	
87	70,384	70,894	71,404	71,913	72,423	72,932	73,441	73,950	74,459	74,968	75,477	75,985	76,494	77,002	77,510	
88	70,097	70,607	71,117	71,627	72,137	72,646	73,156	73,665	74,174	74,683	75,192	75,701	76,210	76,718	77,227	
89	69,808	70,319	70,829	71,340	71,850	72,360	72,869	73,379	73,889	74,398	74,907	75,416	75,925	76,434	76,943	
90	69,519	70,030	70,541	71,052	71,562	72,072	72,582	73,092	73,602	74,112	74,621	75,131	75,640	76,149	76,658	
91	69,230	69,741	70,252	70,763	71,274	71,784	72,295	72,805	73,315	73,825	74,335	74,845	75,354	75,864	76,373	
92	68,940	69,451	69,963	70,474	70,985	71,496	72,007	72,517	73,028	73,538	74,048	74,558	75,068	75,578	76,087	
93	68,648	69,160	69,672	70,184	70,695	71,206	71,718	72,228	72,739	73,250	73,760	74,271	74,781	75,291	75,801	
94	68,357	68,869	69,381	69,893	70,405	70,916	71,428	71,939	72,450	72,961	73,472	73,983	74,493	75,003	75,514	
95	68,064	68,577	69,089	69,602	70,114	70,626	71,138	71,649	72,161	72,672	73,183	73,694	74,205	74,715	75,226	
96	67,771	68,284	68,797	69,309	69,822	70,334	70,846	71,358	71,870	72,382	72,893	73,404	73,916	74,427	74,937	
97	67,477	67,990	68,503	69,017	69,529	70,042	70,555	71,067	71,579	72,091	72,603	73,114	73,626	74,137	74,648	
98	67,182	67,696	68,209	68,723	69,236	69,749	70,262	70,775	71,287	71,800	72,312	72,824	73,335	73,847	74,359	
99	66,886	67,400	67,914	68,428	68,942	69,455	69,969	70,482	70,995	71,507	72,020	72,532	73,044	73,556	74,068	
100	66,589	67,104	67,619	68,133	68,647	69,161	69,675	70,188	70,701	71,214	71,727	72,240	72,753	73,265	73,777	
101	66,292	66,807	67,322	67,837	68,351	68,866	69,380	69,894	70,407	70,921	71,434	71,947	72,460	72,973	73,485	
102	65,993	66,509	67,025	67,540	68,055	68,570	69,084	69,598	70,113	70,626	71,140	71,653	72,167	72,680	73,193	
103	65,694	66,211	66,726	67,242	67,758	68,273	68,788	69,302	69,817	70,331	70,845	71,359	71,873	72,386	72,899	
104	65,394	65,911	66,427	66,944	67,459	67,975	68,490	69,006	69,521	70,035	70,550	71,064	71,578	72,092	72,605	
105	65,093	65,610	66,127	66,644	67,160	67,677	68,192	68,708	69,223	69,738	70,253	70,768	71,282	71,797	72,311	
106	64,791	65,309	65,827	66,344	66,861	67,377	67,893	68,410	68,925	69,441	69,956	70,471	70,986	71,501	72,015	
107	64,489	65,007	65,525	66,042	66,560	67,077	67,594	68,110	68,626	69,142	69,658	70,174	70,689	71,204	71,719	
108	64,185	64,704	65,222	65,740	66,258	66,776	67,293	67,810	68,327	68,843	69,359	69,875	70,391	70,907	71,422	
109	63,880	64,399	64,918	65,437	65,956	66,474	66,991	67,509	68,026	68,543	69,060	69,576	70,092	70,608	71,124	
110	63,574	64,094	64,614	65,133	65,652	66,171	66,689	67,207	67,725	68,242	68,759	69,276	69,793	70,309	70,825	
111	63,268	63,788	64,308	64,828	65,348	65,867	66,386	66,904	67,422	67,940	68,458	68,975	69,493	70,009	70,526	
112	62,960	63,481	64,002	64,522	65,042	65,562	66,081	66,600	67,119	67,638	68,156	68,674	69,191	69,709	70,226	
113	62,651	63,173	63,694	64,215	64,736	65,256	65,776	66,296	66,815	67,334	67,853	68,371	68,889	69,407	69,925	
114	62,341	62,863	63,385	63,907	64,428	64,949	65,470	65,990	66,510	67,030	67,549	68,068	68,586	69,105	69,623	
115	62,030	62,553	63,076	63,598	64,120	64,642	65,163	65,683	66,204	66,724	67,244	67,763	68,282	68,801	69,320	
116	61,718	62,242	62,765	63,288	63,811	64,333	64,854	65,376	65,897	66,418	66,938	67,458	67,978	68,497	69,016	
117	61,405	61,929	62,453	62,977	63,500	64,023	64,545	65,067	65,589	66,110	66,631	67,152	67,672	68,192	68,711	
118	61,090	61,616	62,140	62,665	63,188	63,714	64,235	64,758	65,280	65,802	66,323	66,844	67,365	67,886	68,406	
119	60,775	61,301	61,826	62,351	62,876	63,400	63,924	64,447	64,970	65,492	66,014	66,536	67,058	67,579	68,099	
120	60,458	60,985	61,511	62,037	62,562	63,087	63,611	64,135	64,659	65,182	65,705	66,227	66,749	67,271	67,792	



ISORAN AND ISORAN DD

ISORAN AND ISORAN DD

Megadyne Isoran and Isoran DD belts are a class of belt very widely used in several kind of applications. These belts are made in polychloroprene compound. Special compounds with different features are available on request. Here under some belt's characteristics.



Pitch		MXL	XL	L	H	XH	XXH	XLDD	LDD	HDD
Pitch length (mm)	p	2,032	5,080	9,525	12,700	22,225	31,750	5,080	9,525	12,700
Teeth height (mm)	ht	0,51	1,27	1,91	2,29	6,35	9,53	1,27	1,91	2,29
Belt height (mm)	H	1,14	2,40	3,60	4,40	11,40	15,30	3,05	4,60	5,90

Resistance to:	Standard belt resistance
Water	Medium
Acids / Alkalis	None
Solvents	None
Mineral oils	Low
Oils	Low
Greases	Medium
Fuels	None
Environmental agents	Medium

Other features	
Temperature range	Min: -25 °C
	Max: 80 °C
	Max peak: 100 °C
Hardness	74 +/- 4 ShA

ISORAN AND ISORAN DD

STANDARD TOLERANCES

Width tolerances						
Belt width (inches)		Belt width (mm)		Tolerance on belt width		
More than	Up to	More than	Up to	Belt length (inches)		
				Up to 33"	More than 33" up to 66"	More than 66"
-	044	-	11,1	+0,4 -0,8	+0,4 -0,8	-
044	150	11,1	38,1	±0,8	+0,8 -1,2	+0,8 -1,2
150	200	38,1	50,8	+0,8 -1,2	±1,2	+1,2 -1,6
200	300	50,8	76,2	+1,2 -1,6	±1,6	+1,6 -2,0
300	400	76,2	101,6	-	+1,3 -1,5	+1,3 -1,5
400	500	101,6	127,0	-	+1,3 -1,5	+1,3 -1,5

Length tolerances					
Belt length (mm)		Tolerance (mm)	Belt length (mm)		Tolerance (mm)
More than	Up to		More than	Up to	
-	254	±0,40	2.286	2.540	±1,00
254	381	±0,45	2.540	2.794	±1,05
381	508	±0,50	2.794	3.048	±1,10
508	762	±0,60	3.048	3.302	±1,15
762	991	±0,65	3.302	3.556	±1,20
991	1.220	±0,75	3.556	3.810	±1,25
1.220	1.524	±0,80	3.810	4.064	±1,30
1.524	1.778	±0,85	4.064	4.318	±1,35
1.778	2.032	±0,90	4.318	4.572	±1,40
2.032	2.286	±0,95	-	-	-

Thickness tolerances				
Pitch	Nominal belt tickness (mm)	Tolerance degree (mm)		
		Standard belt	Grade 2	Grade 1
MXL	1,14	±0,25	±0,15	±0,15
XL	2,40	±0,25	±0,15	±0,15
L	3,60	±0,25	±0,25	±0,15
H	4,40	±0,60	±0,25	±0,15
XH	11,40	±0,60	±0,25	-
XXH	15,30	±0,60	±0,25	-

For specific application where you might require different tolerances, please contact our Application Department.

STANDARD WIDTHS													
Pitch	Belt widths												
	012	019	025	031	037	050	075	100	150	200	300	400	500
	3,05	4,83	6,35	7,87	9,40	12,70	19,05	25,40	38,10	50,80	76,20	101,60	127,00
MXL	•	•	•										
XL - XL DD			•	•	•								
L - L DD						•	•	•					
H - H DD							•	•	•	•	•		
XH										•	•	•	
XXH										•	•	•	•

RANGE

MXL		MXL		L		XH		XL DD		L DD	
Code	Pitch length (mm)	Code	Pitch length (mm)	Code	Pitch length (mm)	Code	Pitch length (mm)	Code	Pitch length (mm)	Code	Pitch length (mm)
360 MXL	91,44	4064 MXL	1032,26	124 L	314,32	507 XH	1289,00	120 XL DD	304,80	124 L DD	314,32
432 MXL	109,73	4200 MXL	1066,80	135 L	342,90	534 XH	1355,72	130 XL DD	330,20	135 L DD	342,90
440 MXL	111,76	4280 MXL	1087,12	150 L	381,00	560 XH	1422,40	140 XL DD	355,60	150 L DD	381,00
456 MXL	115,82	4320 MXL	1097,28	173 L	438,15	630 XH	1600,20	146 XL DD	370,84	173 L DD	438,15
480 MXL	121,92	4456 MXL	1131,82	187 L	476,25	700 XH	1778,00	150 XL DD	381,00	187 L DD	476,25
488 MXL	123,95	4736 MXL	1202,94	202 L	514,35	770 XH	1955,80	156 XL DD	396,24	202 L DD	514,35
496 MXL	125,98	4800 MXL	1219,20	210 L	533,40	840 XH	2133,60	160 XL DD	406,40	210 L DD	533,40
536 MXL	136,14	5224 MXL	1326,90	225 L	571,50	980 XH	2489,20	170 XL DD	431,80	225 L DD	571,50
544 MXL	138,18	Standard widths		240 L	609,60	1120 XH	2844,80	176 XL DD	447,04	240 L DD	609,60
576 MXL	146,30	012	3,05	255 L	647,70	1260 XH	3200,40	180 XL DD	457,20	255 L DD	647,70
584 MXL	148,34	019	4,83	270 L	685,80	1400 XH	3556,00	182 XL DD	462,28	270 L DD	685,80
608 MXL	154,43	025	6,35	285 L	723,90	1540 XH	3911,60	188 XL DD	477,52	285 L DD	723,90
632 MXL	160,53	XL		300 L	762,00	1750 XH	4445,00	190 XL DD	482,60	300 L DD	762,00
640 MXL	162,56	Code	Pitch length (mm)	322 L	819,15	Standard widths		198 XL DD	502,92	322 L DD	819,15
656 MXL	166,62	54 XL	137,16	334 L	848,36	200	50,80	200 XL DD	508,00	334 L DD	848,36
664 MXL	168,66	60 XL	152,40	345 L	876,30	300	76,20	202 XL DD	513,08	345 L DD	876,30
680 MXL	172,72	70 XL	177,80	367 L	933,45	400	101,60	210 XL DD	533,40	367 L DD	933,45
704 MXL	178,82	80 XL	203,20	390 L	990,60	Standard widths		212 XL DD	538,48	390 L DD	990,60
720 MXL	182,88	90 XL	228,60	405 L	1028,70	200	50,80	214 XL DD	543,56	405 L DD	1028,70
736 MXL	186,94	98 XL	248,92	412 L	1047,75	300	76,20	220 XL DD	558,80	412 L DD	1047,75
752 MXL	191,00	100 XL	254,00	420 L	1066,80	400	101,60	228 XL DD	579,12	420 L DD	1066,80
760 MXL	193,04	102 XL	259,08	450 L	1143,00	Standard widths		230 XL DD	584,20	450 L DD	1143,00
776 MXL	197,10	104 XL	264,16	480 L	1219,20	200	50,80	234 XL DD	594,36	480 L DD	1219,20
800 MXL	203,20	106 XL	269,24	510 L	1295,40	300	76,20	240 XL DD	609,60	510 L DD	1295,40
808 MXL	205,23	110 XL	279,40	540 L	1371,60	400	101,60	250 XL DD	635,00	540 L DD	1371,60
824 MXL	209,30	120 XL	304,80	600 L	1524,00	Standard widths		260 XL DD	660,40	600 L DD	1524,00
840 MXL	213,36	130 XL	330,20	728 L	1847,85	200	50,80	270 XL DD	685,80	728 L DD	1847,85
880 MXL	223,52	140 XL	355,60	817 L	2076,45	300	76,20	276 XL DD	701,04	817 L DD	2076,45
888 MXL	225,55	146 XL	370,84	Standard widths		400	101,60	290 XL DD	736,60	Standard widths	
912 MXL	231,65	150 XL	381,00	050	12,70	Standard widths		310 XL DD	787,40	050	12,70
920 MXL	233,68	156 XL	396,24	075	19,05	200	50,80	316 XL DD	802,64	075	19,05
944 MXL	239,78	160 XL	406,40	100	25,40	300	76,20	320 XL DD	812,80	100	25,40
952 MXL	241,81	170 XL	431,80	H		400	101,60	330 XL DD	838,20	H DD	
960 MXL	243,84	176 XL	447,04	Code	Pitch length (mm)	500	127,00	344 XL DD	873,76	Code	Pitch length (mm)
976 MXL	247,90	180 XL	457,20	240 H	609,60	XXH		352 XL DD	894,08	240 H DD	609,60
984 MXL	249,94	182 XL	462,28	270 H	685,80	Code	Pitch length (mm)	364 XL DD	924,56	270 H DD	685,80
1000 MXL	254,00	188 XL	477,52	300 H	762,00	700 XXH	1778,00	380 XL DD	965,20	300 H DD	762,00
1008 MXL	256,03	190 XL	482,60	330 H	838,20	800 XXH	2032,00	384 XL DD	975,36	330 H DD	838,20
1016 MXL	258,06	198 XL	502,92	360 H	914,40	900 XXH	2286,00	388 XL DD	985,52	360 H DD	914,40
1040 MXL	264,16	200 XL	508,00	390 H	990,60	1000 XXH	2540,00	390 XL DD	990,60	390 H DD	990,60
1056 MXL	268,22	202 XL	513,08	420 H	1066,80	1200 XXH	3048,00	392 XL DD	995,68	392 XL DD	995,68
1072 MXL	272,29	210 XL	533,40	450 H	1143,00	1400 XXH	3556,00	434 XL DD	1102,36	434 XL DD	1102,36
1120 MXL	284,48	212 XL	538,48	480 H	1219,20	1600 XXH	4064,00	460 XL DD	1168,40	460 XL DD	1168,40
1160 MXL	294,64	214 XL	543,56	480 H	1219,20	1800 XXH	4572,00	530 XL DD	1346,20	530 XL DD	1346,20
1176 MXL	298,70	220 XL	558,80	510 H	1295,40	Standard widths		600 XL DD	1524,00	600 XL DD	1524,00
1184 MXL	300,74	228 XL	579,12	540 H	1371,60	200	50,80	710 XL DD	1803,40	710 XL DD	1803,40
1200 MXL	304,80	230 XL	584,20	570 H	1447,80	300	76,20	Standard widths		025	6,35
1224 MXL	310,90	234 XL	594,36	600 H	1524,00	400	101,60	031	7,87	031	7,87
1240 MXL	314,96	240 XL	609,60	630 H	1600,20	500	127,00	037	9,40	037	9,40
1280 MXL	325,12	250 XL	635,00	660 H	1676,40	Standard widths		Standard widths		025	6,35
1400 MXL	355,60	260 XL	660,40	670 H	1701,80	200	50,80	Standard widths		031	7,87
1472 MXL	373,89	270 XL	685,80	700 H	1778,00	300	76,20	Standard widths		037	9,40
1496 MXL	379,98	276 XL	701,04	725 H	1841,50	400	101,60	Standard widths		Standard widths	
1520 MXL	386,08	290 XL	736,60	750 H	1905,00	500	127,00	Standard widths		Standard widths	
1600 MXL	406,40	310 XL	787,40	800 H	2032,00	Standard widths		Standard widths		Standard widths	
1680 MXL	426,72	316 XL	802,64	850 H	2159,00	200	50,80	Standard widths		Standard widths	
1696 MXL	430,78	320 XL	812,80	900 H	2286,00	300	76,20	Standard widths		Standard widths	
1768 MXL	449,07	330 XL	838,20	1000 H	2540,00	400	101,60	Standard widths		Standard widths	
1800 MXL	457,20	344 XL	873,76	1100 H	2794,00	500	127,00	Standard widths		Standard widths	
1832 MXL	465,33	352 XL	894,08	1120 H	2844,80	Standard widths		Standard widths		Standard widths	
1856 MXL	471,42	364 XL	924,56	1140 H	2895,60	200	50,80	Standard widths		Standard widths	
1888 MXL	479,55	380 XL	965,20	1150 H	2921,00	300	76,20	Standard widths		Standard widths	
1984 MXL	503,94	384 XL	975,36	1250 H	3175,00	400	101,60	Standard widths		Standard widths	
1992 MXL	505,97	388 XL	985,52	1400 H	3556,00	500	127,00	Standard widths		Standard widths	
2048 MXL	520,19	390 XL	990,60	1645 H	4178,30	Standard widths		Standard widths		Standard widths	
2240 MXL	568,96	392 XL	995,68	1700 H	4318,00	Standard widths		Standard widths		Standard widths	
2360 MXL	599,44	434 XL	1102,36	Standard widths		Standard widths		Standard widths		Standard widths	
2384 MXL	605,54	460 XL	1168,40	075	19,05	Standard widths		Standard widths		Standard widths	
2480 MXL	629,92	530 XL	1346,20	100	25,40	Standard widths		Standard widths		Standard widths	
2496 MXL	633,98	600 XL	1524,00	150	38,10	Standard widths		Standard widths		Standard widths	
2520 MXL	640,08	710 XL	1803,40	200	50,80	Standard widths		Standard widths		Standard widths	
2584 MXL	656,34	Standard widths		300	76,20	Standard widths		Standard widths		Standard widths	
2776 MXL	705,10	025	6,35	Standard widths		Standard widths		Standard widths		Standard widths	
2864 MXL	727,46	031	7,87	Standard widths		Standard widths		Standard widths		Standard widths	
2880 MXL	731,52	037	9,40	Standard widths		Standard widths		Standard widths		Standard widths	
2976 MXL	755,90	Standard widths		Standard widths		Standard widths		Standard widths		Standard widths	
3064 MXL	778,26	Standard widths		Standard widths		Standard widths		Standard widths		Standard widths	
3104 MXL	788,42	Standard widths		Standard widths		Standard widths		Standard widths		Standard widths	
3200 MXL	812,80	Standard widths		Standard widths		Standard widths		Standard widths		Standard widths	
3296 MXL	837,18	Standard widths		Standard widths		Standard widths		Standard widths		Standard widths	
3424 MXL	869,70	Standard widths		Standard widths		Standard widths		Standard widths		Standard widths	
3472 MXL	881,89	Standard widths		Standard widths		Standard widths		Standard widths		Standard widths	
3480 MXL	883,92	Standard widths		Standard widths		Standard widths		Standard widths		Standard widths	
3520 MXL	894,08	Standard widths		Standard widths		Standard widths		Standard widths		Standard widths	
3632 MXL	922,53	Standard widths		Standard widths		Standard widths		Standard widths		Standard widths	
3704 MXL	940,82	Standard widths		Standard widths		Standard widths		Standard widths		Standard widths	
3944 MXL	1001,78	Standard widths		Standard widths		Standard widths		Standard widths		Standard widths	
4000 MXL	1016,00	Standard widths		Standard widths		Standard widths		Standard widths		Standard widths	

BASIC PERFORMANCE Pb IN W FOR ISORAN MXL - 25 mm WIDE (W / 25 mm)

d (mm)	6,47	7,11	7,76	9,06	9,70	10,35	11,64	12,94	13,58	14,23	15,52	18,11	19,40	20,70
z	10	11	12	14	15	16	18	20	21	22	24	28	30	32
rpm														
100	3	3	3	4	4	4	5	6	6	6	7	8	8	9
200	6	6	7	8	8	9	10	11	12	12	13	15	17	18
300	8	9	10	12	12	13	15	17	17	18	20	23	25	26
400	11	12	13	15	17	18	20	22	23	24	26	31	33	35
500	14	15	17	19	21	22	25	28	29	30	33	39	41	44
600	17	18	20	23	25	26	30	33	35	36	40	46	50	53
725	20	22	24	28	30	32	36	40	42	44	48	56	60	64
800	22	24	26	31	33	35	40	44	46	48	53	62	66	71
900	25	27	30	35	37	40	45	50	52	55	60	69	74	79
950	26	29	31	37	39	42	47	52	55	58	63	73	79	84
1000	28	30	33	39	41	44	50	55	58	61	66	77	83	88
1100	30	33	36	42	45	48	55	61	64	67	73	85	91	97
1200	33	36	40	46	50	53	60	66	69	73	79	93	99	106
1300	36	39	43	50	54	57	64	72	75	79	86	100	107	115
1400	39	42	46	54	58	62	69	77	81	85	93	108	116	123
1425	39	43	47	55	59	63	71	79	82	86	94	110	118	126
1500	41	45	50	58	62	66	74	83	87	91	99	116	124	132
1600	44	48	53	62	66	71	79	88	93	97	106	123	132	141
1700	47	52	56	66	70	75	84	94	98	103	112	131	140	150
1800	50	55	60	69	74	79	89	99	104	109	119	139	149	158
1900	52	58	63	73	79	84	94	105	110	115	126	146	157	167
2000	55	61	66	77	83	88	99	110	116	121	132	154	165	176
2200	61	67	73	85	91	97	109	121	127	133	145	169	182	194
2400	66	73	79	93	99	106	119	132	139	145	158	185	198	211
2600	72	79	86	100	107	115	129	143	150	157	172	200	214	229
2800	77	85	93	108	116	123	139	154	162	169	185	215	231	246
2850	79	86	94	110	118	126	141	157	165	172	188	219	235	250
3000	83	91	99	116	124	132	149	165	173	182	198	231	247	263
3200	88	97	106	123	132	141	158	176	185	194	211	246	263	281
3400	94	103	112	131	140	150	168	187	196	206	224	261	280	298
3600	99	109	119	139	149	158	178	198	208	218	237	276	296	315
3800	105	115	126	146	157	167	188	209	219	230	250	292	312	333
4000	110	121	132	154	165	176	198	220	231	242	263	307	328	350
4200	116	127	139	162	173	185	208	231	242	254	276	322	345	367
4400	121	133	145	169	182	194	218	242	254	266	289	337	361	384
4600	127	139	152	177	190	202	227	253	265	278	302	352	377	402
4800	132	145	158	185	198	211	237	263	276	289	315	367	393	419
5000	138	151	165	192	206	220	247	274	288	301	328	382	409	436
5200	143	157	172	200	214	229	257	285	299	313	341	397	425	453
5400	149	163	178	208	223	237	267	296	311	325	354	412	441	470
5600	154	169	185	215	231	246	276	307	322	337	367	427	457	486
5800	160	175	191	223	239	255	286	318	333	349	380	442	473	503
6000	165	182	198	231	247	263	296	328	345	361	393	457	488	520
6500	179	197	214	250	267	285	320	355	373	390	425	494	528	562
7000	192	212	231	269	288	307	345	382	401	420	457	530	567	603
7500	206	227	247	288	308	328	369	409	429	449	488	567	605	643
8000	220	242	263	307	328	350	393	436	457	478	520	603	643	684
8500	233	257	280	326	349	372	417	462	485	507	551	638	681	724
9000	247	272	296	345	369	393	441	488	512	536	582	674	719	763
9500	261	286	312	363	389	414	465	515	539	564	613	709	755	801
10000	274	301	328	382	409	436	488	541	567	592	643	743	792	839
10500	288	316	345	401	429	457	512	567	594	621	674	777	828	877
11000	301	331	361	420	449	478	536	592	621	649	704	811	863	914
11500	315	346	377	438	469	499	559	618	647	676	733	844	898	950
12000	328	361	393	457	488	520	582	643	674	704	763	877	932	985
12500	342	376	409	475	508	541	605	669	700	731	792	909	965	1020
13000	355	390	425	494	528	562	628	694	726	758	821	941	998	1053
13500	369	405	441	512	547	582	651	719	752	785	849	972	1030	1086
14000	382	420	457	530	567	603	674	743	777	811	877	1002	1062	1118
14500	396	434	473	549	586	623	696	768	803	837	905	1032	1092	1150
15000	409	449	488	567	605	643	719	792	828	863	932	1062	1122	1180
16000	436	478	520	603	643	684	763	839	877	914	985	1118	1180	1238
17000	462	507	551	638	681	724	806	886	925	963	1037	1172	1234	1291
18000	488	536	582	674	719	763	849	932	972	1011	1086	1223	1285	1340
19000	515	564	613	709	755	801	891	976	1017	1058	1134	1272	1331	1385
20000	541	592	643	743	792	839	932	1020	1062	1102	1180	1316	1374	1425

BASIC PERFORMANCE Pb IN kW FOR ISORAN XL AND XL DD - 25 mm WIDE (kW / 25 mm)														
d (mm)	16,17	17,79	19,40	22,64	24,26	25,87	29,11	32,34	33,96	35,57	38,81	45,28	48,51	51,74
z	10	11	12	14	15	16	18	20	21	22	24	28	30	32
rpm														
100	0,02	0,02	0,02	0,02	0,02	0,02	0,03	0,03	0,03	0,03	0,04	0,04	0,05	0,05
200	0,03	0,03	0,04	0,04	0,05	0,05	0,05	0,06	0,06	0,07	0,07	0,09	0,09	0,10
300	0,05	0,05	0,05	0,06	0,07	0,07	0,08	0,09	0,10	0,10	0,11	0,13	0,14	0,15
400	0,06	0,07	0,07	0,09	0,09	0,10	0,11	0,12	0,13	0,13	0,15	0,17	0,18	0,19
500	0,08	0,08	0,09	0,11	0,11	0,12	0,14	0,15	0,16	0,17	0,18	0,21	0,23	0,24
600	0,09	0,10	0,11	0,13	0,14	0,15	0,16	0,18	0,19	0,20	0,22	0,26	0,27	0,29
725	0,11	0,12	0,13	0,15	0,17	0,18	0,20	0,22	0,23	0,24	0,26	0,31	0,33	0,35
800	0,12	0,13	0,15	0,17	0,18	0,19	0,22	0,24	0,26	0,27	0,29	0,34	0,36	0,39
900	0,14	0,15	0,16	0,19	0,21	0,22	0,25	0,27	0,29	0,30	0,33	0,38	0,41	0,44
950	0,14	0,16	0,17	0,20	0,22	0,23	0,26	0,29	0,30	0,32	0,35	0,40	0,43	0,46
1000	0,15	0,17	0,18	0,21	0,23	0,24	0,27	0,30	0,32	0,33	0,36	0,43	0,46	0,49
1100	0,17	0,18	0,20	0,23	0,25	0,27	0,30	0,33	0,35	0,37	0,40	0,47	0,50	0,53
1200	0,18	0,20	0,22	0,26	0,27	0,29	0,33	0,36	0,38	0,40	0,44	0,51	0,55	0,58
1300	0,20	0,22	0,24	0,28	0,30	0,32	0,36	0,39	0,41	0,43	0,47	0,55	0,59	0,63
1400	0,21	0,23	0,26	0,30	0,32	0,34	0,38	0,43	0,45	0,47	0,51	0,59	0,64	0,68
1425	0,22	0,24	0,26	0,30	0,32	0,35	0,39	0,43	0,45	0,48	0,52	0,60	0,65	0,69
1500	0,23	0,25	0,27	0,32	0,34	0,36	0,41	0,46	0,48	0,50	0,55	0,64	0,68	0,73
1600	0,24	0,27	0,29	0,34	0,36	0,39	0,44	0,49	0,51	0,53	0,58	0,68	0,73	0,77
1700	0,26	0,28	0,31	0,36	0,39	0,41	0,46	0,52	0,54	0,57	0,62	0,72	0,77	0,82
1800	0,27	0,30	0,33	0,38	0,41	0,44	0,49	0,55	0,57	0,60	0,65	0,76	0,82	0,87
1900	0,29	0,32	0,35	0,40	0,43	0,46	0,52	0,58	0,60	0,63	0,69	0,80	0,86	0,92
2000	0,30	0,33	0,36	0,43	0,46	0,49	0,55	0,61	0,64	0,67	0,73	0,84	0,90	0,96
2200	0,33	0,37	0,40	0,47	0,50	0,53	0,60	0,67	0,70	0,73	0,80	0,93	0,99	1,06
2400	0,36	0,40	0,44	0,51	0,55	0,58	0,65	0,73	0,76	0,80	0,87	1,01	1,08	1,15
2600	0,39	0,43	0,47	0,55	0,59	0,63	0,71	0,79	0,82	0,86	0,94	1,09	1,17	1,24
2800	0,43	0,47	0,51	0,59	0,64	0,68	0,76	0,84	0,89	0,93	1,01	1,17	1,25	1,33
2850	0,43	0,48	0,52	0,60	0,65	0,69	0,78	0,86	0,90	0,94	1,03	1,19	1,28	1,36
3000	0,46	0,50	0,55	0,64	0,68	0,73	0,82	0,90	0,95	0,99	1,08	1,25	1,34	1,42
3200	0,49	0,53	0,58	0,68	0,73	0,77	0,87	0,96	1,01	1,06	1,15	1,33	1,42	1,51
3400	0,52	0,57	0,62	0,72	0,77	0,82	0,92	1,02	1,07	1,12	1,22	1,41	1,51	1,60
3600	0,55	0,60	0,65	0,76	0,82	0,87	0,97	1,08	1,13	1,18	1,29	1,49	1,59	1,69
3800	0,58	0,63	0,69	0,80	0,86	0,92	1,03	1,14	1,19	1,25	1,36	1,57	1,67	1,78
4000	0,61	0,67	0,73	0,84	0,90	0,96	1,08	1,20	1,25	1,31	1,42	1,65	1,76	1,86
4200	0,64	0,70	0,76	0,89	0,95	1,01	1,13	1,25	1,31	1,37	1,49	1,72	1,84	1,95
4400	0,67	0,73	0,80	0,93	0,99	1,06	1,18	1,31	1,37	1,44	1,56	1,80	1,91	2,03
4600	0,70	0,76	0,83	0,97	1,04	1,10	1,24	1,37	1,43	1,50	1,63	1,87	1,99	2,11
4800	0,73	0,80	0,87	1,01	1,08	1,15	1,29	1,42	1,49	1,56	1,69	1,95	2,07	2,19
5000	0,76	0,83	0,90	1,05	1,12	1,20	1,34	1,48	1,55	1,62	1,76	2,02	2,15	2,27
5200	0,79	0,86	0,94	1,09	1,17	1,24	1,39	1,54	1,61	1,68	1,82	2,09	2,22	2,34
5400	0,82	0,90	0,97	1,13	1,21	1,29	1,44	1,59	1,67	1,74	1,88	2,16	2,29	2,42
5600					1,25	1,33	1,49	1,65	1,72	1,80	1,95	2,23	2,36	2,49
5800					1,30	1,38	1,54	1,70	1,78	1,86	2,01	2,30	2,43	2,56
6000					1,34	1,42	1,59	1,76	1,84	1,91	2,07	2,36	2,50	2,63
6500					1,45	1,54	1,72	1,89	1,97	2,06	2,22	2,52	2,67	2,80
7000					1,55	1,65	1,84	2,02	2,11	2,19	2,36	2,68	2,82	2,95
7500							1,95	2,15	2,24	2,33	2,50	2,82	2,96	3,09
8000							2,07	2,27	2,36	2,46	2,63	2,95	3,09	3,21
8500							2,18	2,39	2,48	2,58	2,76	3,07	3,21	3,32
9000							2,29	2,50	2,60	2,70	2,88	3,18	3,31	3,41
9500							2,40	2,61	2,71	2,81	2,99	3,28	3,40	3,48
10000							2,50	2,72	2,82	2,91	3,09	3,37	3,47	3,54
10500							2,60	2,82	2,92	3,01	3,18	3,44	3,52	3,57
11000							2,70	2,91	3,01	3,11	3,27	3,50	3,56	3,58
11500							2,79	3,01	3,10	3,19	3,35	3,54	3,58	3,57
12000							2,88	3,09	3,18	3,27	3,41	3,57	3,58	3,54
12500							2,96	3,17	3,26	3,34	3,47	3,58	3,56	3,49
13000							3,04	3,24	3,33	3,40	3,51	3,58	3,52	3,41
13500							3,11	3,31	3,39	3,45	3,55	3,56	3,46	3,30
14000							3,18	3,37	3,44	3,50	3,57	3,52	3,38	3,16
14500							3,25	3,42	3,49	3,54	3,58	3,46	3,28	3,00
15000							3,31	3,47	3,52	3,56	3,58	3,38	3,15	2,81

Yellow area: at these conditions life's reduction is expected.

Light blue area: at these conditions linear speed exceeds 30 m/s, we suggest to use special pulleys.

Green area: both of the above conditions exist.

BASIC PERFORMANCE Pb IN kW FOR ISORAN L AND L DD - 25 mm WIDE (kW / 25 mm)															
d (mm)	30,32	36,38	42,45	48,51	54,57	60,64	66,70	72,77	78,83	84,89	90,96	97,02	109,15	121,28	145,53
z	10	12	14	16	18	20	22	24	26	28	30	32	36	40	48
rpm															
100	0,04	0,05	0,05	0,06	0,07	0,08	0,08	0,09	0,10	0,11	0,11	0,12	0,14	0,15	0,18
200	0,08	0,09	0,11	0,12	0,14	0,15	0,17	0,18	0,20	0,21	0,23	0,24	0,28	0,31	0,37
300	0,11	0,14	0,16	0,18	0,21	0,23	0,25	0,28	0,30	0,32	0,34	0,37	0,41	0,46	0,55
400	0,15	0,18	0,21	0,24	0,28	0,31	0,34	0,37	0,40	0,43	0,46	0,49	0,55	0,61	0,73
500	0,19	0,23	0,27	0,31	0,34	0,38	0,42	0,46	0,50	0,53	0,57	0,61	0,69	0,76	0,91
600	0,23	0,28	0,32	0,37	0,41	0,46	0,50	0,55	0,60	0,64	0,69	0,73	0,82	0,91	1,09
700	0,27	0,32	0,37	0,43	0,48	0,53	0,59	0,64	0,69	0,75	0,80	0,85	0,96	1,06	1,27
725	0,28	0,33	0,39	0,44	0,50	0,55	0,61	0,66	0,72	0,77	0,83	0,88	0,99	1,10	1,32
800	0,31	0,37	0,43	0,49	0,55	0,61	0,67	0,73	0,79	0,85	0,91	0,97	1,09	1,21	1,45
900	0,34	0,41	0,48	0,55	0,62	0,69	0,76	0,82	0,89	0,96	1,03	1,09	1,23	1,36	1,62
950	0,36	0,44	0,51	0,58	0,65	0,72	0,80	0,87	0,94	1,01	1,08	1,15	1,29	1,43	1,71
1000	0,38	0,46	0,53	0,61	0,69	0,76	0,84	0,91	0,99	1,06	1,14	1,21	1,36	1,51	1,80
1100	0,42	0,50	0,59	0,67	0,76	0,84	0,92	1,00	1,09	1,17	1,25	1,33	1,49	1,65	1,97
1200	0,46	0,55	0,64	0,73	0,82	0,91	1,00	1,09	1,18	1,27	1,36	1,45	1,62	1,80	2,13
1300	0,50	0,60	0,69	0,79	0,89	0,99	1,09	1,18	1,28	1,38	1,47	1,57	1,75	1,94	2,30
1400	0,53	0,64	0,75	0,85	0,96	1,06	1,17	1,27	1,38	1,48	1,58	1,68	1,88	2,08	2,46
1425	0,54	0,65	0,76	0,87	0,98	1,08	1,19	1,29	1,40	1,50	1,61	1,71	1,91	2,11	2,50
1500	0,57	0,69	0,80	0,91	1,03	1,14	1,25	1,36	1,47	1,58	1,69	1,80	2,01	2,22	2,62
1600	0,61	0,73	0,85	0,97	1,09	1,21	1,33	1,45	1,57	1,68	1,80	1,91	2,13	2,35	2,77
1700	0,65	0,78	0,91	1,03	1,16	1,29	1,41	1,54	1,66	1,78	1,90	2,02	2,26	2,48	2,92
1800	0,69	0,82	0,96	1,09	1,23	1,36	1,49	1,62	1,75	1,88	2,01	2,13	2,38	2,62	3,06
1900	0,72	0,87	1,01	1,15	1,29	1,43	1,57	1,71	1,85	1,98	2,11	2,24	2,50	2,74	3,21
2000	0,76	0,91	1,06	1,21	1,36	1,51	1,65	1,80	1,94	2,08	2,22	2,35	2,62	2,87	3,34
2200	0,84	1,00	1,17	1,33	1,49	1,65	1,81	1,97	2,12	2,27	2,42	2,56	2,84	3,11	3,60
2400	0,91	1,09	1,27	1,45	1,62	1,80	1,97	2,13	2,30	2,46	2,62	2,77	3,06	3,34	3,83
2600	0,99	1,18	1,38	1,57	1,75	1,94	2,12	2,30	2,47	2,64	2,81	2,97	3,27	3,56	4,04
2800	1,06	1,27	1,48	1,68	1,88	2,08	2,27	2,46	2,64	2,82	2,99	3,16	3,47	3,76	4,23
2850	1,08	1,29	1,50	1,71	1,91	2,11	2,31	2,50	2,68	2,86	3,04	3,21	3,52	3,81	4,27
3000	1,14	1,36	1,58	1,80	2,01	2,22	2,42	2,62	2,81	2,99	3,17	3,34	3,66	3,94	4,39
3200	1,21	1,45	1,68	1,91	2,13	2,35	2,56	2,77	2,97	3,16	3,34	3,52	3,83	4,11	4,51
3400	1,29	1,54	1,78	2,02	2,26	2,48	2,71	2,92	3,12	3,32	3,50	3,68	3,99	4,26	4,61
3600	1,36	1,62	1,88	2,13	2,38	2,62	2,84	3,06	3,27	3,47	3,66	3,83	4,14	4,39	4,67
3800	1,43	1,71	1,98	2,24	2,50	2,74	2,98	3,21	3,42	3,62	3,81	3,98	4,27	4,50	4,70
4000	1,51	1,80	2,08	2,35	2,62	2,87	3,11	3,34	3,56	3,76	3,94	4,11	4,39	4,58	4,68
4200	1,58	1,88	2,17	2,46	2,73	2,99	3,24	3,47	3,69	3,89	4,07	4,23	4,49	4,64	4,63
4400	1,65	1,97	2,27	2,56	2,84	3,11	3,36	3,60	3,81	4,01	4,19	4,34	4,57	4,68	4,53
4600	1,72	2,05	2,36	2,67	2,96	3,23	3,48	3,72	3,93	4,13	4,29	4,43	4,63	4,70	4,40
4800	1,80	2,13	2,46	2,77	3,06	3,34	3,60	3,83	4,04	4,23	4,39	4,51	4,67	4,68	4,21
5000	1,87	2,22	2,55	2,87	3,17	3,45	3,71	3,94	4,15	4,33	4,47	4,58	4,69	4,64	3,98
5200	1,94	2,30	2,64	2,97	3,27	3,56	3,81	4,04	4,24	4,41	4,54	4,63	4,69	4,57	3,69
5400	2,01	2,38	2,73	3,06	3,37	3,66	3,92	4,14	4,33	4,49	4,60	4,67	4,67	4,47	3,36
5600	2,08	2,46	2,82	3,16	3,47	3,76	4,01	4,23	4,41	4,55	4,64	4,69	4,63	4,34	2,97
5800	2,15	2,54	2,91	3,25	3,57	3,85	4,10	4,31	4,48	4,60	4,68	4,70	4,56	4,18	2,53
6000	2,20	2,62	2,99	3,34	3,66	3,94	4,19	4,39	4,54	4,64	4,69	4,68	4,47	3,98	2,02
6200	2,28	2,69	3,08	3,43	3,75	4,03	4,27	4,45	4,59	4,67	4,70	4,65	4,35	3,75	
6400	2,35	2,77	3,16	3,52	3,83	4,11	4,34	4,51	4,63	4,69	4,68	4,60	4,21	3,48	
6600	2,42	2,84	3,24	3,60	3,92	4,19	4,40	4,57	4,66	4,70	4,65	4,53	4,04	3,17	
6800	2,48	2,92	3,32	3,68	3,99	4,26	4,46	4,61	4,69	4,69	4,61	4,45	3,84	2,83	
7000	2,55	2,99	3,40	3,76	4,07	4,33	4,52	4,64	4,70	4,67	4,55	4,34	3,62	2,45	

Yellow area: at these conditions life's reduction is expected.

Light blue area: at these conditions linear speed exceeds 30 m/s, we suggest to use special pulleys.

Green area: both of the above conditions exist.

BASIC PERFORMANCE Pb IN kW FOR ISORAN H AND H DD - 25 mm WIDE (kW / 25 mm)													
d (mm)	56,60	64,68	72,77	80,85	88,94	97,02	105,11	113,19	121,28	129,36	145,53	161,70	194,04
z	14	16	18	20	22	24	26	28	30	32	36	40	48
rpm													
100	0,18	0,21	0,23	0,26	0,29	0,31	0,34	0,36	0,39	0,42	0,47	0,52	0,62
200	0,36	0,42	0,47	0,52	0,57	0,62	0,68	0,73	0,78	0,83	0,93	1,04	1,25
400	0,73	0,83	0,93	1,04	1,14	1,25	1,35	1,45	1,56	1,66	1,87	2,07	2,49
500	0,91	1,04	1,17	1,30	1,43	1,56	1,69	1,82	1,94	2,07	2,33	2,59	3,10
600	1,09	1,25	1,40	1,56	1,71	1,87	2,02	2,18	2,33	2,49	2,79	3,10	3,71
700	1,27	1,45	1,63	1,82	2,00	2,18	2,36	2,54	2,72	2,90	3,25	3,61	4,32
725	1,32	1,51	1,69	1,88	2,07	2,25	2,44	2,63	2,81	3,00	3,37	3,74	4,47
800	1,45	1,66	1,87	2,07	2,28	2,49	2,69	2,90	3,10	3,31	3,71	4,12	4,92
900	1,63	1,87	2,10	2,33	2,56	2,79	3,02	3,25	3,48	3,71	4,17	4,62	5,51
950	1,72	1,97	2,22	2,46	2,70	2,95	3,19	3,43	3,67	3,91	4,39	4,87	5,81
1000	1,82	2,07	2,33	2,59	2,84	3,10	3,36	3,61	3,86	4,12	4,62	5,12	6,10
1100	2,00	2,28	2,56	2,84	3,13	3,41	3,69	3,97	4,24	4,52	5,07	5,61	6,68
1200	2,18	2,49	2,79	3,10	3,41	3,71	4,02	4,32	4,62	4,92	5,51	6,10	7,25
1300	2,36	2,69	3,02	3,36	3,69	4,03	4,34	4,67	4,99	5,31	5,95	6,58	7,80
1400		2,90	3,25	3,61	3,97	4,32	4,67	5,02	5,36	5,71	6,39	7,06	8,35
1425		2,95	3,31	3,67	4,03	4,39	4,75	5,10	5,46	5,81	6,50	7,17	8,49
1500		3,10	3,48	3,86	4,24	4,62	4,99	5,36	5,73	6,10	6,82	7,53	8,89
1600		3,31	3,71	4,12	4,52	4,92	5,31	5,71	6,10	6,48	7,25	7,99	9,41
1700		3,51	3,94	4,37	4,79	5,22	5,63	6,05	6,46	6,87	7,67	8,44	9,92
1800		3,71	4,17	4,62	5,07	5,51	5,95	6,39	6,82	7,25	8,08	8,89	10,42
1900		3,91	4,39	4,87	5,34	5,81	6,27	6,72	7,17	7,62	8,49	9,33	10,90
2000		4,12	4,62	5,12	5,61	6,10	6,58	7,06	7,53	7,99	8,89	9,76	11,37
2200		4,52	5,07	5,61	6,15	6,68	7,20	7,71	8,22	8,71	9,67	10,58	12,25
2400		4,92	5,51	6,10	6,68	7,25	7,80	8,35	8,89	9,41	10,42	11,17	13,06
2600		5,95	6,58	7,20	7,80	8,40	8,98	9,54	10,09	10,99	11,14	12,11	13,79
2800		6,39	7,06	7,71	8,35	8,98	9,59	10,17	10,74	11,82	11,82	12,80	14,44
2850		6,50	7,17	7,84	8,49	9,12	9,73	10,33	10,90	11,98	11,98	12,96	14,58
3000		6,82	7,53	8,22	8,89	9,54	10,17	10,78	11,37	12,46	12,46	13,44	14,99
3200		7,25	7,99	8,71	9,41	10,09	10,74	11,37	11,97	13,06	14,02	14,02	15,44
3400			8,44	9,20	9,92	10,62	11,29	11,93	12,53	13,62	14,54	14,54	15,79
3600			8,89	9,67	10,42	11,14	11,82	12,46	13,06	14,13	14,99	14,99	16,02
3800			9,33	10,13	10,90	11,63	12,32	12,96	13,56	14,58	15,37	15,37	16,14
4000			9,76	10,58	11,37	12,11	12,80	13,44	14,02	14,99	15,68	15,68	16,13
4200			10,17	11,02	11,82	12,56	13,25	13,88	14,44	15,34	15,92	15,92	16,13
4400			10,58	11,45	12,25	13,00	13,68	14,82	14,82	15,63	16,07	16,07	16,13
4600			10,98	11,86	12,67	13,41	14,07	14,65	15,15	15,86	16,14	16,14	16,13
4800			11,37	12,25	13,06	13,79	14,44	14,99	15,44	16,02	16,13	16,13	16,13
5000			11,75	12,63	13,44	14,15	14,77	15,28	15,68	16,12	16,02	16,02	16,13
5200			12,11	13,00	13,79	14,49	15,07	15,54	15,88	16,15	15,81	15,81	16,13
5400			12,46	13,35	14,13	14,79	15,34	15,75	16,02	16,10	15,51	15,51	16,13
5600			12,80	13,64	14,44	15,07	15,57	15,92	16,11	16,48	15,10	15,10	16,13
5800			13,13	13,99	14,72	15,32	15,76	16,04	16,15	16,79	14,58	14,58	16,13
6000			13,44	14,28	14,99	15,54	15,92	16,12	16,13	15,51	13,96	13,96	16,13

Yellow area: at these conditions life's reduction is expected.

Light blue area: at these conditions linear speed exceeds 30 m/s, we suggest to use special pulleys.

Green area: both of the above conditions exist.

BASIC PERFORMANCE Pb IN kW FOR ISORAN XH - 25 mm WIDE (kW / 25 mm)											
d (mm)	127,34	141,49	155,64	169,79	183,94	198,08	212,23	226,38	240,53	254,68	282,98
z	18	20	22	24	26	28	30	32	34	36	40
rpm											
100	0,56	0,62	0,68	0,74	0,81	0,87	0,93	0,99	1,05	1,12	1,24
200	1,12	1,24	1,36	1,49	1,61	1,73	1,86	1,98	2,10	2,23	2,47
300	1,67	1,86	2,04	2,23	2,41	2,60	2,78	2,96	3,15	3,33	3,70
400	2,23	2,47	2,72	2,96	3,21	3,45	3,70	3,94	4,18	4,42	4,90
500	2,78	3,09	3,39	3,70	4,00	4,30	4,60	4,90	5,20	5,49	6,08
600	3,33	3,70	4,06	4,42	4,78	5,14	5,49	5,84	6,20	6,54	7,23
700	3,88	4,30	4,72	5,14	5,55	5,96	6,37	6,77	7,17	7,57	8,34
725	4,01	4,45	4,88	5,31	5,74	6,17	6,59	7,00	7,41	7,82	8,61
800	4,42	4,90	5,37	5,84	6,31	6,77	7,23	7,68	8,12	8,56	9,41
900	4,96	5,49	6,02	6,54	7,06	7,57	8,07	8,56	9,04	9,52	10,44
950	5,23	5,79	6,34	6,89	7,43	7,96	8,48	8,99	9,49	9,98	10,93
1000	5,49	6,08	6,66	7,23	7,79	8,34	8,88	9,41	9,93	10,44	11,41
1100	6,02	6,66	7,28	7,90	8,51	9,10	9,67	10,24	10,78	11,31	12,32
1200	6,54	7,23	7,90	8,56	9,20	9,83	10,44	11,03	11,59	12,14	13,16
1300	7,06	7,79	8,51	9,20	9,88	10,54	11,17	11,78	12,36	12,92	13,93
1400		8,34	9,10	9,83	10,54	11,22	11,87	12,49	13,08	13,63	14,63
1425		8,48	9,24	9,98	10,70	11,38	12,04	12,66	13,25	13,80	14,79
1500		8,88	9,67	10,44	11,17	11,87	12,53	13,16	13,75	14,29	15,24
1600		9,41	10,24	11,03	11,78	12,49	13,16	13,78	14,36	14,88	15,76
1700		9,93	10,78	11,59	12,36	13,08	13,75	14,36	14,91	15,40	16,18
1800			11,31	12,14	12,92	13,63	14,29	14,88	15,40	15,85	16,50
1900			11,82	12,66	13,44	14,15	14,79	15,35	15,83	16,22	16,72
2000			12,32	13,16	13,93	14,63	15,24	15,76	16,18	16,36	16,82
2100			12,79	13,63	14,39	15,06	15,64	16,10	16,46	16,50	16,80
2200			13,24	14,08	14,82	15,46	15,98	16,39	16,66	16,70	16,65
2300			13,67	14,49	15,21	15,80	16,27	16,60	16,79	16,81	16,37
2400			14,08	14,88	15,56	16,10	16,50	16,75	16,82	16,82	15,96
2500			14,46	15,24	15,87	16,35	16,67	16,82	16,77	16,72	15,40
2600			14,82	15,56	16,14	16,55	16,78	16,81	16,63	16,53	16,69
2700			15,15	15,85	16,37	16,70	16,82	16,72	16,39	15,80	13,82
2800				16,10	16,55	16,79	16,80	16,56	16,05	15,27	12,79
2850				16,22	16,63	16,81	16,76	16,44	15,84	14,95	12,22
2900				16,32	16,69	16,82	16,70	16,30	15,61	14,61	11,60
3000				16,50	16,78	16,80	16,53	15,96	15,06	13,82	10,23
3200				16,75	16,81	16,56	15,96	14,99	13,63	11,85	
3400				16,82	16,63	16,05	15,06	13,63	11,72		
3600				16,72	16,22	15,27	13,82	11,85			
3800				16,44	15,58	14,19	12,22				
4000				15,96	14,69	12,79	10,23				
4200				15,27	13,53	11,07					
4400				14,36	12,10						
4500				13,82	11,27						

Yellow area: at these conditions life's reduction is expected.

Light blue area: at these conditions linear speed exceeds 30 m/s, we suggest to use special pulleys.

Green area: both of the above conditions exist.

BASIC PERFORMANCE Pb IN kW FOR ISORAN XXH - 25 mm WIDE (kW / 25 mm)								
d (mm)	181,91	202,13	222,34	242,55	262,76	303,19	343,62	404,25
z	18	20	22	24	26	30	34	40
rpm								
100	0,98	1,09	1,19	1,30	1,41	1,63	1,84	2,17
200	1,95	2,17	2,38	2,60	2,81	3,24	3,67	4,31
300	2,92	3,24	3,57	3,89	4,21	4,84	5,47	6,41
400	3,89	4,31	4,74	5,16	5,58	6,41	7,24	8,45
500	4,84	5,37	5,89	6,41	6,93	7,94	8,94	10,39
600	5,79	6,41	7,03	7,64	8,25	9,43	10,58	12,22
700	6,72	7,44	8,15	8,84	9,53	10,86	12,13	13,91
725	6,95	7,69	8,42	9,14	9,84	11,20	12,50	14,31
800	7,64	8,45	9,23	10,01	10,76	12,22	13,58	15,45
900	8,54	9,43	10,29	11,13	11,95	13,50	14,93	16,80
950	8,99	9,91	10,81	11,68	12,52	14,11	15,55	17,40
1000	9,43	10,39	11,32	12,22	13,08	14,70	16,15	17,95
1100	10,29	11,32	12,30	13,25	14,15	15,80	17,23	18,88
1200	11,13	12,22	13,25	14,23	15,15	16,80	18,16	19,56
1300	11,95	13,08	14,15	15,15	16,08	17,69	18,92	19,97
1400		13,91	15,00	16,01	16,93	18,45	19,50	20,08
1425		14,11	15,21	16,22	17,12	18,62	19,92	20,06
1500		14,70	15,80	16,80	17,69	19,07	18,89	19,88
1600		15,45	16,55	17,52	18,35	19,56	20,07	19,34
1700		16,15	17,23	18,16	18,92	19,89	20,03	18,44
1800		16,80	17,85	18,71	19,38	20,06	19,75	17,15
1900		17,40	18,40	19,18	19,73	20,06	19,23	15,46
2000		17,45	18,88	19,56	19,97	19,88	18,44	13,34
2100		18,45	19,29	19,84	20,08	19,51	17,37	10,77
2200		18,88	19,61	20,01	20,05	18,93	16,01	
2300		19,25	19,86	20,08	19,90	18,15	14,35	
2400		19,56	20,01	20,04	19,60	17,15	12,37	
2500		19,80	20,08	19,88	19,15	15,92	10,05	
2600		19,97	20,05	19,60	18,54	14,46		
2700		20,06	19,93	19,19	17,78	12,74		
2800		20,08	19,71	18,65	16,85	10,77		
2850		20,06	19,55	18,33	16,32			
2900		20,02	19,37	17,97	15,74			
3000		19,88	18,93	17,15	14,56			
3100		19,65	18,38	16,19	12,99			
3200		19,34	17,71	15,07	11,32			
3300		18,89	16,93	13,80				
3400		18,44	16,01	12,37				
3500		17,84	14,97	10,77				

Yellow area: at these conditions life's reduction is expected.

Light blue area: at these conditions linear speed exceeds 30 m/s, we suggest to use special pulleys.

Green area: both of the above conditions exist.



ISORAN RPP AND ISORAN RPP DD



ISORAN RPP AND ISORAN RPP DD

Megadyne Isoran RPP and Isoran RPP DD belts are a high power and high precision class of belt. Compared to Isoran Imperial, they can transmit more power in the same width or can allow a reduction of width to transmit the same power. This kind of belt uses a parabolic profile with the purpose to transmit more power and reduce the kind of accidents as tooth jump and to reduce noise.

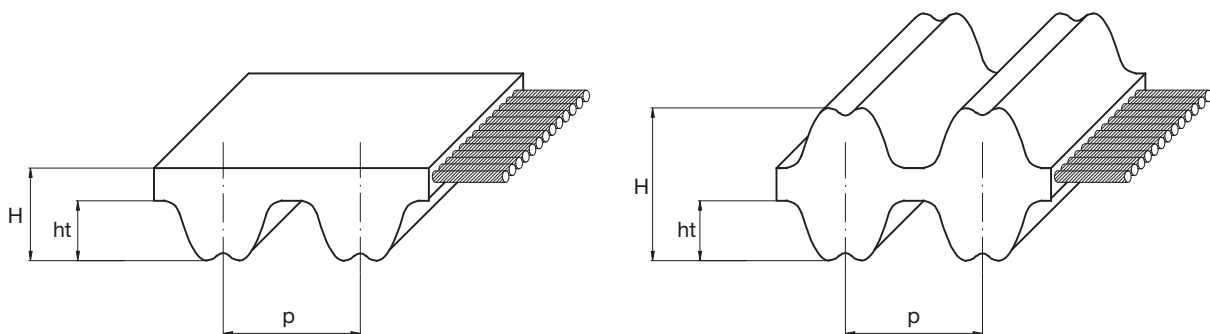
The parabolic profile has a progressive pressure angle since the tooth root up to the top. This allows to have a taller tooth with the same pitch length. These two features lead to the following advantages:

- Reduction interference between the pulley and the belt and its related wearing coming from the torque peaks;
- Less noise;
- More resistance to tooth jump and to tooth shear;
- Higher transmittable torques;
- Less pre-tension.

Looking at the tooth design, it has a groove on the top. This allows a local deformation leading to the following advantages:

- A smoother engagement;
- A better meshing of the tooth in the pulley groove;
- A more uniform sharing of engaging teeth's stress;
- Less noise because of the smoother engagement;
- Less wearing because of the less slippage during engagement.

RPP profile have been designed even to be interchangeable with existing deep groove profiles and run on pulleys according to ISO 13050.



Pitch		RPP3	RPP5	RPP8	RPP14	RPP5 DD	RPP8 DD	RPP14 DD
Pitch length (mm)	p	3	5	8	14	5	8	14
Teeth height (mm)	ht	1,15	2,00	3,20	6,00	2,00	3,20	5,70
Belt height (mm)	H	2,40	3,80	5,40	9,70	5,20	7,80	14,00

Resistance to:	Standard belt resistance
Water	Medium
Acids / Alaklis	None
Solvents	None
Mineral oils	Low
Oils	Low
Greases	Medium
Fuels	None
Environmental agents	Medium

Other features	
Temperature range	Min: -25 °C
	Max: 80 °C
	Max peak: 100 °C
Hardness	74 +/-4 ShA

ISORAN RPP AND ISORAN RPP DD

STANDARD TOLERANCES

Width tolerances				
Belt width (mm)		Tolerance on belt width		
		Belt length (mm)		
More than	Up to	Up to 838	More than 838 up to 1676	More than 1676
-	11,1	+0,5 -0,8	+0,5 -0,8	--
11,1	38,1	±0,8	+0,8 -1,3	+0,8 -1,3
38,1	50,8	+0,8 -1,3	±1,3	+1,3 -1,5
50,8	76,2	+1,3 -1,5	±1,5	+1,5 -2,0
76,2	170,0	+1,3 -1,5	+1,3 -2,0	±2,0

Length tolerances			
Belt length [mm]		Tolerance (mm)	Centre distance tolerance (mm)
More than	Up to		
254	381	±0,45	±0,225
381	508	±0,50	±0,250
508	762	±0,60	±0,300
762	991	±0,65	±0,325
991	1,220	±0,75	±0,375
1,220	1,524	±0,80	±0,400
1,524	1,778	±0,85	±0,425
1,778	2,032	±0,90	±0,450
2,032	2,286	±0,95	±0,475
over 2,286		$\pm [0,95 + \left(\frac{L - 2286}{254} \cdot 0,03\right)]$	$\pm [0,475 + \left(\frac{L - 2286}{254} \cdot 0,015\right)]$

Thickness tolerances				
Pitch	Nominal belt tickness (mm)	Tolerance degree (mm)		
		Standard belt	Grade 2	Grade 1
RPP3	2,40	±0,60	±0,25	±0,15
RPP5	3,80	±0,60	±0,25	±0,15
RPP8	5,40	±0,60	±0,25	±0,15
RPP14	9,70	±0,60	±0,25	±0,15

For specific application where you might require different tolerances, please contact our Application Department.

STANDARD WIDTHS												
Pitch	Belt widths											
	6,00	9,00	15,00	20,00	25,00	30,00	40,00	50,00	55,00	85,00	115,00	170,00
RPP3	•	•	•									
RPP5 / RPP5 DD		•	•		•							
RPP8 / RPP8 DD				•		•		•		•		
RPP14 / RPP14 DD							•		•	•	•	•

BASIC PERFORMANCE Pb IN W FOR ISORAN RPP3 - 6 mm WIDE (W / 6 mm)															
d (mm)	9,55	11,46	13,37	15,28	17,19	19,10	22,92	26,74	30,56	38,20	45,84	53,48	61,12	68,75	76,39
z	10	12	14	16	18	20	24	28	32	40	48	56	64	72	80
rpm															
10	1	1	1	1	2	2	2	3	3	4	5	6	8	9	10
20	1	2	2	2	3	3	4	5	6	7	9	11	13	15	17
30	2	2	3	3	4	4	5	6	7	10	12	15	17	20	22
50	3	3	4	5	5	6	8	9	11	14	18	21	25	29	33
70	3	4	5	6	7	8	10	12	14	18	23	28	32	37	42
100	5	6	7	8	9	10	13	16	18	24	30	36	42	49	55
200	8	10	11	13	16	18	22	26	31	40	50	61	71	82	93
300	10	13	16	18	21	24	30	36	42	55	68	82	96	111	126
400	13	16	19	23	26	30	37	44	62	80	100	120	141	163	185
500	15	19	23	27	31	35	44	52	71	92	115	138	162	187	212
600	17	22	26	31	35	40	50	60	79	103	129	155	182	209	237
700	20	24	29	34	40	45	56	67	87	114	142	171	201	231	262
800	22	27	32	38	44	50	62	75	96	125	155	187	219	253	286
900	24	29	35	42	48	54	68	81	103	135	168	202	237	273	310
1000	26	32	38	45	52	59	73	88	111	145	181	217	255	293	332
1100	28	34	41	48	56	63	79	95	119	155	193	232	272	313	355
1200	29	37	44	52	59	67	84	101	126	164	204	246	288	332	376
1300	31	39	47	55	63	72	89	107	133	174	216	260	305	351	397
1400	33	41	49	58	67	76	94	113	140	183	227	273	321	369	418
1500	35	43	52	61	70	80	99	119	147	192	239	287	336	387	438
1600	36	45	55	64	74	84	104	125	154	201	250	300	352	404	458
1700	38	47	57	67	77	88	109	131	160	209	260	313	367	422	477
1800	40	50	60	70	81	91	114	137	167	218	271	326	381	438	496
1900	41	52	62	73	84	95	118	142	174	227	281	338	396	455	515
2000	43	54	64	76	87	99	123	148	199	259	322	386	452	519	586
2400	49	61	74	87	100	113	141	169	223	290	360	431	504	578	652
2800	55	69	83	97	112	127	158	190	246	320	396	474	553	633	713
3200	61	76	92	108	124	140	174	210	268	348	430	514	599	684	768
3600	67	83	100	117	135	153	190	229	289	375	463	552	642	731	819
4000	72	90	108	127	146	166	206	247	338	438	538	637	735	830	922
5000	85	106	128	150	172	195	242	290	384	493	602	707	808	903	989
6000	98	122	146	171	197	223	275	329	425	542	655	762	859	945	1017
7000	110	136	163	191	220	248	307	366	462	584	697	799	886	954	999
8000	121	150	180	210	241	273	336	399	522	644	745	818	858	858	813
10000	142	176	211	246	281	316	387	456	564	670	736	752	706	588	
12000	162	200	239	277	316	354	429	499	585	685	664	586			
14000	180	222	264	305	346	386	461	528							

BASIC PERFORMANCE Pb IN W FOR ISORAN RPP5 AND RPP5 DD - 9 mm WIDE (W / 9 mm)													
d (mm)	22,28	25,46	28,65	31,83	38,20	44,56	50,93	63,66	76,39	89,13	101,86	114,59	127,32
z	14	16	18	20	24	28	32	40	48	56	64	72	80
rpm													
10	5	6	7	7	9	11	13	15	17	19	21	26	30
20	8	10	11	13	16	19	22	25	29	32	36	43	51
30	11	13	15	17	21	25	30	34	39	44	49	59	69
50	16	19	22	25	31	37	44	51	57	64	71	86	101
70	21	25	28	32	40	48	56	65	74	83	92	110	130
100	27	32	37	42	52	63	74	85	96	108	120	144	169
200	46	54	62	71	88	106	124	143	162	182	202	243	285
300	62	73	84	96	119	143	168	194	220	246	273	329	386
400	77	91	105	119	148	178	209	240	273	306	339	408	479
500	91	107	124	140	175	210	247	284	322	361	401	482	566
600	105	123	142	161	200	241	283	325	369	414	459	553	648
700	118	138	159	181	225	270	317	365	414	465	516	620	727
800	130	153	176	200	248	299	351	404	458	513	570	685	803
900	142	167	192	218	271	326	383	441	500	560	622	748	877
1000	154	180	208	236	293	353	414	477	541	606	673	808	948
1100	165	194	223	253	315	379	445	519	581	651	722	867	1017
1200	176	207	238	270	336	404	474	546	619	694	770	925	1084
1300	187	220	253	287	357	429	504	580	657	736	817	981	1149
1400	198	232	267	303	377	454	532	612	694	778	862	1035	1212
1500	208	244	281	319	397	477	560	644	713	818	907	1089	1274
1600	219	256	295	335	417	501	587	676	776	858	951	1141	1335
1700	229	268	309	351	436	524	614	707	801	897	994	1192	1393
1800	239	280	322	366	455	547	641	737	835	935	1036	1241	1451
1900	249	292	336	381	473	569	667	767	869	972	1077	1290	1507
2000	258	303	349	396	492	591	692	796	902	1009	1117	1338	1562
2400	296	347	399	453	563	675	791	909	1028	1149	1271	1518	1767
2800	332	389	448	507	630	755	884	1014	1146	1279	1413	1682	1650
3200	366	429	494	559	694	831	971	1113	1256	1400	1543	1830	2112
3600	399	468	538	609	755	903	1054	1206	1359	1511	1663	1962	2252
4000	432	505	581	657	813	972	1132	1293	1453	1613	1770	2077	2368
5000	508	594	681	769	948	1128	1307	1484	1657	1825	1886	2286	2547
6000	578	675	773	871	1068	1262	1452	1635	1809	1971	2120	2372	2548
7000	644	749	856	962	1171	1374	1566	1744	1905	2046	2164	2318	2347
8000	704	818	931	1043	1259	1462	1646	1806	1939	2040	2105	2108	1914
10000	811	935	1056	1171	1382	1559	1693	1776	1800	1756	1637		
12000	899	1026	1144	1252	1427	1538	1570	1507					
14000	966	1087	1193	1280	1386	1382	1248						

RPP8 - RPP8 DD

BASIC PERFORMANCE Pb IN kW FOR ISORAN RPP8 AND RPP8 DD - 20 mm WIDE (kW / 20 mm)																
d (mm)	56,02	61,12	66,21	71,30	76,39	81,49	86,58	91,67	96,77	101,86	112,05	122,23	142,60	162,97	183,35	203,72
z	22	24	26	28	30	32	34	36	38	40	44	48	56	64	72	80
rpm																
10	0,06	0,07	0,08	0,08	0,09	0,10	0,11	0,11	0,12	0,13	0,14	0,16	0,19	0,22	0,26	0,29
20	0,11	0,12	0,13	0,14	0,15	0,16	0,18	0,19	0,20	0,22	0,24	0,27	0,32	0,38	0,44	0,49
30	0,14	0,16	0,17	0,19	0,21	0,22	0,24	0,26	0,27	0,29	0,33	0,36	0,44	0,51	0,59	0,67
50	0,21	0,23	0,26	0,28	0,30	0,33	0,35	0,38	0,40	0,43	0,48	0,53	0,64	0,75	0,87	0,98
70	0,27	0,30	0,33	0,36	0,39	0,42	0,45	0,49	0,52	0,55	0,62	0,69	0,82	0,97	1,12	1,27
100	0,35	0,39	0,43	0,47	0,51	0,55	0,59	0,63	0,68	0,72	0,81	0,90	1,08	1,27	1,46	1,65
200	0,59	0,66	0,72	0,79	0,86	0,93	1,00	1,07	1,14	1,21	1,36	1,51	1,81	2,13	2,45	2,78
300	0,80	0,89	0,98	1,07	1,16	1,26	1,35	1,45	1,54	1,64	1,84	2,04	2,46	2,88	3,32	3,77
400	0,99	1,10	1,21	1,33	1,44	1,56	1,67	1,79	1,91	2,03	2,28	2,53	3,05	3,57	4,12	4,67
500	1,17	1,30	1,43	1,57	1,70	1,84	1,98	2,12	2,26	2,40	2,70	2,99	3,60	4,22	4,86	5,51
600	1,35	1,49	1,64	1,80	1,95	2,11	2,27	2,43	2,59	2,76	3,09	3,43	4,12	4,83	5,56	6,31
700	1,51	1,68	1,85	2,02	2,19	2,37	2,55	2,73	2,91	3,09	3,47	3,84	4,62	5,42	6,24	7,07
800	1,67	1,85	2,04	2,23	2,42	2,62	2,81	3,01	3,21	3,42	3,83	4,25	5,10	5,98	6,88	7,79
900	1,82	2,02	2,23	2,43	2,64	2,86	3,07	3,29	3,51	3,77	4,18	4,63	5,57	6,52	7,50	8,49
1000	1,97	2,19	2,41	2,63	2,86	3,09	3,32	3,55	3,79	4,03	4,52	5,01	6,01	7,04	8,09	9,16
1100	2,12	2,35	2,59	2,83	3,07	3,31	3,56	3,81	4,07	4,32	4,84	5,37	6,45	7,55	8,67	9,80
1200	2,26	2,51	2,76	3,01	3,27	3,54	3,80	4,07	4,34	4,61	5,16	5,72	6,87	8,03	9,22	10,42
1300	2,40	2,66	2,93	3,20	3,47	3,75	4,03	4,31	4,60	4,89	5,47	6,07	7,27	8,51	9,75	11,02
1400	2,53	2,81	3,09	3,38	3,67	3,96	4,26	4,56	4,86	5,16	5,78	6,40	7,67	8,96	10,27	11,59
1500	2,67	2,96	3,26	3,56	3,86	4,17	4,48	4,79	5,11	5,43	6,07	6,73	8,05	9,40	10,76	12,13
1600	2,80	3,10	3,41	3,73	4,05	4,37	4,69	5,02	5,35	5,69	6,36	7,04	8,43	9,83	11,24	12,66
1700	2,93	3,25	3,57	3,90	4,23	4,57	4,91	5,25	5,59	5,94	6,64	7,35	8,79	10,24	11,50	13,16
1800	3,05	3,39	3,72	4,07	4,41	4,76	5,11	5,47	5,83	6,19	6,92	7,65	9,14	10,64	11,70	13,60
1900	3,18	3,52	3,87	4,23	4,59	4,95	5,32	5,69	6,06	6,43	7,19	7,95	9,48	11,02	12,56	14,09
2000	3,30	3,66	4,02	4,39	4,76	5,14	5,52	5,90	6,28	6,67	7,45	8,23	9,81	11,39	12,97	15,52
2200	3,54	3,92	4,32	4,70	5,10	5,50	5,90	6,31	6,72	7,13	7,95	8,78	10,44	12,09	13,72	15,31
2400	3,77	4,18	4,59	5,00	5,42	5,85	6,27	6,70	7,13	7,56	8,43	9,30	11,03	12,73	14,39	16,00
2600	3,99	4,42	4,86	5,30	5,74	6,18	6,63	7,08	7,53	7,98	8,88	9,78	11,57	13,31	14,99	16,59
2800	4,21	4,66	5,12	5,58	6,04	6,51	6,97	7,44	7,91	8,38	9,31	10,24	12,07	13,83	15,50	17,06
3000	4,42	4,90	5,37	5,85	6,33	6,82	7,30	7,79	8,27	8,76	9,72	10,67	12,52	14,29	15,93	17,43
3500	4,93	5,45	5,97	6,49	7,02	7,54	8,06	8,58	9,10	9,61	10,62	11,60	13,46	15,14		
4000					7,64	8,19	8,73	9,28	9,81	10,33	11,35	12,32	14,08			
4500						8,75	9,31	9,86	10,40	10,92	11,91	12,82				
5000							9,80	10,34	10,86	11,35	12,27	13,08				
5500									11,18	11,63	12,44					
6000									11,36	11,75	12,38					

BASIC PERFORMANCE Pb IN kW FOR ISORAN RPP14 AND RPP14 DD - 40 mm WIDE (kW / 40 mm)																	
d (mm)	124,78	129,23	133,69	142,60	151,51	160,43	169,34	178,25	196,08	213,90	231,73	249,55	267,38	285,21	303,03	320,86	356,51
z	28	29	30	32	34	36	38	40	44	48	52	56	60	64	68	72	80
rpm																	
10	0,43	0,45	0,47	0,51	0,54	0,58	0,62	0,66	0,74	0,82	0,91	0,99	1,08	1,16	1,25	1,34	1,52
20	0,73	0,76	0,79	0,85	0,92	0,98	1,05	1,11	1,25	1,38	1,52	1,67	1,81	1,96	2,10	2,25	2,56
30	0,98	1,03	1,07	1,15	1,24	1,33	1,42	1,51	1,69	1,88	2,07	2,26	2,45	2,65	2,85	3,05	3,46
50	1,44	1,50	1,57	1,69	1,82	1,95	2,08	2,21	2,48	2,75	3,03	3,31	3,60	3,89	4,18	4,48	5,08
70	1,86	1,94	2,02	2,18	2,34	2,51	2,68	2,85	3,19	3,54	3,90	4,26	4,63	5,00	5,38	5,76	6,54
100	2,42	2,53	2,63	2,85	3,06	3,28	3,50	3,72	4,17	4,63	5,10	5,57	6,05	6,54	7,03	7,53	8,54
200	4,08	4,25	4,43	4,79	5,15	5,51	5,88	6,25	7,01	7,78	8,57	9,36	10,17	10,99	11,81	12,65	14,35
300	5,52	5,76	6,00	6,48	6,97	7,47	7,97	8,47	9,50	10,54	11,60	12,67	13,76	14,87	15,98	17,11	19,41
400	6,85	7,14	7,44	8,04	8,64	9,26	9,87	10,50	11,77	13,06	14,37	15,69	17,04	18,40	19,78	21,17	23,99
500	8,09	8,44	8,79	9,49	10,21	10,93	11,66	12,39	13,89	15,40	16,94	18,50	20,08	21,68	23,30	24,92	28,22
600	9,27	9,67	10,07	10,87	11,69	12,51	13,34	14,19	15,89	17,62	19,37	21,15	22,94	24,75	26,58	28,42	32,15
700	10,39	10,84	11,28	12,19	13,10	14,02	14,95	15,89	17,79	19,71	21,67	23,64	25,63	27,64	29,66	31,70	35,80
800	11,47	11,96	12,45	13,45	14,45	15,46	16,48	17,51	19,60	21,71	23,84	26,00	28,17	30,36	32,55	34,76	39,19
900	12,51	13,04	13,58	14,66	15,75	16,85	17,95	19,07	21,33	23,61	25,91	28,23	30,57	32,91	35,26	37,62	42,32
1000	13,51	14,06	14,66	15,82	16,99	18,18	19,37	20,56	22,98	25,42	27,88	30,35	32,82	35,31	37,79	40,27	45,20
1100	14,48	15,10	15,71	16,95	18,20	19,45	20,72	21,99	24,56	27,14	29,74	32,34	34,95	37,55	40,14	42,72	47,81
1200	15,42	16,07	16,72	18,03	19,36	20,69	22,02	23,37	26,07	28,78	31,50	34,22	36,93	39,93	42,30	44,96	50,16
1300	16,33	17,02	17,70	19,08	20,47	21,87	23,28	24,68	27,51	30,34	33,17	35,98	38,78	41,55	44,29	46,98	52,23
1400	17,21	17,93	18,65	20,10	21,55	23,01	24,48	25,94	28,88	31,81	34,73	37,63	40,49	43,31	46,08	48,79	54,01
1500	18,07	18,82	19,57	21,08	22,59	24,11	25,63	27,16	30,18	33,20	36,20	39,15	42,05	44,90	47,67	50,37	55,48
1600	18,90	19,68	20,46	22,02	23,59	25,16	26,73	28,30	31,42	34,51	37,56	40,55	43,47	46,31	49,06	51,71	56,65
1700	19,70	20,50	21,31	22,93	24,55	26,17	27,78	29,39	32,58	35,73	38,81	41,82	44,73	47,55	50,24	52,81	57,49
1800	20,48	21,31	22,14	23,81	25,47	27,13	28,78	30,42	33,67	36,86	39,96	42,96	45,84	48,60	51,21	53,65	58,00
1900	21,23	22,08	22,94	24,65	26,35	28,05	29,73	31,40	34,69	37,90	40,99	43,96	46,79	49,46	51,94	54,23	58,15
2000	21,95	22,83	23,71	25,45	27,19	28,92	30,63	32,32	35,64	38,84	41,92	44,83	47,57	50,12	52,45		
2500	25,19	26,15	27,09	28,96	30,79	32,58	34,32	36,00	39,19	42,11	44,70	46,94					
3000			29,69	31,54	33,31	34,98	36,56	38,03									
3500			31,43	33,10	34,63	35,99	37,19	38,19									
4000				33,55	34,63												



ISORAN SILVER

Megadyne Isoran Silver belts have been developed to give a more powerful alternative to Isoran RPP belts to compete against high performance transmission systems already using chains and gears, that always have a disadvantage in terms of weight, noise, lubrication and maintenance costs.

Because of the greater power they can transmit compared to Isoran RPP, Isoran Silver can be used to improve and easily upgrade already existing drives working with Isoran RPP in the spirit and concept of interchangeability which has identified Megadyne's market approach philosophy in the last years. By the way we always suggest to check that every other transmission component can bare the increased transmitted power.

Under the same transmission conditions, Isoran Silver belts have the same noise level of the Isoran RPP. Silver timing belts offers to designers:

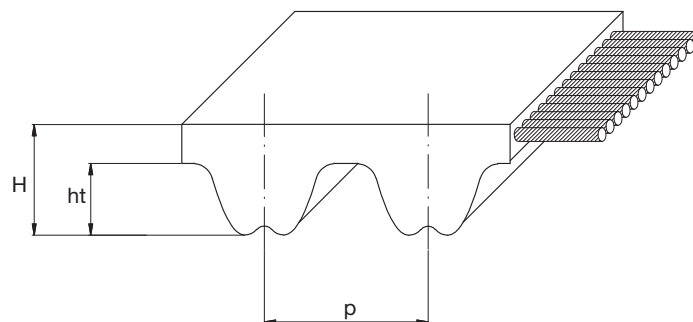
- Increased performance (by 110% compared to Isoran RPP)
- The possibility to keep using the same RPP pulleys.

Because of these features, replacing an Isoran RPP with an Isoran Silver can allow:

- To reduce belt width thanks to the higher power rate; this allows also to reduce the required pulley width. They both lead to a significant transmission weight reduction.
- To reduce the pulley dimension thanks to the higher power rate; this leads to a lower belt linear speed and to the consequent noise reduction.

Isoran Silver belts have RPP profile, designed even to be interchangeable with existing deep groove profiles and run on pulleys according to ISO 13050.

Isoran Silver belts are antistatic according to BS 2050.



		SILVER5	SILVER8	SILVER14
Pitch				
Pitch length (mm)	p	5	8	14
Teeth height (mm)	ht	2,00	3,20	6,00
Belt height (mm)	H	3,80	5,40	9,70

Resistance to:	Standard belt resistance
Water	Medium
Acids / Alaklis	None
Solvents	None
Mineral oils	Low
Oils	Low
Greases	Medium
Fuels	None
Environmental agents	Medium

Other features	
Temperature range	Min: -25 °C
	Max: 80 °C
	Max peak: 100 °C
Hardness	90 +/-4 ShA
Antistatic	According to BS 2050

STANDARD TOLERANCES

Width tolerances				
Belt width (mm)		Tolerance on belt width		
		Belt length (mm)		
More than	Up to	Up to 838	More than 838 up to 1676	More than 1676
-	11,1	+0,5 -0,8	+0,5 -0,8	-
11,1	38,1	±0,8	+0,8 -1,3	+0,8 -1,3
38,1	50,8	+0,8 -1,3	±1,3	+1,3 -1,5
50,8	76,2	+1,3 -1,5	±1,5	+1,5 -2,0
76,2	170,0	+1,3 -1,5	+1,3 -2,0	±2,0

Length tolerances			
Belt length (mm)		Tolerance (mm)	Centre distance tolerance (mm)
More than	Up to		
254	381	±0,45	±0,225
381	508	±0,50	±0,250
508	762	±0,60	±0,300
762	991	±0,65	±0,325
991	1,220	±0,75	±0,375
1,220	1,524	±0,80	±0,400
1,524	1,778	±0,85	±0,425
1,778	2,032	±0,90	±0,450
2,032	2,286	±0,95	±0,475
over 2,286		$\pm [0,95 + \left(\frac{L - 2286}{254} \cdot 0,03\right)]$	$\pm [0,475 + \left(\frac{L - 2286}{254} \cdot 0,015\right)]$

For specific application where you might require different tolerances, please contact our Application Department.

Thickness tolerances				
Pitch	Nominal belt thickness (mm)	Tolerance degree (mm)		
		Standard belt	Grade 2	Grade 1
SILVER5	3,80	±0,60	±0,25	±0,15
SILVER8	5,40	±0,60	±0,25	±0,15
SILVER14	9,70	±0,60	±0,25	±0,15

STANDARD WIDTHS											
Pitch	Belt widths										
	9,00	15,00	20,00	25,00	30,00	40,00	50,00	55,00	85,00	115,00	170,00
SILVER5	•	•		•							
SILVER8			•		•		•		•		
SILVER14						•		•	•	•	•

RANGE

SILVER5	
Code	Pitch length [mm]
180 SLV5	180,00
225 SLV5	225,00
235 SLV5	235,00
245 SLV5	245,00
255 SLV5	255,00
265 SLV5	265,00
270 SLV5	270,00
280 SLV5	280,00
285 SLV5	285,00
295 SLV5	295,00
300 SLV5	300,00
305 SLV5	305,00
325 SLV5	325,00
345 SLV5	345,00
350 SLV5	350,00
375 SLV5	375,00
400 SLV5	400,00
420 SLV5	420,00
425 SLV5	425,00
450 SLV5	450,00
455 SLV5	455,00
460 SLV5	460,00
465 SLV5	465,00
475 SLV5	475,00
500 SLV5	500,00
525 SLV5	525,00
535 SLV5	535,00
565 SLV5	565,00
575 SLV5	575,00
580 SLV5	580,00
600 SLV5	600,00
610 SLV5	610,00
615 SLV5	615,00
635 SLV5	635,00
640 SLV5	640,00
670 SLV5	670,00
675 SLV5	675,00
700 SLV5	700,00
705 SLV5	705,00
710 SLV5	710,00
725 SLV5	725,00
740 SLV5	740,00
750 SLV5	750,00
755 SLV5	755,00
800 SLV5	800,00
835 SLV5	835,00
850 SLV5	850,00
890 SLV5	890,00
900 SLV5	900,00
935 SLV5	935,00
940 SLV5	940,00
950 SLV5	950,00
980 SLV5	980,00
1000 SLV5	1000,00
1025 SLV5	1025,00
1050 SLV5	1050,00
1100 SLV5	1100,00
1125 SLV5	1125,00
1135 SLV5	1135,00
1195 SLV5	1195,00
1200 SLV5	1200,00
1240 SLV5	1240,00
1270 SLV5	1270,00
1420 SLV5	1420,00
1500 SLV5	1500,00
1595 SLV5	1595,00
1605 SLV5	1605,00
1690 SLV5	1690,00
1790 SLV5	1790,00
1800 SLV5	1800,00
1870 SLV5	1870,00
1895 SLV5	1895,00
1945 SLV5	1945,00
2000 SLV5	2000,00
2250 SLV5	2250,00
2525 SLV5	2525,00

SILVER8	
Code	Pitch length [mm]
248 SLV8	248,00
288 SLV8	288,00
320 SLV8	320,00
352 SLV8	352,00
360 SLV8	360,00
376 SLV8	376,00
384 SLV8	384,00
408 SLV8	408,00
416 SLV8	416,00
424 SLV8	424,00
456 SLV8	456,00
480 SLV8	480,00
536 SLV8	536,00
544 SLV8	544,00
560 SLV8	560,00
600 SLV8	600,00
608 SLV8	608,00
632 SLV8	632,00
640 SLV8	640,00
680 SLV8	680,00
720 SLV8	720,00
760 SLV8	760,00
800 SLV8	800,00
840 SLV8	840,00
880 SLV8	880,00
896 SLV8	896,00
920 SLV8	920,00
960 SLV8	960,00
1000 SLV8	1000,00
1040 SLV8	1040,00
1080 SLV8	1080,00
1120 SLV8	1120,00
1200 SLV8	1200,00
1224 SLV8	1224,00
1280 SLV8	1280,00
1352 SLV8	1352,00
1424 SLV8	1424,00
1440 SLV8	1440,00
1464 SLV8	1464,00
1600 SLV8	1600,00
1680 SLV8	1680,00
1760 SLV8	1760,00
1792 SLV8	1792,00
1800 SLV8	1800,00
1904 SLV8	1904,00
2000 SLV8	2000,00
2200 SLV8	2200,00
2240 SLV8	2240,00
2272 SLV8	2272,00
2400 SLV8	2400,00
2520 SLV8	2520,00
2600 SLV8	2600,00
2800 SLV8	2800,00
2840 SLV8	2840,00
3048 SLV8	3048,00
3200 SLV8	3200,00
3280 SLV8	3280,00
3600 SLV8	3600,00
4000 SLV8	4000,00
4400 SLV8	4400,00

SILVER14	
Code	Pitch length [mm]
966 SLV14	966,00
994 SLV14	994,00
1092 SLV14	1092,00
1106 SLV14	1106,00
1120 SLV14	1120,00
1190 SLV14	1190,00
1260 SLV14	1260,00
1288 SLV14	1288,00
1344 SLV14	1344,00
1400 SLV14	1400,00
1442 SLV14	1442,00
1568 SLV14	1568,00
1610 SLV14	1610,00
1750 SLV14	1750,00
1764 SLV14	1764,00
1778 SLV14	1778,00
1848 SLV14	1848,00
1890 SLV14	1890,00
1904 SLV14	1904,00
1960 SLV14	1960,00
2100 SLV14	2100,00
2240 SLV14	2240,00
2310 SLV14	2310,00
2380 SLV14	2380,00
2450 SLV14	2450,00
2520 SLV14	2520,00
2590 SLV14	2590,00
2660 SLV14	2660,00
2800 SLV14	2800,00
2968 SLV14	2968,00
3136 SLV14	3136,00
3150 SLV14	3150,00
3304 SLV14	3304,00
3360 SLV14	3360,00
3500 SLV14	3500,00
3850 SLV14	3850,00
3920 SLV14	3920,00
4326 SLV14	4326,00
4410 SLV14	4410,00
4578 SLV14	4578,00
4956 SLV14	4956,00

ISORAN SILVER5

BASIC PERFORMANCE Pb IN W FOR SILVER5 - 9 mm wide (W / 9 mm)															
d (mm)	28,65	31,83	35,01	38,20	41,38	44,56	50,93	57,30	63,66	70,03	76,39	89,13	101,86	114,59	127,32
z	18	20	22	24	26	28	32	36	40	44	48	56	64	72	80
rpm															
10	7	8	8	9	10	11	12	14	15	17	18	21	25	28	31
20	12	15	17	18	20	21	25	28	31	34	37	43	49	55	61
30	17	21	25	28	30	32	37	41	46	51	55	64	74	83	92
50	26	32	39	46	50	54	61	69	77	84	92	107	123	138	153
70	35	43	51	61	70	75	86	97	107	118	129	150	172	193	215
100	48	58	70	82	96	107	123	138	153	169	184	215	245	276	307
200	86	105	126	149	173	200	245	276	307	337	368	429	491	552	613
300	122	149	173	211	245	282	363	414	460	506	552	644	736	828	920
400	156	191	229	269	314	361	465	552	613	675	736	859	981	1104	1227
500	189	231	277	326	380	437	563	690	767	843	920	1073	1227	1380	1533
600	221	270	323	381	444	510	657	822	920	1012	1104	1288	1472	1656	1840
700	252	308	369	435	506	582	750	938	1073	1181	1288	1503	1717	1932	2146
800	283	345	413	487	567	653	841	1051	1227	1349	1472	1717	1962	2208	2453
900	313	382	457	539	627	722	930	1162	1380	1518	1656	1932	2208	2483	2759
1000	342	418	500	590	687	790	1017	1272	1533	1686	1840	2146	2453	2759	3065
1100	371	453	543	640	745	857	1104	1380	1685	1855	2024	2361	2698	3035	3372
1200	400	488	585	689	802	923	1189	1486	1815	2024	2208	2575	2943	3310	3678
1300	428	523	626	738	859	989	1273	1592	1943	2192	2391	2790	3188	3586	3984
1400	456	557	667	786	915	1053	1356	1696	2070	2361	2575	3004	3433	3861	4290
1500	484	591	707	834	971	1117	1439	1799	2196	2529	2759	3218	3678	4137	4596
1600	511	624	748	882	1026	1181	1520	1901	2321	2698	2943	3433	3923	4412	4901
1700	538	657	787	928	1080	1243	1601	2002	2444	2866	3127	3647	4167	4687	5207
1800	565	690	827	975	1135	1306	1681	2102	2566	3035	3310	3861	4412	4962	5512
1900	592	723	866	1021	1188	1367	1761	2201	2688	3203	3494	4076	4657	5237	5818
2000	618	755	905	1067	1241	1429	1840	2300	2808	3363	3678	4290	4901	5512	6123
2400	707	863	1034	1219	1419	1632	2102	2628	3208	3843	4412	5146	5879	6611	7342
2800	824	1007	1206	1422	1655	1904	2452	3065	3742	4482	5146	6001	6854	7707	8557
3000	875	1068	1279	1508	1755	2020	2601	3251	3969	4754	5512	6428	7342	8254	9164
3200	908	1109	1329	1567	1823	2098	2701	3376	4122	4937	5821	6854	7828	8800	9770
3600	1022	1248	1494	1762	2050	2359	3038	3797	4636	5552	6546	7707	8800	9891	10978
4000	1118	1365	1635	1928	2243	2581	3324	4154	5070	6073	7160	8557	9770	10978	12181
4500	1236	1509	1807	2131	2480	2853	3674	4591	5604	6712	7912	9618	10978	12331	
5000	1352	1651	1977	2331	2713	3121	4018	5021	6128	7339	8651	10676	12181		
6000	1579	1928	2309	2722	3167	3643	4690	5860	7151	8561	10090	12781			
7000	1800	2197	2631	3102	3609	4151	5342	6673	8142	9746	11484				
8000	2016	2460	2946	3172	4039	4646	5978	7465	9105	10896					
10000	2434	2970	3555	4189	4871	5601	7202								
12000	2836	3459	4139	4875	5667	6514									
14000	3224	3930	4701	5534											

BASIC PERFORMANCE IN kW FOR SILVER8 - 20 mm WIDE (kW / 20 mm)																
d (mm)	56,02	61,12	66,21	71,30	76,39	81,49	86,58	91,67	96,77	101,86	112,05	122,23	142,60	162,97	183,30	203,72
z	22	24	26	28	30	32	34	36	38	40	44	48	56	64	72	80
rpm																
10	0,07	0,08	0,08	0,09	0,09	0,10	0,11	0,11	0,12	0,13	0,14	0,15	0,18	0,20	0,23	0,25
20	0,14	0,15	0,16	0,18	0,19	0,20	0,21	0,23	0,24	0,25	0,28	0,30	0,35	0,40	0,45	0,50
30	0,21	0,23	0,25	0,26	0,28	0,30	0,32	0,34	0,36	0,38	0,42	0,45	0,53	0,60	0,68	0,76
50	0,35	0,38	0,41	0,44	0,47	0,50	0,53	0,57	0,60	0,63	0,69	0,76	0,88	1,01	1,13	1,26
70	0,48	0,53	0,57	0,62	0,66	0,70	0,75	0,79	0,84	0,88	0,97	1,06	1,23	1,41	1,59	1,76
100	0,68	0,75	0,82	0,88	0,94	1,01	1,07	1,13	1,20	1,26	1,38	1,51	1,76	2,01	2,27	2,52
200	1,14	1,26	1,38	1,50	1,62	1,74	1,86	1,98	2,11	2,23	2,48	2,74	3,26	3,78	4,31	4,85
300	1,55	1,71	1,87	2,03	2,19	2,36	2,52	2,69	2,86	3,03	3,37	3,71	4,41	5,12	5,84	6,58
400	1,92	2,12	2,32	2,52	2,72	2,93	3,13	3,34	3,55	3,76	4,18	4,61	5,47	6,35	7,25	8,16
500	2,27	2,51	2,74	2,98	3,22	3,46	3,70	3,94	4,19	4,44	4,94	5,44	6,47	7,51	8,57	9,64
600	2,61	2,87	3,14	3,41	3,69	3,96	4,24	4,52	4,80	5,09	5,66	6,24	7,41	8,61	9,81	11,04
700	2,92	3,22	3,53	3,83	4,14	4,45	4,76	5,08	5,39	5,71	6,35	7,00	8,32	9,65	11,01	12,38
800	3,23	3,56	3,90	4,23	4,57	4,92	5,26	5,61	5,96	6,31	7,02	7,74	9,19	10,66	12,16	13,67
900	3,53	3,89	4,26	4,62	5,00	5,37	5,75	6,12	6,51	6,89	7,66	8,44	10,03	11,64	13,26	14,91
1000	3,82	4,21	4,61	5,00	5,40	5,81	6,22	6,63	7,04	7,45	8,29	9,13	10,84	12,58	14,34	16,11
1100	4,10	4,52	4,95	5,37	5,80	6,24	6,67	7,11	7,56	8,00	8,90	9,80	11,64	13,50	15,38	17,27
1200	4,38	4,83	5,28	5,73	6,19	6,66	7,12	7,59	8,06	8,54	9,49	10,46	12,41	14,39	16,39	18,40
1300	4,65	5,12	5,60	6,09	6,57	7,06	7,56	8,06	8,56	9,06	10,07	11,09	13,16	15,26	17,37	19,50
1400	4,91	5,42	5,92	6,43	6,95	7,47	7,99	8,51	9,04	9,57	10,64	11,72	13,90	16,10	18,32	20,56
1500	5,17	5,70	6,23	6,77	7,31	7,86	8,41	8,96	9,51	10,07	11,19	12,33	14,61	16,93	19,25	21,59
1600	5,43	5,98	6,54	7,10	7,67	8,24	8,82	9,40	9,98	10,56	11,74	12,92	15,32	17,73	20,16	22,59
1700	5,68	6,26	6,84	7,43	8,02	8,62	9,22	9,83	10,43	11,04	12,27	13,51	16,00	18,52	21,04	23,57
1800	5,93	6,53	7,14	7,75	8,37	8,99	9,62	10,25	10,88	11,52	12,80	14,08	16,67	19,28	21,90	24,52
1900	6,17	6,80	7,43	8,07	8,71	9,36	10,01	10,66	11,32	11,98	13,31	14,64	17,33	20,03	22,74	25,44
2000	6,41	7,06	7,72	8,38	9,05	9,72	10,40	11,07	11,75	12,44	13,81	15,20	17,98	20,76	23,55	26,33
2500	7,56	8,33	9,10	9,88	10,66	11,44	12,23	13,02	13,82	14,61	16,21	17,80	20,99	24,16	27,30	30,38
3000	8,65	9,52	10,40	11,28	12,16	13,05	13,94	14,83	15,72	16,61	18,40	20,17	23,69	27,14	30,49	
3500	9,67	10,64	11,62	12,59	13,57	14,55	15,53	16,51	17,49	18,46	20,40	22,32	26,07	29,69		
4000	10,65	11,71	12,77	13,83	14,90	15,95	17,01	18,06	19,11	20,15	22,21	24,23	28,13			
4500	11,58	12,72	13,86	15,00	16,14	17,26	18,39	19,50	20,60	21,69	23,83	25,91				
5000	12,47	13,68	14,89	16,10	17,29	18,48	19,65	20,81	21,95	23,07	25,26					

ISORAN SILVER14

BASIC PERFORMANCE IN kW FOR SILVER14 - 40 mm WIDE (kW / 40 mm)																	
d (mm)	124,78	129,23	133,69	142,60	151,52	160,43	169,34	178,25	196,08	213,90	231,73	249,55	267,38	285,21	303,03	320,86	356,51
z	28	29	30	32	34	36	38	40	44	48	52	56	60	64	68	72	80
rpm																	
10	0,40	0,42	0,43	0,46	0,49	0,52	0,55	0,58	0,63	0,69	0,75	0,81	0,86	0,92	0,98	1,04	1,15
20	0,81	0,84	0,86	0,92	0,98	1,04	1,10	1,15	1,27	1,38	1,50	1,61	1,73	1,84	1,96	2,07	2,31
30	1,21	1,25	1,30	1,38	1,47	1,56	1,64	1,73	1,90	2,07	2,25	2,42	2,59	2,77	2,94	3,11	3,46
50	2,02	2,09	2,16	2,31	2,45	2,59	2,74	2,88	3,17	3,46	3,75	4,03	4,32	4,61	4,90	5,19	5,76
70	2,82	2,92	3,03	3,23	3,43	3,63	3,83	4,03	4,44	4,84	5,24	5,65	6,05	6,45	6,86	7,26	8,07
100	4,03	4,18	4,32	4,61	4,90	5,19	5,47	5,76	6,34	6,92	7,49	8,07	8,64	9,22	9,80	10,37	11,52
200	7,50	7,82	8,13	8,78	9,43	10,09	10,75	11,42	12,68	13,83	14,98	16,13	17,28	18,43	19,58	20,73	23,03
300	10,16	10,59	11,02	11,90	12,78	13,67	14,57	15,48	17,32	19,19	21,08	23,01	24,96	26,93	28,92	30,93	34,51
400	12,61	13,14	13,67	14,75	15,85	16,95	18,07	19,19	21,47	23,79	26,14	28,52	30,93	33,37	35,83	38,32	43,37
500	14,90	15,53	16,16	17,43	18,72	20,03	21,34	22,67	25,36	28,09	30,87	33,67	36,51	39,38	42,28	45,21	51,14
600	17,07	17,79	18,52	19,98	21,45	22,95	24,45	25,97	29,05	32,17	35,34	38,54	41,78	45,06	48,36	51,70	58,44
700	19,15	19,96	20,77	22,41	24,06	25,73	27,42	29,12	32,56	36,06	39,60	43,18	46,79	50,45	54,13	57,84	65,34
800	21,15	22,05	22,94	24,75	26,57	28,41	30,27	32,15	35,94	39,78	43,67	47,60	51,58	55,58	59,62	63,68	71,88
900	23,09	24,06	25,04	27,00	28,99	31,00	33,02	35,06	39,18	43,36	47,58	51,85	56,15	60,49	64,85	69,24	78,08
1000	24,96	26,01	27,07	29,19	31,33	33,50	35,68	37,87	42,31	46,81	51,35	55,92	60,54	65,18	69,85	74,53	83,95
1100	26,79	27,91	29,04	31,31	33,60	35,92	38,25	40,60	45,34	50,13	54,97	59,84	64,74	69,67	74,61	79,57	89,50
1200	28,56	29,75	30,95	33,37	35,81	38,27	40,74	43,23	48,26	53,34	58,45	63,60	68,77	73,96	79,15	84,35	94,74
1300	30,28	31,55	32,82	35,37	37,95	40,55	43,16	45,79	51,09	56,43	61,81	67,21	72,63	78,05	83,47	88,89	99,65
1400	31,97	33,30	34,64	37,33	40,04	42,77	45,51	48,27	53,83	59,42	65,04	70,68	76,32	81,95	87,57	93,17	104,25
1500	33,61	35,01	36,41	39,23	42,07	44,92	47,79	50,68	56,48	62,31	68,15	74,00	79,84	85,66	91,45	97,19	108,53
1600	35,22	36,67	38,14	41,08	44,04	47,02	50,01	53,01	59,04	65,08	71,13	77,17	83,19	89,17	95,10	100,96	112,47
1700	36,79	38,30	39,83	42,89	45,96	49,06	52,16	55,27	61,51	67,76	74,00	80,20	86,37	92,48	98,52	104,47	
1800	38,32	39,89	41,47	44,65	47,84	51,04	54,25	57,46	63,90	70,33	76,73	83,09	89,38	95,59	101,71		
1900	39,82	41,45	43,08	46,37	49,66	52,96	56,27	59,59	66,21	72,80	79,35	85,83	92,22	98,50			
2000	41,28	42,96	44,65	48,04	51,43	54,84	58,24	61,64	68,43	75,17	81,84	88,41	94,88	101,20			
2500	48,11	50,03	51,94	55,76	59,57	63,36	67,13	70,86	78,22	85,39							
3000	54,15	56,23	58,31	62,42	66,49	70,49	74,43	78,29									
3500	59,38	61,57	63,73	67,98	72,12	76,15											
4000	63,79	65,99	68,16	72,37													
4500	67,31																



ISORAN GOLD



ISORAN GOLD

Megadyne Isoran Gold belts have been developed to give a more powerful alternative to RPP and Silver belts to compete against high performance transmission systems using chains and gears, that always have a disadvantage in terms of weight, noise, lubrication and maintenance costs.

As for Isoran Silver, Isoran Gold can be used to improve and easily upgrade already existing drives working with both Isoran RPP and Isoran Silver. Also here, we always suggest to check that every other transmission component can bare the increased transmitted power, especially if you are going to replace an Isoran RPP, because of the wide power upgrade. GOLD timing belts offer to designers:

- Increased performance compared to Isoran RPP and to Isoran Silver.
- The possibility to keep using the same RPP pulleys.

Isoran GOLD belts have two nylon plies on the tooth to:

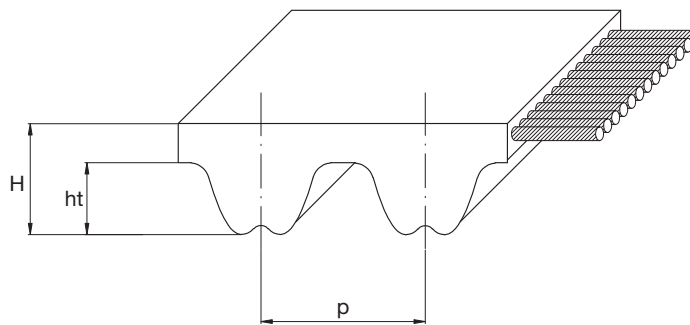
- Improve belt resistance to wearing;
- Reduce friction and noise levels.

Because of these features, replacing an Isoran RPP or an Isoran Silver with an Isoran Gold can allow:

- To reduce belt width thanks to the higher power rate; this allows also to reduce the required pulley width. They both lead to a significant transmission weight reduction.
- To reduce the pulley dimension thanks to the higher power rate; this leads to a lower belt linear speed and to the consequent noise reduction.

Gold belts have RPP profile, designed even to be interchangeable with existing deep groove profiles and run on pulleys according to ISO 13050.

Isoran Gold belts are antistatic according to BS 2050.



Pitch		GOLD8	GOLD14
Pitch length (mm)	p	8	14
Teeth height (mm)	ht	3,20	6,00
Belt height (mm)	H	5,40	9,70

Resistance to:	Standard belt resistance
Water	Medium
Acids / Alaklis	None
Solvents	None
Mineral oils	Low
Oils	Low
Greases	Medium
Fuels	None
Environmental agents	Medium

Other features	
Temperature range	Min: -25 °C
	Max: 80 °C
	Max peak: 100 °C
Hardness	90 +/-4 ShA
Antistatic	According to BS 2050

STANDARD TOLERANCES

Width tolerances				
Belt width (mm)		Tolerance on belt width		
		Belt length (mm)		
More than	Up to	Up to 838	More than 838 up to 1676	More than 1676
-	11,1	+0,5 -0,8	+0,5 -0,8	-
11,1	38,1	±0,8	+0,8 -1,3	+0,8 -1,3
38,1	50,8	+0,8 -1,3	±1,3	+1,3 -1,5
50,8	76,2	+1,3 -1,5	±1,5	+1,5 -2,0
76,2	170,0	+1,3 -1,5	+1,3 -2,0	±2,0

Length tolerances			
Belt length [mm]		Tolerance [mm]	Centre distance tolerance [mm]
More than	Up to		
254	381	±0,45	±0,225
381	508	±0,50	±0,250
508	762	±0,60	±0,300
762	991	±0,65	±0,325
991	1,220	±0,75	±0,375
1,220	1,524	±0,80	±0,400
1,524	1,778	±0,85	±0,425
1,778	2,032	±0,90	±0,450
2,032	2,286	±0,95	±0,475
over 2,286		$\pm [0,95 + \left(\frac{L - 2286}{254} \cdot 0,03\right)]$	$\pm [0,475 + \left(\frac{L - 2286}{254} \cdot 0,015\right)]$

For specific application where you might require different tolerances, please contact our Application Department.

Thickness tolerances				
Pitch	Nominal belt thickness (mm)	Tolerance degree [mm]		
		Standard belt	Grade 2	Grade 1
RPP8	5,40	±0,60	±0,25	±0,15
RPP14	9,70	±0,60	±0,25	±0,15

STANDARD WIDTHS												
Pitch	Belt widths											
	6,00	9,00	15,00	20,00	25,00	30,00	40,00	50,00	55,00	85,00	115,00	170,00
RPP3	•	•	•									
RPP5 / RPP5 DD		•	•		•							
RPP8 / RPP8 DD				•		•		•		•		
RPP14 / RPP14 DD							•		•	•	•	•

RANGE

GOLD8	
Code	Pitch length [mm]
248 GLD8	248,00
288 GLD8	288,00
320 GLD8	320,00
352 GLD8	352,00
360 GLD8	360,00
376 GLD8	376,00
384 GLD8	384,00
408 GLD8	408,00
416 GLD8	416,00
424 GLD8	424,00
456 GLD8	456,00
480 GLD8	480,00
536 GLD8	536,00
544 GLD8	544,00
560 GLD8	560,00
600 GLD8	600,00
608 GLD8	608,00
632 GLD8	632,00
640 GLD8	640,00
680 GLD8	680,00
720 GLD8	720,00
760 GLD8	760,00
800 GLD8	800,00
840 GLD8	840,00
880 GLD8	880,00
896 GLD8	896,00
920 GLD8	920,00
960 GLD8	960,00
1000 GLD8	1000,00
1040 GLD8	1040,00
1080 GLD8	1080,00
1120 GLD8	1120,00
1200 GLD8	1200,00
1224 GLD8	1224,00
1280 GLD8	1280,00
1352 GLD8	1352,00
1424 GLD8	1424,00
1440 GLD8	1440,00
1464 GLD8	1464,00
1600 GLD8	1600,00
1680 GLD8	1680,00
1760 GLD8	1760,00
1792 GLD8	1792,00
1800 GLD8	1800,00
1904 GLD8	1904,00
2000 GLD8	2000,00
2200 GLD8	2200,00
2240 GLD8	2240,00
2272 GLD8	2272,00
2400 GLD8	2400,00
2520 GLD8	2520,00
2600 GLD8	2600,00
2800 GLD8	2800,00
2840 GLD8	2840,00
3048 GLD8	3048,00
3200 GLD8	3200,00
3280 GLD8	3280,00
3600 GLD8	3600,00
4000 GLD8	4000,00
4400 GLD8	4400,00

GOLD14	
Code	Pitch length [mm]
966 GLD14	966,00
994 GLD14	994,00
1092 GLD14	1092,00
1106 GLD14	1106,00
1120 GLD14	1120,00
1190 GLD14	1190,00
1260 GLD14	1260,00
1288 GLD14	1288,00
1344 GLD14	1344,00
1400 GLD14	1400,00
1442 GLD14	1442,00
1568 GLD14	1568,00
1610 GLD14	1610,00
1750 GLD14	1750,00
1764 GLD14	1764,00
1778 GLD14	1778,00
1848 GLD14	1848,00
1890 GLD14	1890,00
1904 GLD14	1904,00
1960 GLD14	1960,00
2100 GLD14	2100,00
2240 GLD14	2240,00
2310 GLD14	2310,00
2380 GLD14	2380,00
2450 GLD14	2450,00
2520 GLD14	2520,00
2590 GLD14	2590,00
2660 GLD14	2660,00
2800 GLD14	2800,00
2968 GLD14	2968,00
3136 GLD14	3136,00
3150 GLD14	3150,00
3304 GLD14	3304,00
3360 GLD14	3360,00
3500 GLD14	3500,00
3850 GLD14	3850,00
3920 GLD14	3920,00
4326 GLD14	4326,00
4410 GLD14	4410,00
4578 GLD14	4578,00
4956 GLD14	4956,00

BASIC PERFORMANCE IN Kw FOR GOLD8 - 20 mm WIDE (kW / 20 mm)																
d (mm)	56,02	61,12	66,21	71,30	76,39	81,49	86,58	91,67	96,77	101,86	112,05	122,23	142,60	162,97	183,30	203,72
z	22	24	26	28	30	32	34	36	38	40	44	48	56	64	72	80
rpm																
10	0,10	0,11	0,12	0,13	0,14	0,15	0,16	0,17	0,18	0,19	0,21	0,22	0,26	0,30	0,34	0,37
20	0,18	0,20	0,22	0,24	0,25	0,27	0,29	0,31	0,33	0,35	0,39	0,43	0,51	0,60	0,67	0,75
30	0,26	0,28	0,31	0,34	0,36	0,39	0,42	0,45	0,48	0,50	0,56	0,62	0,74	0,85	0,98	1,10
50	0,40	0,45	0,49	0,53	0,57	0,62	0,66	0,70	0,75	0,79	0,88	0,97	1,16	1,34	1,53	1,73
70	0,54	0,60	0,66	0,71	0,77	0,83	0,89	0,95	1,01	1,07	1,19	1,31	1,56	1,81	2,07	2,33
100	0,75	0,82	0,90	0,98	1,06	1,14	1,22	1,30	1,38	1,46	1,63	1,79	2,13	2,48	2,83	3,19
200	1,38	1,52	1,66	1,81	1,95	2,10	2,25	2,40	2,55	2,70	3,00	3,31	3,94	4,58	5,23	5,89
300	1,97	2,18	2,38	2,59	2,80	3,01	3,22	3,43	3,65	3,86	4,30	4,74	5,64	6,56	7,48	8,43
400	2,54	2,81	3,07	3,34	3,61	3,88	4,15	4,43	4,70	4,98	5,55	6,12	7,28	8,46	9,65	10,86
500	3,10	3,42	3,74	4,07	4,39	4,72	5,06	5,39	5,73	6,07	6,76	7,45	8,86	10,30	11,75	13,23
600	3,64	4,02	4,40	4,78	5,16	5,55	5,94	6,34	6,73	7,13	7,94	8,76	10,41	12,10	13,81	15,54
700	4,17	4,60	5,04	5,47	5,92	6,36	6,81	7,26	7,72	8,18	9,10	10,03	11,93	13,86	15,81	17,80
800	4,70	5,18	5,67	6,16	6,66	7,16	7,66	8,17	8,68	9,20	10,24	11,29	13,42	15,59	17,79	20,01
900	5,21	5,75	6,29	6,84	7,39	7,94	8,50	9,07	9,64	10,21	11,36	12,52	14,89	17,29	19,72	22,19
1000	5,72	6,31	6,90	7,50	8,11	8,72	9,33	9,95	10,57	11,20	12,46	13,74	16,33	18,97	21,63	24,33
1100	6,23	6,86	7,51	8,16	8,82	9,48	10,15	10,82	11,50	12,18	13,56	14,94	17,76	20,62	23,51	26,44
1200	6,72	7,41	8,11	8,81	9,52	10,24	10,96	11,69	12,42	13,15	14,63	16,13	19,17	22,25	25,37	28,52
1300	7,22	7,96	8,70	9,46	10,22	10,99	11,76	12,54	13,32	14,11	15,70	17,31	20,56	23,86	27,20	30,57
1400	7,70	8,49	9,29	10,10	10,91	11,73	12,56	13,39	14,22	15,06	16,76	18,47	21,93	25,45	29,00	32,58
1500	8,19	9,03	9,88	10,73	11,60	12,47	13,34	14,22	15,11	16,00	17,80	19,62	23,29	27,02	30,78	34,57
1600	8,67	9,56	10,45	11,36	12,27	13,19	14,12	15,05	15,99	16,93	18,84	20,76	24,64	28,57	32,54	36,54
1700	9,14	10,08	11,03	11,98	12,95	13,92	14,89	15,88	16,86	17,86	19,86	21,88	25,97	30,11	34,28	38,47
1800	9,62	10,60	11,60	12,60	13,61	14,63	15,66	16,69	17,73	18,77	20,88	23,00	27,29	31,62	35,99	40,38
1900	10,08	11,12	12,16	13,21	14,27	15,34	16,42	17,50	18,59	19,68	21,88	24,11	28,59	33,12	37,68	42,26
2000	10,55	11,63	12,72	13,82	14,93	16,05	17,17	18,30	19,44	20,58	22,88	25,20	29,88	34,60	39,35	44,11
2500	12,84	14,15	15,47	16,81	18,15	19,50	20,86	22,23	23,60	24,98	27,75	30,53	36,14	41,76	47,37	52,96
3000	15,06	16,60	18,14	19,70	21,27	22,84	24,43	26,01	27,61	29,21	32,41	35,63	42,07	48,48	54,83	
3500	17,23	18,98	20,74	22,51	24,29	26,08	27,87	29,67	31,47	33,28	36,89	40,49	47,67	54,75		
4000	19,35	21,30	23,27	25,25	27,23	29,22	31,21	33,20	35,20	37,19	41,16	45,12	52,93			
4500	21,42	23,57	25,73	27,90	30,08	32,25	34,43	36,60	38,77	40,94	45,24	49,50				
5000	23,44	25,78	28,13	30,49	32,84	35,19	37,54	39,88	42,21	44,52	49,11					

ISORAN GOLD14

BASIC PERFORMANCE IN kW FOR GOLD14 - 40 mm WIDE (kW / 40 mm)																	
d (mm)	124,78	129,23	133,69	142,6	151,52	160,43	169,34	178,25	196,08	213,9	231,73	249,55	267,38	285,21	303,03	320,86	356,51
z	28	29	30	32	34	36	38	40	44	48	52	56	60	64	68	72	80
rpm																	
10	0,75	0,78	0,81	0,86	0,91	0,97	1,02	1,07	1,18	1,29	1,40	1,50	1,61	1,72	1,82	1,93	2,15
20	1,44	1,50	1,56	1,67	1,79	1,91	2,03	2,15	2,36	2,58	2,79	3,01	3,22	3,43	3,65	3,86	4,29
30	2,07	2,16	2,24	2,41	2,58	2,75	2,92	3,10	3,45	3,80	4,16	4,51	4,83	5,15	5,47	5,80	6,44
50	3,28	3,42	3,55	3,82	4,09	4,36	4,63	4,90	5,46	6,02	6,59	7,16	7,74	8,32	8,91	9,50	10,70
70	4,44	4,62	4,80	5,17	5,53	5,90	6,27	6,64	7,39	8,15	8,92	9,69	10,48	11,27	12,06	12,86	14,48
100	6,13	6,37	6,62	7,12	7,62	8,13	8,64	9,15	10,19	11,24	12,29	13,36	14,44	15,53	16,62	17,73	19,96
200	11,43	11,89	12,36	13,29	14,22	15,17	16,12	17,08	19,01	20,96	22,94	24,93	26,94	28,97	31,01	33,07	37,23
300	16,47	17,13	17,80	19,13	20,48	21,84	23,21	24,59	27,37	30,19	33,03	35,90	38,79	41,71	44,65	47,61	53,58
400	21,33	22,19	23,05	24,78	26,53	28,29	30,07	31,85	35,45	39,09	42,77	46,48	50,22	53,99	57,79	61,62	69,34
500	26,07	27,12	28,17	30,29	32,42	34,58	36,74	38,92	43,31	47,76	52,25	56,77	61,34	65,94	70,57	75,23	84,64
600	30,71	31,94	33,18	35,68	38,19	40,72	43,27	45,84	51,01	56,24	61,51	66,84	72,20	77,61	83,05	88,52	99,56
700	35,27	36,69	38,11	40,97	43,86	46,76	49,69	52,63	58,56	64,55	70,60	76,70	82,84	89,03	95,25	101,51	114,12
800	39,76	41,36	42,96	46,18	49,43	52,70	55,99	59,31	65,98	72,72	79,52	86,38	93,28	100,23	107,21	114,23	128,37
900	44,19	45,96	47,74	51,32	54,93	58,56	62,21	65,89	73,29	80,76	88,30	95,89	103,54	111,22	118,94	126,70	142,30
1000	48,56	50,51	52,46	56,39	60,35	64,34	68,34	72,37	80,49	88,69	96,94	105,25	113,61	122,02	130,45	138,92	155,94
1100	52,88	55,00	57,13	61,40	65,71	70,04	74,40	78,78	87,60	96,49	105,45	114,46	123,52	132,62	141,75	150,90	169,27
1200	57,16	59,44	61,74	66,36	71,00	75,68	80,38	85,10	94,61	104,19	113,83	123,53	133,26	143,03	152,83	162,64	182,30
1300	61,39	63,84	66,31	71,26	76,24	81,25	86,28	91,34	101,52	111,78	122,09	132,45	142,84	153,26	163,70	174,14	195,02
1400	65,58	68,20	70,82	76,10	81,42	86,76	92,12	97,51	108,35	119,26	130,22	141,23	152,25	163,30	174,35	185,39	207,43
1500	69,73	72,51	75,30	80,90	86,54	92,21	97,90	103,61	115,10	126,64	138,24	149,86	161,50	173,15	184,78	196,40	219,52
1600	73,84	76,78	79,73	85,65	91,61	97,60	103,61	109,64	121,75	133,92	146,13	158,36	170,59	182,80	195,00	207,15	231,29
1700	77,91	81,01	84,12	90,36	96,63	102,93	109,25	115,59	128,32	141,10	153,90	166,71	179,50	192,27	204,98	217,64	
1800	81,95	85,20	88,47	95,02	101,60	108,20	114,83	121,48	134,81	148,17	161,55	174,91	188,25	201,53	214,74		
1900	85,95	89,36	92,78	99,63	106,52	113,42	120,35	127,29	141,21	155,14	169,07	182,97	196,82	210,59			
2000	89,92	93,48	97,05	104,20	111,38	118,59	125,81	133,04	147,52	162,01	176,47	190,88	205,21	219,44			
2500	109,27	113,54	117,82	126,39	134,98	143,56	152,14	160,71	177,78	194,73							
3000	127,78	132,71	137,64	147,49	157,31	167,10	176,85	186,54									
3500	145,46	150,98	156,48	167,44	178,33	183,13											
4000	162,27	168,30	174,30	186,19													
4500	178,17																

SPECIAL EXECUTION FEASIBILITY

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

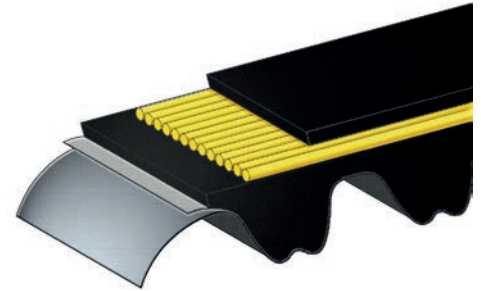
SUPER

On customer's request and with minimum quantity Megadyne can produce Isoran, Isoran RPP and Isoran Silver with a double nylon fabric on the tooth surface to improve torque carrying capacity. Isoran Gold has already two nylon fabric plies.

The advantages of this solution are:

- Exceptional resistance to abrasion
- Low coefficient of friction
- Increased drive efficiency
- Increased belt and pulley life.

This solution will increase the belt performances by a 10%.



ANTISTATIC

On customer's request and with minimum quantity Megadyne can produce Isoran L, H, RPP5 and RPP8 in antistatic version according to BS 2050. We remind that Isoran Silver and Isoran Gold already comply BS 2050.

For very severe applications, Megadyne can also produce super-conductive belts overcoming BS 2050 parameters.

HIGH TEMPERATURE

On customer's request and with minimum quantity Megadyne can produce special belts to work up to 130°C. Please check with our Application Department for advice or for even more severe requirement.

SPECIAL COMPOUNDS

On customer's request and with minimum quantity Megadyne can also manufacture belts to stand to specific chemicals or environments as acids, oils, solvents, etc. Please check with our Application Department for guidance.

LOW NOISE

On customer's request and with minimum quantity Megadyne can produce soft compounded belts (60 ±3 ShA) to reduce noise level. In this case, belt's performance will decrease by a 10% compared to an Isoran or an Isoran RPP.

SPECIAL BRANDING

On customer's request and with minimum quantity Megadyne can brand the belts with special branding.

SPECIAL PACKAGING

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

PAINTING

For painting applications (as automotive painting shop) Megadyne suggest to use Megapaint, special suited and developed for this kind of application. Belts are available in RPP8 pitch and have the same performance of SILVER8. For further information, please check in Megapaint brochure or contact Megadyne's Application Department.

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 · 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 · 10 ⁻⁷
J	HP ⇔ h	3,72506 · 10 ⁻⁷
J	kWh	2,77778 · 10 ⁻⁷
kg	lb	2,204623
kgf	N	9,80665
kgf	lbf	2,204623
kgf ⇔ m/s	CV	0,013333333
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

The data and information contained in the present catalogue are up-to-dated to the date of the catalogue's printing. Megadyne S.p.A. 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.

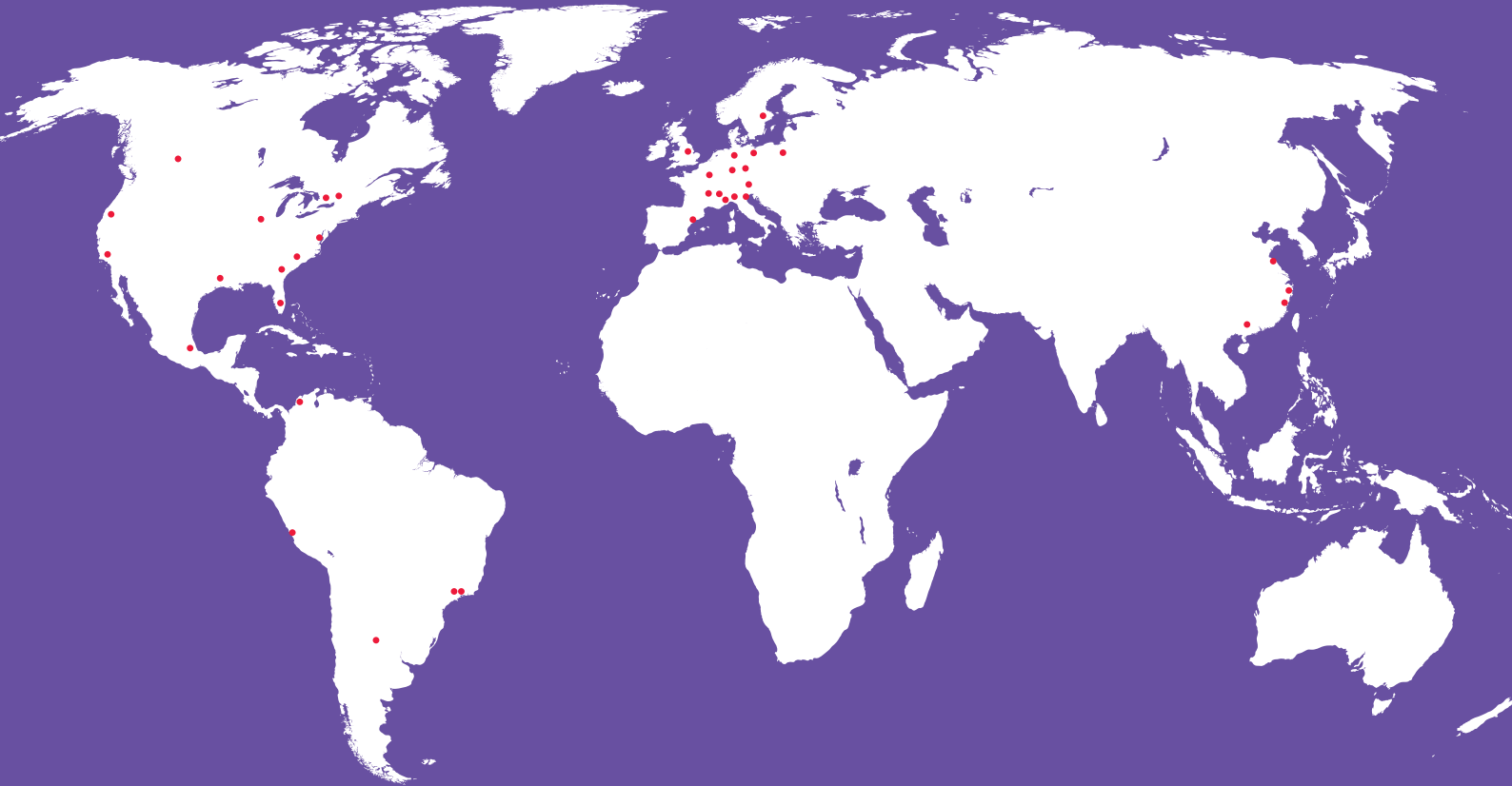
Technical specifications, performances and other information provided in the present catalogue are indicative and do not bound Megadyne unless such specifications, performances or other information are expressly agreed in the agreement with the customer.

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.

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MEGADYNE



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