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Technical Manual

optibelt ZR

Chloroprene Timing Belts

optibelt
Power Transmission

Drive solutions with Optibelt

Quality
is the result of design fuelled by intent.

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Technical Manual for drives equipped with Optibelt ZR Timing Belts

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This manual contains all of the important technical information regarding the correct and approved usage as well as the methods used for calculating power drives equipped with Optibelt ZR Timing Belts.

The following drive products from the Optibelt product range will be handled in detail below:

optibelt ZR	Timing Belts
optibelt ZR D	Double Section Timing Belts
optibelt ZRS	Standard Timing Pulleys
optibelt TB	Taper Bushes

Optibelt ZR Timing Belts have been developed for usage in power drives. The drive speed is transferred in a synchronous manner. This means without loss of speed and in a manner with a constant transmission ratio.

We recommend the usage of the Optibelt OMEGA Timing Belts when using synchronous high power drives.

We would like to point out the advantages obtained by using Optibelt ALPHA Timing Belts when dealing with chemical influences for example.

The described characteristics can change due to various influences. Therefore, the drives must undergo inspections that are either consistent or are as consistent as possible with the later usage of the drive if required.

Naturally our engineers from the Application Engineering Specialist Department are available to advise you regarding the usage of our products and will help you to solve your drive problems. This service is free of charge.

Under no circumstances should you forego this service, especially when dealing with large volume productions. We supply you with the ideal solution by using the most up-to-date programs, for example the Optibelt CAP Drive Calculation Program.

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Power Transmission

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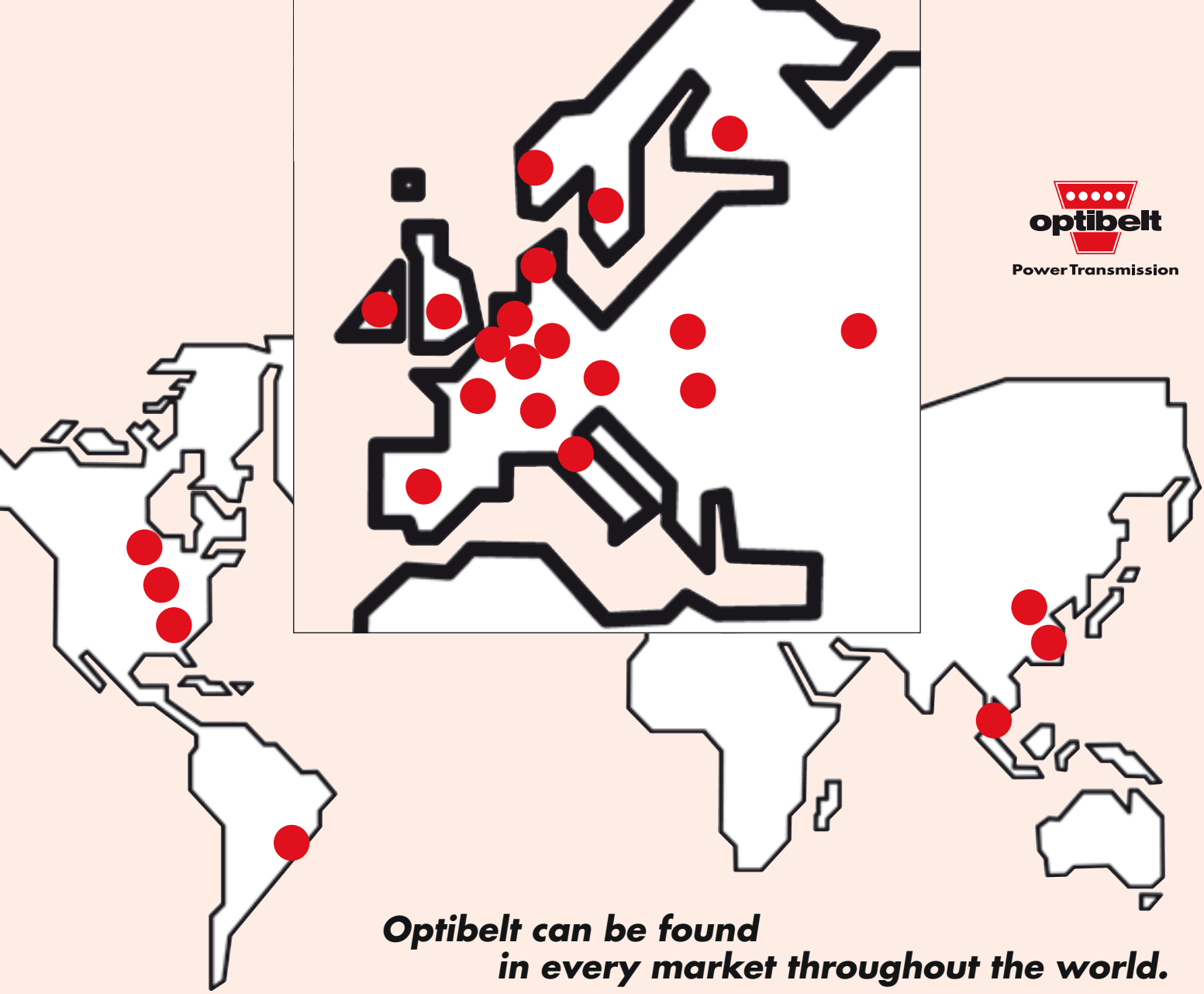

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Product Description

optibelt *ZR* Timing Belts

to ISO 5296

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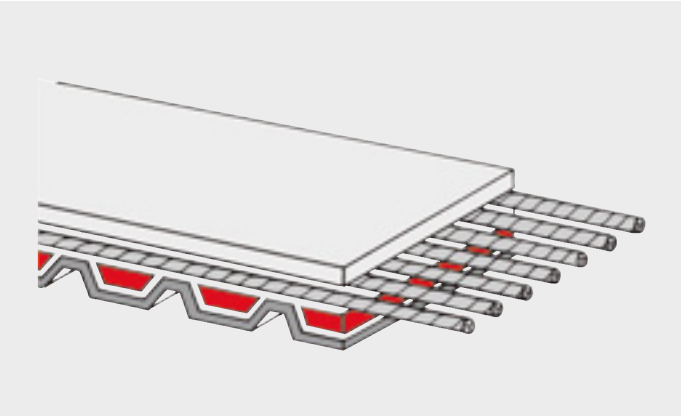
Construction



Tension Cord

The tension cord is continuous, spirally wound, fibre glass. This material has a high tensile strength and is extremely flexible. The low-stretch properties of the tension cord ensure that the pitch of the belt corresponds to the pitch of the pulley – even when under strain.

The high specific tensile strength of the tension cord ensures that it has a small cross-section, so that the Optibelt ZR Timing Belt is very thin.

Top Surface

A flexible top surface embeds the tension element and supports it against the reverse idlers. The top surface consists of a resistant, extremely thinly developed, high-quality chloroprene compound. This protects the tension cord from oil, damp and friction and wear and tear.

This top surface is limited amount resistant to mineral oils, but not to vegetable and water soluble cooling and cutting oils.

Teeth

The teeth are made of a shear- and wear-resistant rubber compound bonded to the top surface to form a single mass. The shape and arrangement of the teeth are such that the pulley engages the belt teeth precisely and with minimum friction.

As long as six teeth or more are in mesh on the small pulley, the complete capacity of the timing belt can be used without any take-off.

Fabric Cover

To reduce wear and tear, the tooth faces are covered in a tough, friction-resistant fabric. In order to obtain a low level of wear on the running surfaces as well as achieving a high level of tooth shear strength, a tough, wear-resistant fabric will be applied on to the tooth side.

Double Section Timing Belt

You can find a product description of the Optibelt ZR D on page 35.

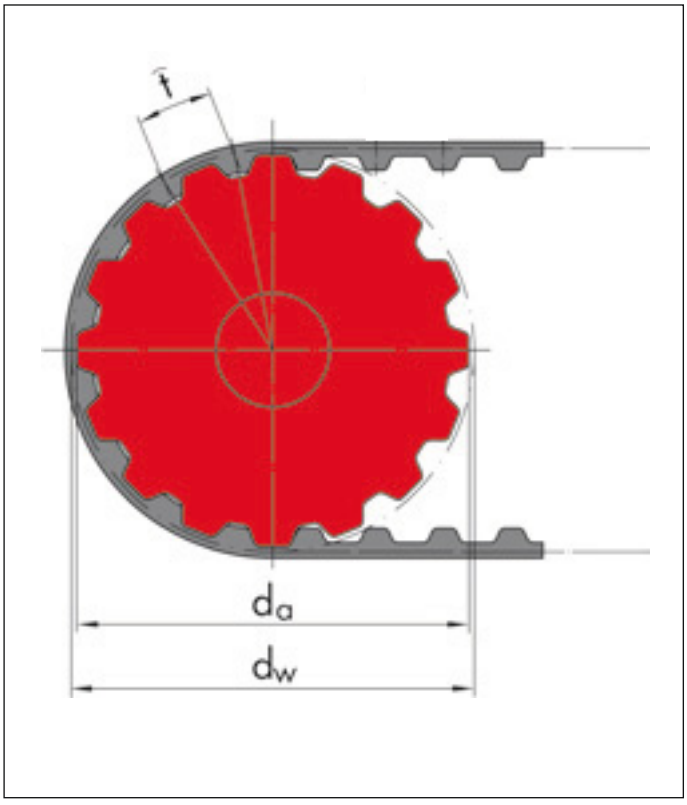
Tooth Pitch, Designations

Optibelt ZR Timing Belts are manufactured to ISO 5296 and toothed timing pulleys to ISO 5294. Both come in six standard sections. Due to the American origin of the timing belt section, the unit of length is the inch. The width/length codes have been derived from the appropriate imperial (inch) details with regards to the widths and lengths.

Table 1: Belt sections and tooth pitch

Section	Tooth pitch t	
	[mm]	[inches]
MXL	2.032	0.080 ($^{2}/_{25}$)
XL	5.080	0.200 ($^{1}/_{5}$)
L	9.525	0.375 ($^{3}/_{8}$)
H	12.700	0.500 ($^{1}/_{2}$)
XH	22.225	0.875 ($^{7}/_{8}$)
XXH	31.750	1.250 ($1\,^{1}/_{4}$)

Tooth pitch is the distance from the centre of one tooth to the centre of the next measured at the pitch line, which corresponds to the level of the tension cord. The pitch or datum diameter of the pulley is a theoretical dimension which lies outside the outer diameter.



Product Description

optibelt *ZR* Timing Belts to ISO 5296

optibelt Power Transmission

Nominal Dimensions

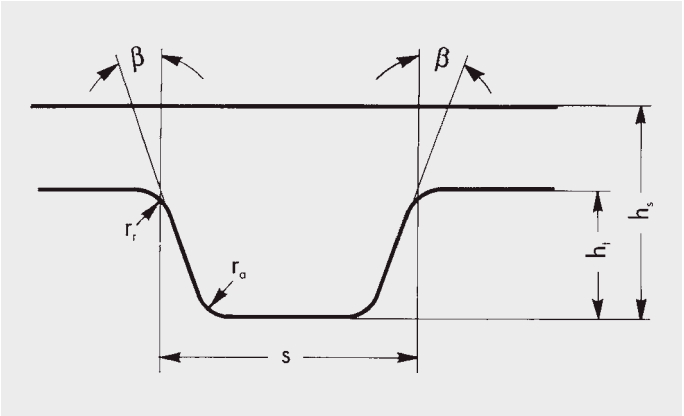


Table 2: Section dimensioning

Section	MXL	XL	L	H	XH	XXH
Tooth angle 2β [°]	40	50	40	40	40	40
Tooth height h_t [mm]	0.51	1.27	1.91	2.29	6.35	9.53
Foot radius r_r [mm]	0.13	0.38	0.51	1.02	1.57	2.29
Head radius r_a [mm]	0.13	0.38	0.51	1.02	1.19	1.52
Tooth width s [mm]	1.14	2.57	4.65	6.12	12.57	19.05
Overall belt thickness h_s [mm]	1.2	2.3	3.6	4.0	11.2	15.7

Table 3: Width tolerances for Optibelt ZR Timing Belts to ISO 5296

Section	Standard width		Permitted deviation of width for belt pitch lengths		
	Width	Designation	up to 838.20 mm	between 838.20 mm and 1676.40 mm	over 1676.40 mm
	[mm]		[mm]	[mm]	[mm]
MXL	3.2 4.8 6.4	012 019 025	+ 0.5 – 0.8	—	—
XL	6.4 7.9 9.5	025 031 037	+ 0.5 – 0.8	+ 0.5 – 0.8	—
L	12.7 19.1 25.4	050 075 100	+ 0.8 – 0.8	+ 0.8 – 1.3	+ 0.8 – 1.2
H	19.1 25.4 38.1	075 100 150	+ 0.8 – 0.8	+ 0.8 – 1.3	+ 0.8 – 1.3
H	50.8	200	+ 0.8 – 1.3	+ 1.3 – 1.3	+ 1.3 – 1.5
H	76.2	300	+ 1.3 – 1.5	+ 1.5 – 1.5	+ 1.5 – 2.0
XH	50.8 76.2 101.6	200 300 400	+ 4.8 – 4.8	+ 4.8 – 4.8	+ 4.8 – 4.8
XXH	50.8 76.2 101.6 127.0	200 300 400 500	+ 4.8 – 4.8	+ 4.8 – 4.8	+ 4.8 – 4.8

Metre Weight

Section	MXL	XL	L	H	XH	XXH
kg/m per 1 mm width	0.0012	0.0021	0.0035	0.0041	0.0110	0.0147

Product Description

Standard Properties/Special Constructions

All Optibelt ZR Timing Belts are oil-, heat- and cold-resistant as standard. They are not specifically marked.

Oil Resistance

Limited oil resistance combats the contaminating effect of mineral oil and grease so long as large amounts of these substances do not permanently come into contact with the timing belt. In the event of increased requirements being placed upon the resistance – for example against mineral oils – the application range of the Optibelt ZR Timing Belts can be expanded via special constructions. Please contact the Optibelt Application Engineering Department for more details.

Temperature Resistance

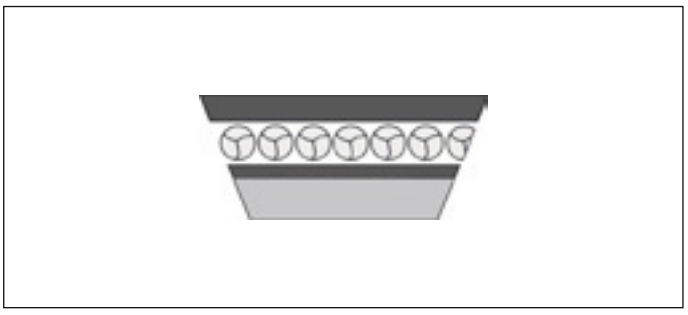
The timing belts can tolerate temperatures from approximately –30 °C up to +100 °C. Temperatures in excess of the above stated values will lead to premature aging and embrittlement of the timing belts and will therefore result in the premature failure of the belt. The temperature resistance of the Optibelt ZR Timing Belts can be extended to +140 °C via special constructions. Please contact the Optibelt Application Engineering Department for more details.

Electrical Conduction

Electrical conduction enables the safe discharge of electrostatic charges. These charges can be so strong with timing belt drives with insufficient electrical conduction ability that there is a risk of ignition due to the formation of sparks. The usage of timing belts with electrical conduction ability requires an inspection of these properties in accordance with the ISO 9563 regulation. The electrical conduction ability of the product can be proved in the form of an acceptance certificate.

Optibelt ZR Timing Belts with Angled Sides

Optibelt ZR Timing Belts with angled sides can be made up to customer specification for special applications.



Special lengths, widths, tooth pitch or open-ended versions of the Optibelt ZR Timing Belts, in addition to minimum order quantities, are available on request.

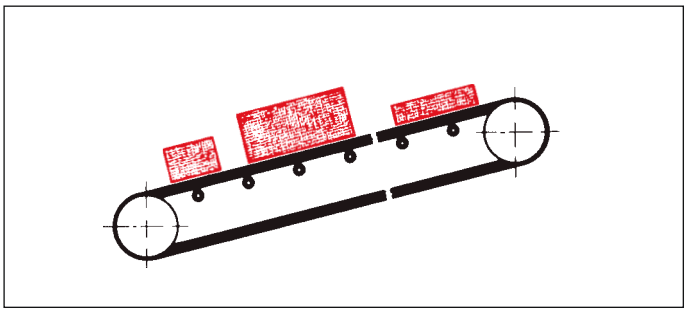
Possible Combinations

Optibelt ZR Timing Belts with standard or special compounds can be combined with other special constructions. However the individual properties of the special compounds cannot be combined with each other. For example, the properties of an extra heat-resistant belt cannot be combined with those of an antistatic belt.

Further Special Constructions

Optibelt ZR Timing Belts with Reinforced Top Surfaces

If the timing belt is to be used for transporting different goods, we recommend using Optibelt ZR Timing Belts with reinforced top surfaces. Please give the required overall thickness (h_s) of the belt when ordering.



Optibelt ZR Timing Belts with Ground Top Surfaces

When using back idlers, especially when dealing with high belt speeds and vibration, we recommend Optibelt ZR Timing Belts with ground top surfaces. Grinding tolerances are given in the following table 4:

Table 4: Optibelt ZR Timing Belts to ISO 5296

Section	Overall belt thickness h_s [mm]		
	Standard construction	Class G 1	Class G 2
MXL	1.20 ± 0.25	1.20 ± 0.13 (≥ 80MXL)	1.20 ± 0.25 (≥ 80MXL)
XL	2.30 ± 0.25	2.30 ± 0.13	2.30 ± 0.25
L	3.60 ± 0.25	3.60 ±0.13	3.60 ± 0.25
H	4.00 ± 0.25	4.00 ± 0.13	4.00 ± 0.25
XH	11.20 ± 0.65	–	11.20 ± 0.25
XXH	15.70 ± 0.65	–	15.70 ± 0.25

Product Description

optibelt *ZR linear*

to ISO 5296 / ISO 5294

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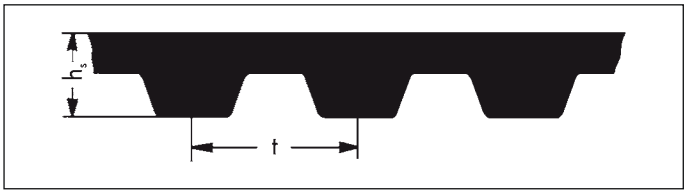
Optibelt ZR linear Timing Belts with trapeze sections are manufactured from sleeves in a spiral cut method. These open-ended V-belts are equipped with a glass cord.

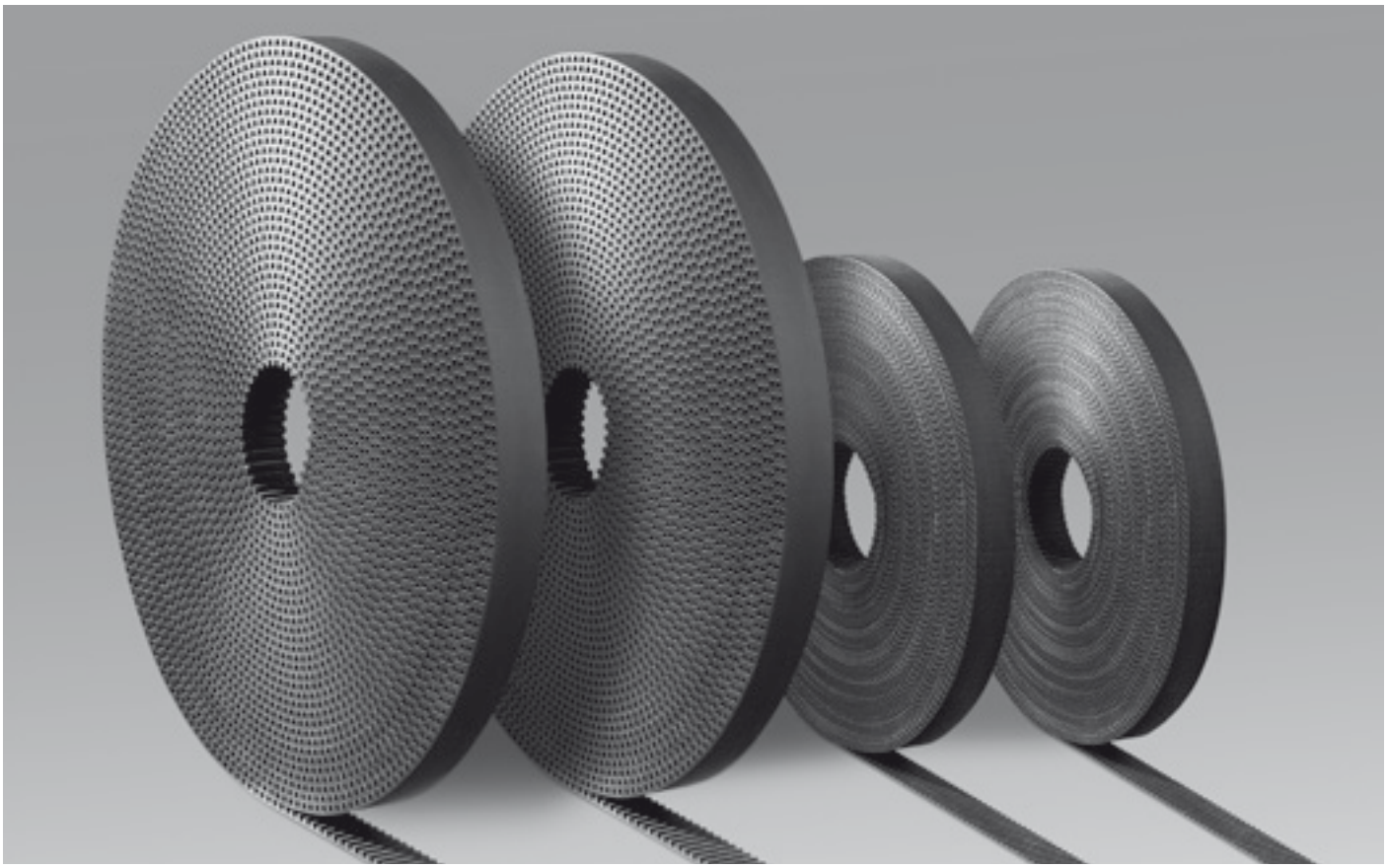
- High level of tensile strength
- Angle misalignment of 0.67° (width-dependent)
- Maintenance-free
- Established worldwide
- For low levels of strain
- Section standardised: ISO 5296 / ISO 5294
- Standard roll length: 30 m



Standard Range		
Section Width Code	Belt width [mm]	Idler length [m]
XL 025	6.35	30
XL 037	7.94	30
XL 050	12.70	30
L 050	12.70	30
L 075	19.05	30
L 100	25.40	30
H 075	19.05	30
H 100	25.40	30

Further dimensions on request.

Please contact the Optibelt Engineers at the Application Engineering Department for more information regarding the characteristics of the Optibelt ZR linear Timing Belt and design of a linear drive.



Standard Range

optibelt *ZR* Timing Belts, optibelt *ZR D* Double Sided Timing Belts to ISO 5296

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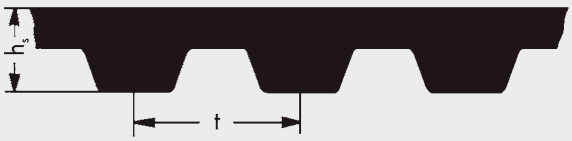
Power Transmission



Profile	MXL	XL	L	H	XH	XXH
h_s [mm]	1.2	2.3	3.6	4.3	11.2	15.7
t [mm]	2.032	5.08	9.525	12.7	22.225	31.75

Profile MXL

Belt designation	Pitch length [mm]	Number of teeth	Belt designation	Pitch length [mm]	Number of teeth	Belt designation	Pitch length [mm]	Number of teeth
360 MXL	91.44	45	816 MXL*	207.26	102	1360 MXL*	345.44	170
432 MXL*	109.73	54	824 MXL*	209.30	103	1400 MXL	355.60	175
440 MXL	111.76	55	840 MXL*	213.36	105	1440 MXL*	365.76	180
448 MXL*	113.79	56	848 MXL*	215.39	106	1472 MXL*	373.89	184
456 MXL*	115.82	57	856 MXL*	217.42	107	1520 MXL*	389.08	190
464 MXL*	117.86	58	864 MXL*	219.46	108	1560 MXL*	396.24	195
480 MXL	121.92	60	880 MXL	223.52	110	1600 MXL*	406.40	200
488 MXL*	123.95	61	896 MXL*	227.58	112	1768 MXL*	449.07	221
536 MXL*	136.14	67	904 MXL*	229.62	113	1800 MXL*	457.20	225
544 MXL*	138.18	68	912 MXL*	231.65	114	1888 MXL*	479.55	236
560 MXL*	142.24	70	920 MXL*	233.68	115	1984 MXL*	503.94	248
568 MXL*	144.27	71	960 MXL*	243.84	120	1992 MXL*	505.97	249
576 MXL*	146.30	72	976 MXL*	247.90	122	2008 MXL*	510.03	251
600 MXL*	152.40	75	984 MXL*	249.94	123	2048 MXL*	520.19	256
608 MXL*	154.43	76	1000 MXL*	254.00	125	2144 MXL*	544.58	268
632 MXL*	160.53	79	1008 MXL*	256.03	126	2240 MXL*	568.96	280
640 MXL	162.56	80	1040 MXL*	264.16	130	2384 MXL*	605.54	298
656 MXL*	166.62	82	1056 MXL*	268.22	132	2480 MXL*	629.92	310
664 MXL*	168.66	83	1072 MXL*	272.29	134	2520 MXL*	640.08	315
672 MXL*	170.69	84	1080 MXL*	274.32	135	2680 MXL*	680.72	335
680 MXL*	172.72	85	1112 MXL*	282.45	139	2776 MXL*	705.10	347
704 MXL*	178.82	88	1120 MXL	284.48	140	2880 MXL*	731.52	360
720 MXL*	182.88	90	1136 MXL*	288.54	142	2920 MXL*	741.68	365
728 MXL*	184.91	91	1176 MXL*	298.70	147	3200 MXL*	812.80	400
736 MXL*	186.94	92	1184 MXL*	300.74	148	3472 MXL*	881.89	434
752 MXL*	191.01	94	1200 MXL*	304.80	150	3624 MXL*	920.50	453
760 MXL*	193.04	95	1224 MXL*	310.90	153	3704 MXL*	940.82	463
776 MXL*	197.10	97	1272 MXL*	323.09	159	3984 MXL*	1011.94	498
800 MXL*	203.20	100	1280 MXL*	325.12	160	4040 MXL*	1026.16	505
808 MXL*	205.23	101	1320 MXL*	335.28	165			

Profile XL

Belt designation	Pitch length [mm]	Number of teeth
60 XL	152.40	30
70 XL	177.80	35
80 XL	203.20	40
86 XL*	218.44	43
88 XL*	223.52	44
90 XL	228.60	45
92 XL*	233.68	46
94 XL*	238.76	47
96 XL*	243.84	48
100 XL	254.00	50
102 XL*	259.08	51
106 XL*	269.24	53
108 XL*	274.32	54
110 XL	279.40	55
112 XL*	284.48	56
116 XL*	294.64	58
118 XL*	299.72	59
120 XL	304.80	60
124 XL*	314.96	62
126 XL*	320.04	63
128 XL*	325.12	64
130 XL	330.20	65
134 XL*	340.36	67
136 XL*	345.44	68
138 XL*	350.52	69
140 XL	355.60	70
148 XL*	375.92	74
150 XL•	381.00	75
156 XL*	396.24	78
160 XL•	406.40	80

The sizes marked with • are also available as double sided timing belts.
Sections and dimensions see page 12.

Standard width	Designation
3.2 mm	**012**
4.8 mm	**019**
6.4 mm	**025**

Standard width	Designation
6.4 mm	**025**
7.9 mm	**031**
9.5 mm	**037**
12.7 mm	**050**
19.1 mm	**075**
25.4 mm	**100**

* Non stock items. Further sizes available on request.

Standard Range

optibelt *ZR* Timing Belts, optibelt *ZR D* Double Sided Timing Belts to ISO 5296

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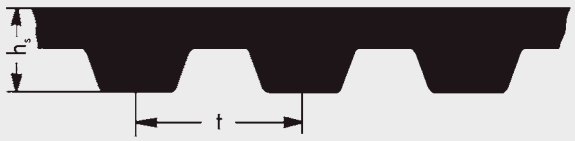

Profile	MXL	XL	L	H	XH	XXH
h_s [mm]	1.2	2.3	3.6	4.3	11.2	15.7
t [mm]	2.032	5.08	9.525	12.7	22.225	31.75

Profile XL

Belt designation	Pitch length [mm]	Number of teeth	Belt designation	Pitch length [mm]	Number of teeth
162 XL*	411.48	81	300 XL•	762.00	150
166 XL*	421.64	83	306 XL*	777.24	153
168 XL*	426.72	84	310 XL•	787.40	155
170 XL•	431.80	85	316 XL	802.64	158
174 XL*	441.96	87	320 XL	812.80	160
176 XL*	447.04	88	322 XL	817.88	161
178 XL*	452.12	89	330 XL	838.20	165
180 XL•	457.20	90	340 XL*	863.60	170
182 XL*	462.28	91	344 XL*	873.76	172
184 XL*	467.36	92	350 XL*	889.00	175
188 XL*	477.52	94	360 XL	914.40	180
190 XL•	482.60	95	380 XL*	965.20	190
192 XL*	487.68	96	382 XL*	970.28	191
194 XL*	492.76	97	388 XL*	985.52	194
196 XL*	497.84	98	390 XL	990.60	195
200 XL•	508.00	100	392 XL*	995.68	196
210 XL•	533.40	105	412 XL*	1046.48	206
220 XL•	558.80	110	414 XL*	1051.56	207
230 XL•	584.20	115	432 XL*	1097.28	216
240 XL•	609.60	120	438 XL*	1112.52	219
244 XL*	619.76	122	460 XL*	1168.40	230
248 XL*	629.92	124	498 XL*	1264.92	249
250 XL•	635.00	125	506 XL*	1285.24	253
260 XL•	660.40	130	514 XL*	1305.56	257
270 XL	685.80	135	580 XL*	1473.20	290
272 XL*	690.88	136	630 XL*	1600.20	315
274 XL*	695.96	137			
280 XL•	711.20	140			
286 XL*	726.44	143			
290 XL	736.60	145			
296 XL*	751.84	148			

Profile L

Belt designation	Pitch length [mm]	Number of teeth
109 L	276.23	29
124 L	314.30	33
150 L•	381.00	40
165 L*	419.10	44
169 L•	429.26	45
173 L	438.15	46
187 L•	476.20	50
210 L•	533.40	56
225 L•	571.50	60
236 L	600.08	63
240 L•	609.60	64
255 L•	647.70	68
270 L•	685.80	72
285 L•	723.90	76
300 L•	762.00	80
322 L•	819.10	86
345 L•	876.30	92
360 L	914.40	96
367 L•	933.40	98
390 L•	990.60	104
405 L	1028.70	108
420 L•	1066.80	112
435 L	1104.90	116
450 L•	1143.00	120
454 L	1152.53	121
480 L•	1219.20	128
510 L•	1295.40	136
525 L	1333.50	140
540 L•	1371.60	144
600 L•	1524.00	160
630 L	1600.20	168
660 L	1676.40	176

The sizes marked with • are also available as double sided timing belts.
Sections and dimensions see page 12.

Standard width	Designation
6.4 mm	**025**
7.9 mm	**031**
9.5 mm	**037**
12.7 mm	**050**
19.1 mm	**075**
25.4 mm	**100**

Standard width	Designation
12.7 mm	**050**
19.1 mm	**075**
25.4 mm	**100**
38.1 mm	**150**
50.8 mm	**200**
76.2 mm	**300**

* Non stock items. Further sizes available on request.

Standard Range

optibelt *ZR* Timing Belts, optibelt *ZR D* Double Sided Timing Belts to ISO 5296

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Power Transmission

Profile	DXL	DL	DH
W [mm]	0.508 ± 0.127	0.762 ± 0.127	1.372 ± 0.127
T [mm]	3.048 ± 0.178	4.572 ± 0.254	5.944 ± 0.127

Profile H

Belt designation	Pitch length [mm]	Number of teeth
230 H	584.20	46
240 H•	609.60	48
255 H	647.70	51
270 H•	685.80	54
280 H	711.20	56
300 H•	762.00	60
330 H•	838.20	66
335 H	850.90	67
350 H	889.00	70
360 H•	914.40	72
370 H	939.80	74
390 H•	990.60	78
400 H	1016.00	80
420 H•	1066.80	84
430 H	1092.20	86
450 H•	1143.00	90
465 H	1181.10	93
480 H•	1219.20	96
510 H•	1295.40	102
540 H•	1371.60	108
560 H	1422.40	112
570 H•	1447.80	114
600 H•	1524.00	120
630 H•	1600.20	126
650 H	1651.00	130
660 H•	1676.40	132
680 H	1727.20	136
700 H•	1778.00	140
730 H	1854.20	146
750 H•	1905.00	150
770 H	1955.80	154
800 H•	2032.00	160
850 H•	2159.00	170
860 H	2184.40	172
900 H•	2286.00	180
950 H	2413.00	190
1000 H•	2540.00	200
1100 H•	2794.00	220
1250 H•	3175.00	250
1400 H•	3556.00	280
1700 H•	4318.00	340

Standard width	Designation
19.1 mm	**075**
25.4 mm	**100**
38.1 mm	**150**
50.8 mm	**200**
76.2 mm	**300**
101.6 mm	**400**
127.0 mm	**500**

Profile XH

Belt designation	Pitch length [mm]	Number of teeth
507 XH	1289.00	58
560 XH	1422.40	64
630 XH	1600.20	72
700 XH	1778.00	80
770 XH	1955.80	88
840 XH	2133.60	96
980 XH	2489.20	112
1120 XH	2844.80	128
1260 XH	3200.40	144
1400 XH	3556.00	160
1540 XH	3911.60	176
1750 XH	4445.00	200

Standard width	Designation
50.8 mm	**200**
76.2 mm	**300**
101.6 mm	**400**
127.0 mm	**500**
152.4 mm	**600**
177.8 mm	**700**

Profile XXH

Belt designation	Pitch length [mm]	Number of teeth
700 XXH	1778.00	56
800 XXH	2032.00	64
900 XXH	2286.00	72
1000 XXH	2540.00	80
1200 XXH	3048.00	96
1400 XXH	3556.00	112
1600 XXH	4064.00	128
1800 XXH	4572.00	144

Standard width	Designation
50.8 mm	**200**
76.2 mm	**300**
101.6 mm	**400**
127.0 mm	**500**

The sizes marked with • are also available as double sided timing belts.

Further sizes available on request.

Drive Design

Explanation of Symbols

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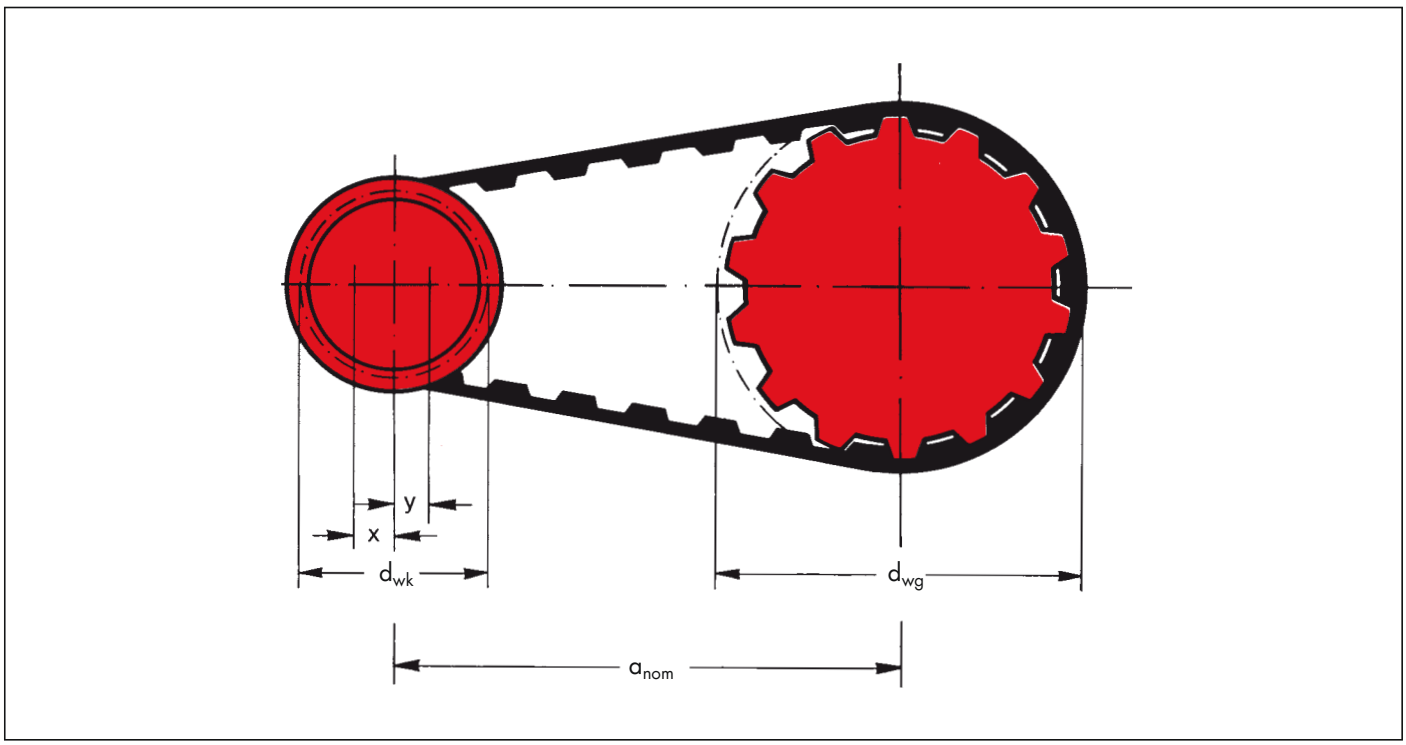
c_0	Basic service factor	
c_1	Teeth in mesh factor	
c_2	Overall service factor	
c_3	Speed ratio correction factor	
c_4	Width factor	
d_a	Outside diameter of pulley	[mm]
d_w	Pitch diameter of pulley	[mm]
d_{wg}	Pitch diameter of large pulley	[mm]
d_{wk}	Pitch diameter of small pulley	[mm]
d_{w1}	Pitch diameter of driving pulley	[mm]
d_{w2}	Pitch diameter of driven pulley	[mm]
e_a	Belt deflection for given span length	[mm]
a	Drive centre distance	[mm]
a_{nom}	Drive centre distance with standard belt length	[mm]
f	Frequency	[Hz]
i	Speed ratio	
l	Drive span length	[mm]
L_{wSt}	Standard pitch length of timing belt	[mm]
L_{wth}	Calculated pitch length of timing belt	[mm]
n_1	Speed of driving pulley	[min^{-1}]
n_2	Speed of driven pulley	[min^{-1}]
P	Power to be transmitted by timing belt drive	[kW]
P_B	Design power	[kW]
P_N	Rated power	[kW]
$P_Ü$	Transmissible power for standard belt width ($P_N \cdot c_1 \cdot c_7$)	[kW]
S_a	Shaft load	[N]
S_{n3}	Effective circumferential force to be transferred	[N]
t	Tooth pitch	[mm]
v	Belt speed	[m/s]
x	Minimum adjustment of drive centre distance a_{nom} for tensioning timing belt	[mm]
y	Minimum adjustment of drive centre distance a_{nom} for installation	[mm]
z_e	Number of teeth in mesh of small pulley	
z_g	Number of teeth on large pulley	
z_k	Number of teeth on small pulley	
z_r	Number of teeth on timing belt	
z_1	Number of teeth on driving pulley	
z_2	Number of teeth on driven pulley	



Drive Design

Service Factors

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Power Transmission

Total Load Factor c_2

The total load factor c_2 is comprised of the basic load factor c_0 plus two further loads c_3 and c_6.

$c_2 = c_0 + c_3 + c_6$

$c_2 \geq M_A/M_N$ recommendation in the event of a higher switching regularity

The basic service factor c_0 takes into account the daily operating time, the type of drive and the prime mover. As it is almost impossible to put all the possible combinations of prime mover / driven unit / environmental conditions in a shortened form which conforms to standards, the service factors shown here are **given only as a guide**. The classification of the work machine is dependent on the respective present load type.

Table 5
Basic Service Factor c_0

c_0	Load Type and Examples for Drive Machines			
	Equal running Electric motor Turbine running at high speed Reciprocating engine with higher quantity of caps		**Non-equal running** Hydraulic motor Turbine running at low speed Reciprocating engine with lower quantity of caps	
Load Type and Examples for Work Machines	Service factor c_0 with daily operation times			
	up to 16 h	over 16 h	up to 16 h	over 16 h
Light drives, shock-free with equally formed running characteristics Measurement devices Film cameras Office machines Conveyor systems (light goods)	1.3	1.4	1.4	1.5
Medium drives, operation with smaller – medium intermittent shock strain Mixing machines Kitchen machines Printing shop machines Textile machines Packaging machines Conveyor systems (heavy goods)	1.6	1.7	1.8	1.9
Heavy drives, operation with medium – high intermittent shock strain Tool machines Wood processing machines Eccentric drives Conveyor systems (heavy goods)	1.8	1.9	2.0	2.1
Extremely heavy drives, operation with high constant shock strain Mills Technical calendars Extruders Piston pumps/compressors Lifting appliances	2.0	2.1	2.2	2.3

Drive Design

Additional Factors

In the event of high switching frequency or constant oscillating operation, the total load factor c_2 is to be set to a higher level than the ratio from the starting torque to the nominal torque. In the event that braking occurs on the motor side, the braking torque is also to be driven in the manner if braking occurs on a regular basis. The Optibelt Application Engineering Department is always happy to help should you have any questions or queries.

Speed Ratio Correction Factor c_3

For transmission with step-up, the respective value of the speed ratio is added to basic load factor c_0.

Table 6.1

Speed ratio i	Speed ratio correction factor c_3
1.00–0.80	0.0
0.79–0.57	0.1
0.56–0.40	0.2
0.39–0.28	0.3
≤ 0.27	0.4

Fatigue Correction Factor c_6

Table 6.2

Operation conditions	Fatigue correction factor c_6
Usage of tension or guide idlers	0.2
Only infrequent or occasional operation	– 0.2

Teeth in Mesh Factor c_1

Table 7

Quantity of teeth that engage into the small pulley z_e	Tooth engagement factor c_1
6 or more	1.00
5	0.80
4	0.60
3	0.40
2	0.20

Width Factor c_4

Table 8

Width designation	Belt width [mm]	Width factor c_4
012	**3.2**	**0.06**
019	**4.8**	**0.12**
025	**6.4**	**0.18**
031	**7.9**	**0.24**
037	**9.5**	**0.30**
043	**11.1**	**0.36**
050	**12.7**	**0.42**
062	**15.9**	**0.57**
075	**19.1**	**0.71**
087	**22.2**	**0.86**
100	**25.4**	**1.00**
125	**31.8**	**1.29**
150	**38.1**	**1.58**
175	**44.5**	**1.84**
200	**50.8**	**2.14**
250	**63.5**	**2.72**
300	**76.2**	**3.36**
350	**88.9**	**4.06**
400	**101.6**	**4.76**
500	**127.0**	**6.15**
600	**152.0**	**7.50**
700	**178.0**	**8.89**
800	**203.0**	**10.32**
900	**229.0**	**11.70**
1000	**254.0**	**13.10**
1100	**279.0**	**14.41**
1200	**305.0**	**15.84**
1300	**330.0**	**17.16**
1400	**356.0**	**18.62**

Please also consult software:
Optibelt CAP Drive Calculation and data
Optibelt CAD 2D / 3D
online at: www.optibelt.com

Drive Design

Guidelines for Selecting the Timing Belt Section

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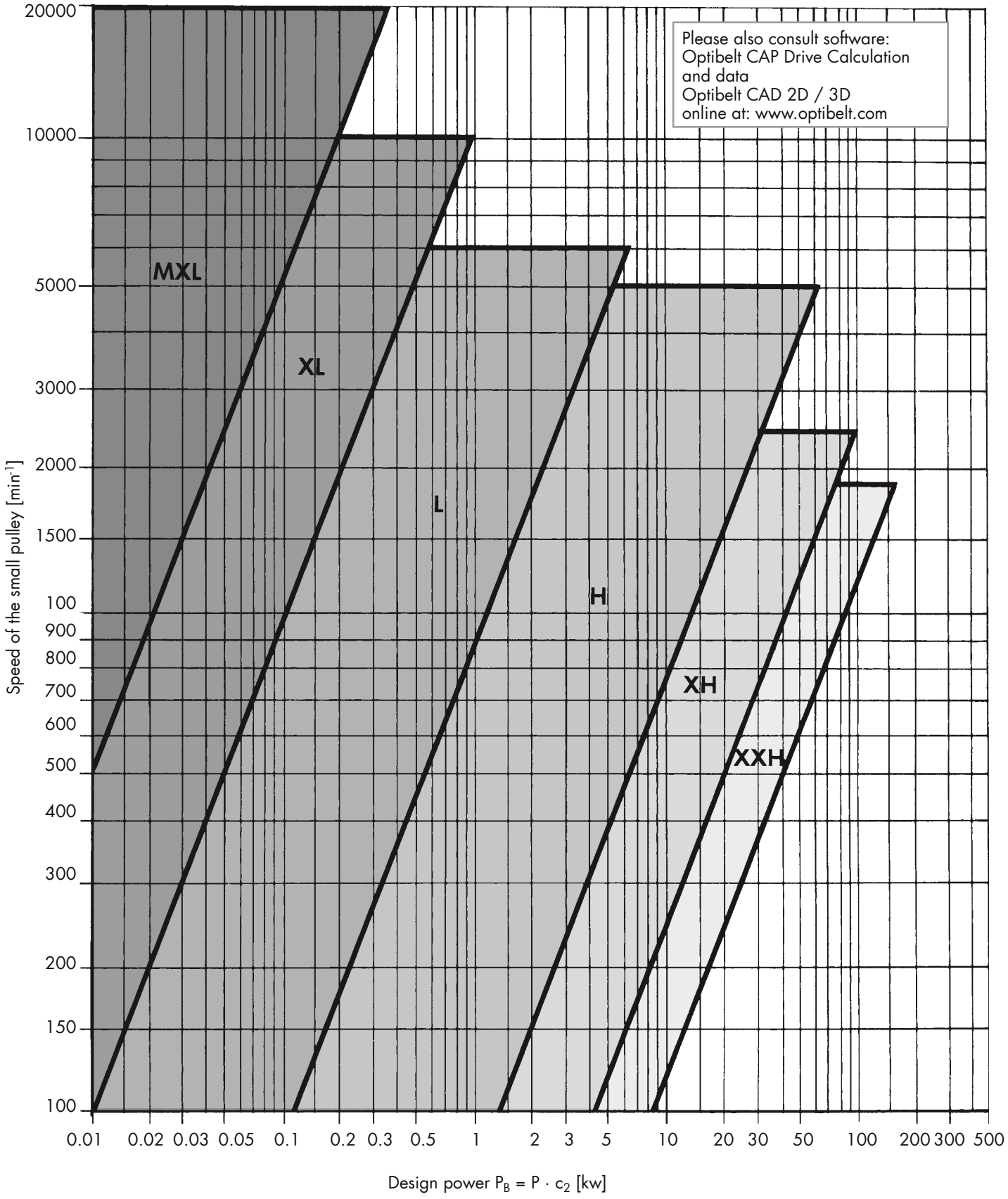
Power Transmission

Diagram 1



Drive Design

Formulae and Drive Design Examples

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Power Transmission

Prime Mover

Three-phase squirrel cage motor
with star delta start
P = 16 kW
n_1 = 2940 min^{-1}
Start-up torque: $M_A = 0.6\ M_N$

Operating Conditions

Start-up with no load
Drive centre distance: as required
between 600 and 630 mm
Toothed timing pulley diameter:
free selection
Operating conditions: normal
Daily operating time: 16 hours
Quantity of daily switches:
approximately 30-40

Driven Machine

Conveying system (light goods)
P = 16 kW
n_2 = 700 min^{-1}

Please also consult software:
Optibelt CAP Drive Calculation
and data
Optibelt CAD 2D / 3D
online at: www.optibelt.com

Formulae

Total service factor

$c_2 = c_0 + c_3 + c_6$

c_0 from table 5 page 14

c_3 from table 6.1 page 15

c_6 from table 6.2 page 15

Design power

$P_B = P \cdot c_2$

Section of timing belt selected

from diagram 1 page 16

Speed ratio

$$i = \frac{n_1}{n_2} = \frac{z_2}{z_1} = \frac{d_{w2}}{d_{w1}}$$

Number of teeth, pitch diameter

For standard pulley range see pages 42 to 55

z_1 see standard pulley range for cylindrical bore and taper bush

$z_2 = z_1 \cdot i$

$d_{w2} = d_{w1} \cdot i$

Observe minimum timing pulley diameters

Calculation Example

$c_2 = 1.4 + 0 + 0 =$ **1.4**

$c_0 = 1.4$

$c_3 = 0$

$c_6 = 0$

$P_B = 16 \cdot 1.4 =$ **22.4 kW**

Type H

$$i = \frac{2940\ min^{-1}}{700\ min^{-1}} =$$ **4.2**

z_1 = **20** d_{w1} = **80.85 mm**

$z_2 = 20 \cdot 4.2 =$ **84**

$d_{w2} = 80.85\ mm \cdot 4.2 =$ **339.57 mm**

Drive Design

Formulae and Drive Design Examples

optibelt Power Transmission

Formulae

Drive centre distance (provisional selection)

Recommendation: $a > 0.5 \cdot (d_{wg} + d_{wk}) + 15$ mm

$a < 2 \cdot (d_{wg} + d_{wk})$

Pitch length of the timing belt

$$L_{wth} = 2\,a + \frac{\pi}{2}(d_{wg} + d_{wk}) + \frac{(d_{wg} - d_{wk})^2}{4\,a}$$

L_{wth} see standard range pages 10 to 12

Drive centre distance from L_{wSt}

$$a_{nom} = K + \sqrt{K^2 - \frac{(d_{wg} - d_{wk})^2}{8}}$$

$$K = \frac{L_{wst}}{4} - \frac{\pi}{8}(d_{wg} + d_{wk})$$

Minimum adjustment range for belt tensioning

$x \geq 0.004 \cdot a_{nom}$

Minimum adjustment range for non-restrained fit

y = from table 22 page 34

Calculation Example

$a > 0.5 \cdot (339.57 \text{ mm} + 80.85 \text{ mm}) + 15 \text{ mm} = 225.21 \text{ mm}$

$a < 2 \cdot (339.57 \text{ mm} + 80.85 \text{ mm}) = 840.84 \text{ mm}$

$a =$ **620 mm** provisionally selected

$$L_{wth} = 2 \cdot 620 \text{ mm} + \frac{\pi}{2}(339.57 \text{ mm} + 80.85 \text{ mm}) + \frac{(339.57 \text{ mm} - 80.85 \text{ mm})^2}{4 \cdot 620}$$

$L_{wth} =$ **1927.05 mm**

nearest standard timing belt length selected from page 12

$L_{wSt} =$ **1905 mm** **Length code and section: 750 H**

$$a_{nom} = 311.15 \text{ mm} + \sqrt{(311.15 \text{ mm})^2 - \frac{(339.57 \text{ mm} - 80.85 \text{ mm})^2}{8}}$$

$a_{nom} =$ **608.5 mm**

$$K = \frac{1905 \text{ mm}}{4} - \frac{\pi}{8}(339.57 \text{ mm} + 80.85 \text{ mm})$$

$K = 311.15$ mm

$x \geq 0.004 \cdot 608.5$ mm

$x \geq$ **2.4 mm**

$y \geq$ **17 mm**

Drive Design

Formulae and Drive Design Examples

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Power Transmission

Formulae

Number of teeth in mesh on the small pulley

$$z_e = \frac{z_k}{6}\left(3 - \frac{(d_{wg} - d_{wk})}{a_{nom}}\right)$$

z_e rounded off

Teeth in mesh factor

c_1 from table 7 page 15

Belt width calculation using the width factor

$$c_4 = \frac{P_B}{P_N \cdot c_1}$$

P_N from table 16 page 28 linearly interpolated

Calculation Example

$$z_e = \frac{20}{6}\left(3 - \frac{(339.57\ \text{mm} - 80.85\ \text{mm})}{608.5\ \text{mm}}\right) = \mathbf{8.58}$$

$z_e = \mathbf{8}$

$c_1 = \mathbf{1}$ $z_e \geq \mathbf{6}$

$$c_4 = \frac{22.4\ \text{kW}}{7.49\ \text{kW} \cdot 1} = \mathbf{3.0}$$

From table 8 page 15 the nearest width factor above the calculated value c_4 = 3.36 gives a belt width of **76.2** mm (width designation **300**).

Design summary:

1 Optibelt ZR Timing Belt	**750 H 300**
1 Optibelt ZRS Timing Belt Pulley	**20 H 300**
1 Optibelt ZRS Timing Belt Pulley	**84 H 300**

Ordering Examples

Timing Belt Designation
The article description consists of:

Length code
Section
Width code

Example: Optibelt ZR Timing Belts 750 H 300
750 75.0 inches ≙ 1905 mm pitch length
H type H, tooth pitch t = 12.7 mm
300 3.00 inches ≙ 76.2 mm belt width

Optibelt ZR D Double Section Timing Belts 270 DL 075
270 27.0 inches ≙ 685.80 mm pitch length
D double section timing belts
L type L, tooth pitch t = 9.525 mm
075 0.75 inches ≙ 19.1 mm belt width

Timing Pulley Designation
The article description consists of:

Number of teeth
Section
Width code

Example: Optibelt ZRS 20 H 300
20 number of teeth
(d_1 = 80.85 mm, d_a = 79.48 mm)
H type H, tooth pitch t = 12.7 mm
300 pulley width for timing belts with a belt width of ≙ 76.2 mm

Drive Design

Belt Tension/Minimum Allowance for Adjustment x/y

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Power Transmission

Tension for Optibelt ZR Timing Belts

The correct belt tension is of crucial importance for trouble free transmission of power, and for the achievement of an acceptable belt service life. Often tension which is too high or too low results in premature belt failure. A belt which is overtensioned can cause bearing failure to the drive or work machine.

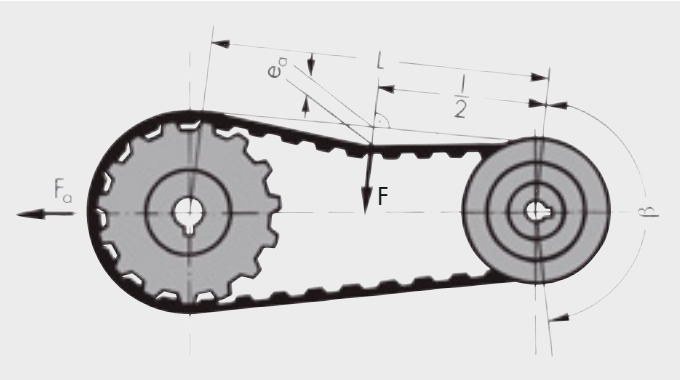
It has been shown that the more common tension instructions – e.g. using the "thumb pressure deflection method" – do not result in a tension level which allows the drive to operate at maximum efficiency. It is therefore recommended that the required static belt tension be calculated individually for each drive using the following Optibelt formulae.

Their extremely low-stretch properties mean that once they have been fitted the Optibelt ZR Timing Belts require no further retensioning.

Formula symbols

F	=	Test load	[N]
S_{n3}	=	Effective circumferential load to be transferred	[N]
e_a	=	Belt deflection for a given span length	[mm]
l	=	Drive span length	[mm]

Apply the load f in the centre of , and at a right angles to, the span as shown in the diagram below. Calculate Ea - the belt deflection for a given span length - and check the deflection acheived against this figure. Adjust the tension if necessary.



1. Calculation of the test load F

$$F = \frac{S_{n3}}{20}$$

$$S_{n3} = \frac{P \cdot 1000}{v}$$

$$F = \frac{1286\ N}{20} = \mathbf{64.3\ N}$$

$$S_{n3} = \frac{16\ kW \cdot 1000}{12.44} = 1286\ N$$

2. Calculation of the belt deflection for a span length e_a for the given drive span length l

$$e_a = \frac{l}{50}$$

$$l = \sqrt{a_{nom}^2 - \left(\frac{d_{wg} - d_{wk}}{2}\right)^2}$$

$$E_a = \frac{594.6\ mm}{50} = \mathbf{11.9\ mm}$$

$$l = \sqrt{(608.5\ mm)^2 - \left(\frac{339.57\ mm - 80.85\ mm}{2}\right)^2} = 594.6\ mm$$

3. Calculation of the minimum static shaft load.

$$S_a = S_{n3} \cdot 1.1$$

$$F_a = \mathbf{1415\ N}$$

4. Frequency calculation for the measurement with the Optibelt Frequency Tension Tester

$$f = \sqrt{\frac{T}{4 \cdot k \cdot l^2}}$$

$$f = \sqrt{\frac{707.5\ N}{4 \cdot 0.312\ \frac{kg}{m} \cdot (0.595\ m)^2}} = \mathbf{40\ Hz}$$

T = 0.5 · F_a
k Meter weight in kg/m – please see page 7
l Span length in m

T = 0.5 · 1415 N = 707.5 N
k = 0.0041 $\frac{kg}{m \cdot mm}$ · 76.2 mm = 0.312 $\frac{kg}{m}$
l ≈ 0.595 m

Length Tolerance

Table 9

Pitch length [mm]	≥ 91,44 ≤ 254	≥ 255 ≤ 381	≥ 382 ≤ 508	≥ 509 ≤ 762	≥ 763 ≤ 1016	≥ 1017 ≤ 1270	≥ 1271 ≤ 1524	≥ 1525 ≤ 1778
Belt length tolerance as centre distance deviation	± 0.20	± 0.23	± 0.25	± 0.30	± 0.33	± 0.38	± 0.41	± 0.43

For each additional 254 mm add 0.0254 mm.

Drive Calculation

optibelt CAP

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Power Transmission

The drive is to be fitted with:

– Optibelt ZR Timing Belt 750 H 300

– Optibelt ZRS Timing Pulley 20 H 300 (cylindrical bore)
– Optibelt ZRS Timing Pulley 84 H 300 (cylindrical bore)

Please also consult software:
Optibelt CAP Drive Calculation
and data
Optibelt CAD 2D / 3D
online at: www.optibelt.com

Drive machine	**Electric motor P = 18.5 kW**			
Work machine	**Textile machine**			
Timing Belt Data				Deviations/Information
Pitch	t:	12.70	mm	
Width	b:	76.20	mm	
Calculated effective length	L_{wth}:	1905.00	mm	
Standard effective length	L_w:	1905.00	mm	
Quantity of teeth	z_r:	150		
Speed (velocity)	v:	12.44	m/s	

Timing Pulley Data		Pulley 1 (driving)		Pulley 2 (driven)	
Quantity of teeth	**z:**	**20**		**84**	
Effective diameter	d_w:	80.85	mm	339.57	mm
Face width	b_1:	84.00	mm	86.00	mm
Speed	**n:**	**2940.0**	**1/min**	**700.0**	**1/min**
Engaged tooth quantity	z_e:	8		47	
Torque	M:	82	Nm	343	Nm
Standard design		6F		11A	
Flanged pulley quantity		2		0	
Materials		St		GG	

Realised Drive Data				Deviations/Information	
Calculated power	**P_B:**	**22.40**	**kW**		
Realised actual power	$P_{\ddot{U}}$:	25.15	kW		
Effective stress factor	**c_2:**	**1.57**			
Effective transmission	i:	4.20		0.0	%
Effective centre distance	**a:**	**608.55**	**mm**	**-6.45**	**mm**
Minimum adjustment range – fit	y:	≥ 17.00	mm		
Minimum adjustment range – tension	x:	≥ 2.43	mm		
Effective circumferential load	S_{n3}:	1286	N		
Static shaft load	S_a:	1414	N		
Static span load	T:	707	N		
Span length	l:	594.50	mm		

Tension Setting Methods			
Belt deflection per span	e_a:	11.9	mm at a test load of F: 64.30 N
Optibelt TT 3 Frequency Tension Tester	f:	40	1/s

Performance Data

optibelt *ZR* Section MXL

Power rating P_N [W] using a belt width of 1" ≙ 25.4 mm

optibelt Power Transmission

Table 10

Number of teeth on small pulley	10 MXL	12 MXL	14 MXL	15 MXL	16 MXL	18 MXL	20 MXL	22 MXL	24 MXL	28 MXL
Pitch diameter [mm]	6.47	7.76	9.06	9.70	10.35	11.64	12.94	14.23	15.52	18.11
Speed of small pulley [rpm]										
10	0.62	0.62	0.74	0.87	0.87	0.99	1.12	1.24	1.36	1.61
40	2.23	2.73	3.10	3.35	3.60	4.09	4.46	4.96	5.33	6.32
60	3.35	4.09	4.71	5.08	5.33	6.08	6.70	7.44	8.06	9.42
100	5.58	6.70	7.81	8.43	8.93	10.04	11.16	12.28	13.39	15.75
200	11.16	13.39	15.75	16.86	17.98	20.21	22.44	24.68	26.91	31.37
400	14.64	26.91	31.37	33.60	35.84	40.30	44.89	49.35	53.82	62.74
600	33.60	40.30	47.12	50.47	54.93	60.51	67.21	74.03	80.72	94.12
800	44.89	53.82	62.74	67.33	71.67	80.72	89.65	98.58	107.63	125.49
1,000	56.05	67.21	78.49	84.07	89.65	100.81	112.10	123.26	134.54	156.86
1,200	67.21	80.72	94.24	100.94	107.63	121.02	134.54	147.93	161.45	188.23
1,400	78.49	94.12	109.86	117.30	125.49	141.24	156.86	172.61	188.23	219.73
1,600	89.65	107.63	125.24	135.16	143.47	161.45	142.10	197.28	215.14	251.10
1,800	100.81	121.02	141.36	151.28	161.45	181.54	201.75	221.96	242.05	282.47
2,000	112.10	134.54	157.48	168.64	179.30	201.75	224.19	246.51	268.96	313.84
2,400	134.54	161.45	188.48	202.12	215.14	242.05	268.96	295.86	322.77	376.59
2,800	156.86	188.23	219.48	235.60	251.10	282.47	313.84	345.22	376.59	439.33
3,200	179.30	215.14	251.72	269.08	286.94	322.77	358.61	394.44	430.40	502.08
3,600	201.75	242.05	282.72	302.56	322.77	363.07	403.50	443.80	484.22	564.82
4,000	224.19	268.96	313.72	336.04	358.61	403.50	448.26	493.15	537.91	627.56
5,000	280.24	336.29	391.84	420.36	448.26	504.31	560.36	616.40	672.45	784.55
6,000	336.29	403.50	471.20	504.68	537.91	605.24	672.45	739.66	806.99	941.41
8,000	448.26	537.91	627.44	673.32	729.74	806.99	896.64	986.30	1075.95	1255.25
10,000	560.36	672.45	784.92	840.72	896.64	1008.74	1120.71	1232.81	1344.90	1569.10
12,000	672.45	806.99	942.40	1009.36	1075.95	1210.36	1344.90	1479.44	1613.86	1882.82
14,000	784.55	941.41	1098.64	1176.76	1255.25	1412.11	1569.10	1725.96	1882.82	2196.66

Please observe the factors and transmission correction factors found on pages 14 and 15.

Performance Data

optibelt *ZR* Section MXL

Power rating P_N [W] using a belt width of 1" ≙ 25.4 mm

optibelt Power Transmission

Table 11

30 MXL	32 MXL	36 MXL	40 MXL	42 MXL	48 MXL	60 MXL	72 MXL	80 MXL	Number of teeth on small pulley
19.40	20.70	23.29	25.87	27.17	31.05	38.81	46.57	51.74	Pitch diameter [mm]
1.74	1.74	1.98	2.23	2.36	2.73	3.35	4.09	4.46	10
6.70	7.19	8.06	8.93	9.42	10.79	13.39	16.12	17.98	40
10.04	10.79	12.15	13.39	14.14	16.12	20.21	24.18	26.91	60
16.86	17.98	20.21	22.44	23.56	26.91	33.60	40.30	44.89	100
33.60	35.84	40.30	44.89	47.12	53.82	67.21	80.72	89.65	200
67.21	71.67	80.72	89.65	94.12	107.63	134.54	161.45	179.30	400
100.81	107.63	121.02	134.54	141.24	161.45	201.75	242.05	268.96	600
134.54	143.47	161.45	179.30	188.23	215.14	268.96	322.77	358.61	800
168.14	179.30	201.75	224.19	235.35	268.96	336.29	403.50	448.26	1,000
201.75	215.14	242.05	268.96	282.47	322.77	403.50	484.22	537.91	1,200
235.35	251.10	282.47	313.84	329.47	376.59	470.70	564.82	627.56	1,400
268.96	286.94	322.77	358.61	376.59	430.40	537.91	645.54	717.34	1,600
302.56	322.77	363.07	403.50	423.58	484.22	605.24	726.27	806.99	1,800
336.29	358.61	403.50	448.26	470.70	537.91	672.45	806.99	896.64	2,000
403.50	430.40	484.22	537.91	564.82	645.54	806.99	968.32	1075.95	2,400
470.70	502.08	564.82	621.98	659.06	753.18	941.41	1129.76	1255.25	2,800
537.91	573.87	645.54	717.34	753.18	860.68	1075.95	1291.09	1434.56	3,200
605.24	645.54	726.27	806.99	847.29	968.32	1210.36	1452.54	1613.86	3,600
672.45	717.34	806.99	896.64	941.41	1075.95	1344.90	1613.86	1793.16	4,000
840.60	896.64	1008.74	1120.71	1176.76	1344.90	1681.19	2017.36	2241.55	5,000
1008.74	1075.95	1210.36	1344.90	1412.11	1613.86	2017.36	2420.85	2689.81	6,000
1344.90	1434.56	1613.86	1793.16	1882.82	2151.90	2689.81	3227.72	3586.45	8,000
1681.19	1793.16	2017.36	2241.55	2353.64	2689.81	3362.26	4034.71	4482.97	10,000
2017.36	2151.90	2420.85	2689.81	2824.35	3227.72	4034.71	4841.70	5379.62	12,000
2353.64	2510.50	2824.35	3138.07	3295.05	3765.76	4707.16	5648.57	6276.26	14,000

Speed of small pulley [rpm]

Please observe the factors and transmission correction factors found on pages 14 and 15.

Performance Data

optibelt *ZR* Section XL

Power rating P_N [kW] using a belt width of 1" ≙ 25.4 mm

optibelt Power Transmission

Table 12

Speed of small pulley [rpm]	Number of teeth on small pulley	10 XL	11 XL	12 XL	13 XL	14 XL	15 XL	16 XL	17 XL	18 XL	19 XL	20 XL
	Pitch diameter [mm]	16.17	17.79	19.40	21.02	22.64	24.26	25.87	27.49	29.11	30.72	32.34
	100	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03
	200	0.03	0.03	0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.06	0.06
	300	0.04	0.05	0.05	0.06	0.07	0.07	0.07	0.08	0.08	0.09	0.09
	400	0.06	0.07	0.07	0.08	0.08	0.09	0.10	0.10	0.10	0.11	0.12
	500	0.07	0.08	0.09	0.10	0.10	0.11	0.12	0.13	0.13	0.14	0.15
	600	0.09	0.10	0.10	0.12	0.13	0.13	0.14	0.15	0.16	017	0.18
	700	0.10	0.11	0.13	0.14	0.15	0.16	0.17	0.18	0.19	020	0.21
	800	0.12	0.13	0.14	0.16	0.17	0.18	0.19	0.21	0.22	0.24	0.25
	900	0.13	0.15	0.16	0.18	0.19	0.20	0.22	0.24	0.25	0.27	0.28
	1,000	0.15	0.16	0.18	0.20	0.22	0.23	0.25	0.27	0.28	0.30	0.31
	1,100	0.16	0.19	0.19	0.21	0.23	0.25	0.27	0.29	0.30	0.32	0.34
	1,200	0.18	0.20	0.22	0.24	0.25	0.28	0.29	0.31	0.33	0.35	0.37
	1,300	0.19	0.22	0.23	0.26	0.28	0.30	0.31	0.34	0.36	0.38	0.40
	1,400	0.21	0.23	0.25	0.28	0.30	0.32	0.34	0.37	0.39	041	0.43
	1,500	0.22	0.25	0.27	0.30	0.32	0.34	0.37	0.39	0.41	044	0.46
	1,600	0.25	0.27	0.30	0.32	0.34	0.37	0.40	0.42	0.44	0.46	0.48
	1,800	0.28	0.30	0.33	0.36	0.38	0.41	0.44	0.47	0.49	0.52	0.55
	2,000	0.31	0.34	0.37	0.40	0.43	0.46	0.48	0.52	0.55	0.58	0.61
	2,200	0.34	0.37	0.40	0.44	0.47	0.51	0.54	0.57	0.60	0.64	0.67
	2,400	0.37	0.40	0.44	0.48	0.51	0.55	0.59	0.63	0.66	0.70	0.73
	2,600	0.40	0.43	0.48	0.52	0.55	0.60	0.63	0.68	0.72	0.76	0.79
	2,800	0.43	0.47	0.51	0.56	0.60	0.64	0.69	0.73	0.77	0.82	0.86
	3,000	0.46	0.50	0.55	0.60	0.64	0.69	0.73	0.78	0.82	0.87	0.92
	3,200	0.48	0.54	0.59	0.64	0.68	0.73	0.78	0.83	0.88	0.93	0.97
	3,400	0.51	0.57	0.62	0.67	0 72	0.78	0.83	0.88	0.93	0.98	1.03
	3,600	0.55	0.60	0.66	0.72	0.77	0.82	0.88	0.93	0.98	1.04	1.09
	3,800	0.58	0.62	0.69	0.75	0.81	0.87	0.93	0.99	1.04	1.10	1.15
	4,000	0.61	0.67	0.73	0.80	0.86	0.92	0.97	1.03	1.09	1.16	1.22
	4,200	0.64	0.70	0.77	0.84	0.90	0.95	1.02	1.08	1.14	1.21	1.28
	4,400	0.67	0.74	0.81	0.87	0.93	1.00	1.07	1.14	1.20	1.27	1.33
	4,600	0.70	0.77	0.84	0.91	0.98	1.04	1.12	1.19	1.25	1 32	1.39
	4,800	0.73	0.80	0.88	0.95	1.02	1.09	1.16	1.24	1.31	1 38	1.45
	5,000	0.76	0.84	0.92	0.99	1.06	1.13	1.22	1.29	1.36	1.43	1.50
	5,500	0.86	0.93	1.01	1.09	1.18	1.25	1.33	1.41	1.49	1.57	1.64
	6,000	0.93	1.01	1.10	1.19	1.29	1.36	1.45	1.53	1.61	1.70	1.78
	6,500	1.01	1.10	1.20	1.29	1.38	1.46	1.56	1.66	1.75	1.84	1.92
	7,000	1.08	1.18	1.29	1.39	1.49	1.57	1.67	1.77	1.86	1.96	2.05
	7,500	1.16	1.27	1.37	1.47	1.58	1.68	1.78	1.88	1.98	2.08	2.18
	8,000	1.23	1.34	1.46	1.57	1.68	1.78	1 88	1.98	2.10	2.21	2.31
	8,500	1.30	1.42	1.54	1.65	1.77	1.88	2.00	2.10	2.22	2.33	2.43
	9,000	1.37	1.50	1.63	1.75	1.87	1.98	2.10	2.21	2.33	2.44	2.54
	9,500	1.44	1.57	1.71	1.83	1.96	2.08	2.20	2.32	2.45	2.56	2.66
	10,000	1.52	1.65	1.79	1.92	2.05	2.18	2.30	2.42	2.54	2.66	2.77

The use of these pulley/speed combinations will lead to a reduction in the service life of the belts.

Please observe the factors and transmission correction factors found on pages 14 and 15.

Performance Data

optibelt *ZR* Section XL

Power rating P_N [kW] using a belt width of 1" ≙ 25.4 mm

optibelt Power Transmission

Table 13

21 XL	22 XL	23 XL	24 XL	25 XL	26 XL	27 XL	28 XL	29 XL	30 XL	Number of teeth on small pulley
33.96	35.57	37.19	38.81	40.43	42.04	43.67	45.28	46.89	48.51	Pitch diameter [mm]
0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	100
0.06	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.09	0.09	200
0.10	0.10	0.10	0.10	0.11	0.12	0.13	0.13	0.13	0.13	300
0.13	0.13	0.14	0.14	0.15	0.16	0.17	0.17	0.18	0.18	400
0.16	0.16	0.17	0.18	0.19	0.20	0.21	0.22	0.22	0.22	500
0.19	0.20	0.21	0.22	0.23	0.24	0.25	0.25	0.27	0.28	600
0.22	0.23	0.24	0.25	0.27	0.28	0.29	0.30	0.31	0.32	700
0.25	0.27	0.29	0.30	0.31	0.32	0.33	0.34	0.36	0.37	800
0.29	0.30	0.32	0.33	0.35	0.36	0.37	0.38	0.40	0.41	900
0.32	0.34	0.36	0.37	0.39	0.40	0.42	0.43	0.45	0.46	1,000
0.35	0.37	0.39	0.40	0.42	0.44	0.46	0.47	0.49	0.51	1,100
0.39	0.40	0.42	0.44	0.46	0.48	0.50	0.51	0.53	0.55	1,200
0.42	0.43	0.46	0.48	0.50	0.52	0.54	0.55	0.58	0.60	1,300
0.45	0.47	0.49	0.51	0.54	0.56	0.58	0.60	0.62	0.64	1,400
0.48	0.50	0.53	0.55	0.58	0.60	0.62	0.64	0.67	0.69	1,500
0.51	0.54	0.57	0.59	0.62	0.64	0.66	0.68	0.71	0.73	1,600
0.57	0.60	0.63	0.66	0.69	0.71	0.74	0.77	0.80	0.82	1,800
0.64	0.67	0.70	0.73	0.77	0.80	0.83	0.86	0.89	0.92	2,000
0.70	0.74	0.78	0.81	0.84	0.87	0.90	0.93	0.97	1.00	2,200
0.77	0.80	0.84	0.88	0.92	0.95	0.99	1.02	1.06	1.09	2,400
0.84	0.87	0.90	0.93	0.98	1.02	1.06	1.10	1.14	1.18	2,600
0.90	0.94	0.98	1.02	1.07	1.11	1.15	1.19	1.24	1.28	2,800
0.95	1.00	1.05	1.09	1.14	1.19	1.24	1.28	1.32	1.36	3,000
1.02	1.07	1.12	1.16	1.21	1.26	1.31	1.35	1.40	1.45	3,200
1.08	1.13	1.19	1.24	1.29	1.34	1.39	1.43	1.48	1.53	3,400
1.15	1.20	1.26	1.31	1.36	1.41	1.46	1.51	1.56	1.61	3,600
1.21	1.27	1.32	1.37	1.43	1.48	1.54	1.59	1.64	1.69	3,800
1.29	1.33	1.39	1.45	1.51	1.56	1.62	1.67	1.73	1.78	4,000
1.33	1.39	1.45	1.51	1.57	1.63	1.69	1.75	1.81	1.86	4,200
1.39	1.45	1.52	1.58	1.65	1.71	1.77	1.83	1.89	1.95	4,400
1.45	1.52	1.59	1.65	1.72	1.78	1.84	1.90	1.96	2.02	4,600
1.51	1.59	1.66	1.72	1.79	1.85	1.92	1.98	2.04	2.10	4,800
1.57	1.64	1.71	1.78	1.85	1.92	1.99	2.05	2.12	2.18	5,000
1.72	1.80	1.88	1.95	2.02	2.09	2.16	2.23	2.30	2.37	5,500
1.86	1.95	2.03	2.10	2.18	2.26	2.34	2.41	2.48	2.54	6,000
2.01	2.09	2.18	2.26	2.34	2.41	2.48	2.55	2.64	2.72	6,500
2.14	2.23	2.32	2.41	2.49	2.57	2.65	2.72	2.79	2.86	7,000
2.28	2.37	2.46	2.54	2.62	2.70	2.78	2.86	2.94	3.01	7,500
2.41	2.49	2.59	2.68	2.76	2.84	2.92	3.00	3.07	3.14	8,000
2.53	2.63	2.72	2.80	2.89	2.97	3.05	3.13	3.20	3.26	8,500
2.65	2.75	2.84	2.92	3.00	3.08	3.16	3.24	3.30	3.36	9,000
2.76	2.86	2.95	3.04	3.12	3.19	3.26	3.33	3.39	3.45	9,500
2.86	2.96	3.05	3.14	3.21	3.28	3.35	3.42	3.47	3.52	10,000

Speed of small pulley [rpm]

Please observe the factors and transmission correction factors found on pages 14 and 15.

Performance Data

optibelt *ZR* Section L

Power rating P_N [kW] using a belt width of 1" ≙ 25.4 mm

optibelt
Power Transmission

Table 14

Speed of small pulley [rpm]	Number of teeth on small pulley	10 L	11 L	12 L	13 L	14 L	15 L	16 L	17 L	18 L	19 L	20 L	21 L	22 L	23 L	24 L	25 L	26 L	27 L	28 L	29 L
	Pitch diameter [mm]	30.32	33.35	36.38	39.41	42.45	45.48	48.51	51.54	54.57	57.61	60.64	63.67	66.70	69.73	72.77	75.80	78.83	81.86	84.89	87.93
	100	0.04	0.04	0.04	0.05	0.05	0.06	0.06	0.07	0.07	0.07	0.07	0.08	0.09	0.10	0.10	0.10	0.10	0.11	0.11	0.12
	200	0.07	0.09	0.10	0.10	0.11	0.12	0.13	0.13	0.14	0.15	0.16	0.16	0.17	0.18	0.19	0.20	0.20	0.21	0.22	0.23
	300	0.12	0.13	0.14	0.15	0.16	0.17	0.19	0.20	0.21	0.22	0.23	0.25	0.25	0.27	0.28	0.30	0.31	0.32	0.33	0.34
	400	0.16	0.18	0.19	0.20	0.22	0.23	0.25	0.26	0.28	0.30	0.31	0.33	0.34	0.36	0.37	0.39	0.40	0.42	0.43	0.45
	500	0.19	0.21	0.23	0.25	0.28	0.29	0.31	0.33	0.35	0.37	0.39	0.41	0.43	0.45	0.47	0.49	0.51	0.53	0.54	0.56
	600	0.23	0.26	0.28	0.31	0.33	0.35	0.37	0.40	0.42	0.44	0.47	0.49	0.51	0.54	0.56	0.58	0.60	0.63	0.65	0.68
	700	0.28	0.31	0.33	0.35	0.38	0.41	0.43	0.46	0.49	0.51	0.54	0.57	0.60	0.63	0.65	0.68	0.71	0.74	0.76	0.79
	800	0.31	0.34	0.37	0.40	0.43	0.46	0.50	0.53	0.56	0.59	0.62	0.65	0.69	0.72	0.75	0.78	0.81	0.84	0.87	0.90
	900	0.35	0.39	0.42	0.46	0.49	0.52	0.56	0.60	0.63	0.66	0.70	0.73	0.77	0.81	0.84	0.87	0.90	0.94	0.97	1.01
	1,000	0.39	0.43	0.46	0.51	0.54	0.58	0.62	0.66	0.70	0.74	0.78	0.81	0.85	0.89	0.93	0.97	1.00	1.04	1.08	1.12
	1,100	0.43	0.47	0.51	0.56	0.60	0.64	0.69	0.72	0.77	0.81	0.85	0.90	0.93	0.97	1.01	1.06	1.10	1.15	1.19	1.23
	1,200	0.47	0.52	0.56	0.60	0.66	0.70	0.75	0.79	0.84	0.88	0.93	0.97	1.01	1.06	1.11	1.16	1.20	1.25	1.29	1.34
	1,300	0.51	0.56	0.60	0.66	0.71	0.75	0.81	0.86	0.90	0.95	1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35	1.40	1.45
	1,400	0.54	0.60	0.65	0.71	0.76	0.81	0.87	0.92	0.97	1.03	1.08	1.13	1.19	1.24	1.29	1.35	1.40	1.45	1.50	1.55
	1,500	0.58	0.64	0.70	0.76	0.81	0.87	0.93	0.98	1.04	1.10	1.16	1.21	1.27	1.33	1.38	1.44	1.49	1.55	1.60	1.66
	1,600	0.62	0.69	0.75	0.81	0.87	0.93	0.98	1.05	1.11	1.17	1.23	1.29	1.35	1.41	1.47	1.53	1.59	1.65	1.70	1.76
	1,700	0.66	0.73	0.79	0.86	0.92	0.98	1.05	1.11	1.18	1.24	1.31	1.37	1.43	1.50	1.56	1.63	1.69	1.75	1.81	1.87
	1,800	0.70	0.77	0.84	0.90	0.97	1.04	1.11	1.18	1.25	1.31	1.38	1.45	1.51	1.58	1.65	1.72	1.78	1.85	1.91	1.98
	1,900	0.74	0.81	0.88	0.95	1.03	1.10	1.17	1.24	1.31	1.38	1.45	1.52	1.60	1.68	1.73	1.80	1.87	1.94	2.01	2.08
	2,000	0.77	0.86	0.93	1.01	1.08	1.16	1.23	1.31	1.38	1.45	1.53	1.60	1.68	1.75	1.82	1.89	1.96	2.03	2.10	2.18
	2,200	0.86	0.94	1.01	1.10	1.19	1.27	1.35	1.43	1.51	1.60	1.68	1.75	1.84	1.92	1.99	2.07	2.15	2.23	2.30	2.38
	2,400	0.93	1.01	1.11	1.20	1.29	1.38	1.47	1.56	1.65	1.73	1.82	1.91	1.99	2.08	2.16	2.25	2.33	2.41	2.49	2.58
	2,500	0.97	1.06	1.16	1.25	1.34	1.43	1.53	1.62	1.72	1.81	1.89	1.98	2.07	2.16	2.25	2.34	2.42	2.51	2.59	2.67
	2,600	1.00	1.11	1.20	1.30	1.40	1.49	1.59	1.69	1.78	1.87	1.96	2.06	2.15	2.24	2.33	2.42	2.51	2.60	2.68	2.76
	2,800	1.08	1.18	1.29	1.40	1.50	1.60	1.71	1.81	1.91	2.01	2.10	2.21	2.31	2.40	2.49	2.59	2.68	2.77	2.86	2.95
	3,000	1.17	1.28	1.38	1.49	1.60	1.71	1.82	1.93	2.04	2.14	2.25	2.35	2.45	2.55	2.65	2.75	2.84	2.94	3.03	3.12
	3,200	1.24	1.36	1.47	1.59	1.70	1.82	1.94	2.04	2.16	2.27	2.38	2.49	2.60	2.70	2.80	2.91	3.01	3.11	3.20	3.30
	3,400	1.31	1.44	1.56	1.69	1.81	1.92	2.05	2.17	2.29	2.40	2.51	2.63	2.74	2.85	2.96	3.06	3.16	3.26	3.36	3.46
	3,600	1.39	1.52	1.65	1.77	1.90	2.04	2.16	2.29	2.41	2.53	2.65	2.77	2.88	2.99	3.10	3.21	3.32	3.42	3.52	3.52
	3,800	1.46	1.60	1.73	1.87	2.01	2.13	2.26	2.40	2.54	2.66	2.78	2.90	3.02	3.14	3.25	3.36	3.46	3.56	3.66	3.76
	4,000	1.53	1.67	1.81	1.96	2.11	2.24	2.39	2.51	2.66	2.78	2.90	3.03	3.16	3.28	3.39	3.50	3.60	3.70	3.80	3.89
	4,200	1.61	1.75	1.90	2.05	2.21	2.35	2.49	2.63	2.78	2.89	3.03	3.16	3.28	3.40	3.52	3.63	3.74	3.84	3.94	4.03
	4,400	1.67	1.83	1.98	2.14	2.30	2.45	2.60	2.74	2.88	3.01	3.15	3.28	3.41	3.53	3.65	3.76	3.87	3.97	4.06	4.15
	4,600	1.76	1.92	2.07	2.23	2.40	2.54	2.71	2.85	2.99	3.13	3.27	3.40	3.53	3.65	3.77	3.88	3.98	4.08	4.17	4.26
	4,800	1.83	1.99	2.15	2.32	2.49	2.64	2.81	2.95	3.11	3.25	3.39	3.52	3.65	3.77	3.88	3.99	4.09	4.18	4.27	4.35
	5,000	1.91	2.08	2.24	2.41	2.58	2.74	2.92	3.06	3.22	3.36	3.49	3.63	3.76	3.88	3.99	4.10	4.20	4.29	4.37	4.45
	5,200	1.98	2.16	2.33	2.50	2.67	2.84	3.01	3.16	3.32	3.45	3.60	3.74	3.86	3.98	4.09	4.20	4.30	4.38	4.46	4.53
	5,400	2.05	2.24	2.41	2.59	2.77	2.93	3.11	3.26	3.42	3.56	3.70	3.83	3.96	4.08	4.19	4.29	4.39	4.46	4.53	4.59
	5,600	2.13	2.31	2.49	2.67	2.85	3.02	3.20	3.36	3.52	3.66	3.80	3.94	4.06	4.17	4.27	4.37	4.46	4.53	4.60	4.64
	5,800	2.19	2.38	2.57	2.76	2.93	3.11	3.30	3.45	3.61	3.76	3.89	4.03	4.16	4.26	4.36	4.45	4.53	4.59	4.65	4.68
	6,000	2.26	2.46	2.65	2.84	3.02	3.20	3.39	3.54	3.71	3.84	3.98	4.12	4.24	4.33	4.42	4.51	4.59	4.64	4.68	4.71

The use of these pulley/speed combinations will lead to a reduction in the service life of the belts.

Please observe the factors and transmission correction factors found on pages 14 and 15.

Performance Data

optibelt *ZR* Section L

Power rating P_N [kW] using a belt width of 1" ≙ 25.4 mm

optibelt Power Transmission

Table 15

30 L	31 L	32 L	33 L	34 L	35 L	36 L	37 L	38 L	39 L	40 L	41 L	42 L	43 L	44 L	45 L	46 L	47 L	48 L	Number of teeth on small pulley
90.96	93.99	97.02	100.05	103.08	106.12	109.15	112.18	115.21	118.24	121.28	124.31	127.34	130.37	133.40	136.44	139.47	142.50	145.53	Pitch diameter [mm]
0.12	0.13	0.13	0.13	0.14	0.14	0.14	0.15	0.15	0.16	0.16	0.16	0.17	0.17	0.17	0.17	0.18	0.19	0.19	100
0.23	0.24	0.25	0.26	0.27	0.28	0.28	0.29	0.30	0.31	0.31	0.32	0.33	0.34	0.34	0.35	0.36	0.37	0.37	200
0.35	0.36	0.37	0.39	0.40	0.41	0.42	0.44	0.45	0.46	0.47	0.48	0.49	0.50	0.51	0.53	0.54	0.55	0.56	300
0.46	0.48	0.50	0.52	0.53	0.55	0.56	0.58	0.59	0.61	0.62	0.64	0.66	0.68	0.69	0.71	0.72	0.74	0.75	400
0.58	0.60	0.62	0.64	0.66	0.68	0.70	0.72	0.74	0.76	0.78	0.80	0.82	0.84	0.85	0.85	0.89	0.91	0.93	500
0.70	0.73	0.75	0.78	0.80	0.82	0.84	0.86	0.89	0.91	0.93	0.95	0.97	0.99	1.01	1.04	1.06	10.9	1.11	600
0.81	0.84	0.87	0.90	0.92	0.95	0.97	1.00	1.03	1.06	1.08	1.11	1.14	1.17	1.19	1.22	1.24	1.27	1.29	700
0.93	0.96	0.98	1.02	1.05	1.08	1.11	1.14	1.17	1.20	1.23	1.26	1.29	1.32	1.35	1.38	1.41	1.44	1.47	800
1.04	1.08	1.11	1.14	1.18	1.22	1.25	1.29	1.32	1.35	1.38	1.42	1.45	1.48	1.51	1.55	1.58	1.62	1.65	900
1.16	1.20	1.23	1.27	1.31	1.35	1.38	1.42	1.46	1.50	1.53	1.57	1.61	1.65	1.68	1.72	1.75	1.79	1.82	1,000
1.27	1.31	1.35	1.39	1.43	1.47	1.51	1.56	1.60	1.64	1.68	1.72	1.76	1.80	1.84	1.88	1.92	1.96	1.99	1,100
1.38	1.43	1.47	1.42	1.56	1.61	1.65	1.70	1.74	1.78	1.82	1.87	1.91	1.95	1.99	2.04	2.08	2.12	2.16	1,200
1.49	1.54	1.59	1.64	1.69	1.74	1.78	1.83	1.87	1.92	1.96	2.01	2.06	2.11	2.15	2.20	2.24	2.29	2.33	1,300
1.60	1.66	1.71	1.76	1.81	1.86	1.91	1.96	2.01	2.06	2.10	2.16	2.21	2.26	2.31	2.36	2.40	2.45	2.49	1,400
1.72	1.77	1.82	1.88	1.93	1.99	2.04	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50	2.55	2.60	2.65	1,500
1.82	1.88	1.94	2.00	2.05	2.11	2.16	2.22	2.28	2.34	2.39	2.45	2.50	2.55	2.60	2.65	2.70	2.75	2.80	1,600
1.93	1.99	2.05	2.11	2.17	2.23	2.29	2.35	2.41	2.47	2.52	2.58	2.64	2.70	2.75	2.81	2.86	2.91	2.96	1,700
2.04	2.10	2.16	2.23	2.29	2.35	2.41	2.47	2.53	2.59	2.65	2.71	2.77	2.83	2.88	2.94	2.99	3.05	3.10	1,800
2.14	2.21	2.28	2.35	2.41	2.47	2.53	2.60	2.66	2.72	2.78	2.84	2.90	2.96	3.02	3.08	3.14	3.20	3.25	1,900
2.25	2.32	2.38	2.45	2.52	2.59	2.66	2.72	2.78	2.84	2.90	2.97	3.03	3.10	3.16	3.22	3.28	3.34	3.39	2,000
2.45	2.53	2.60	2.67	2.74	2.81	2.88	2.95	3.02	3.09	3.16	3.23	3.29	3.35	3.41	3.47	3.53	3.59	3.65	2,200
2.66	2.73	2.80	2.88	2.96	3.04	3.11	3.18	3.25	3.32	3.39	3.46	3.52	3.59	3.65	3.71	3.77	3.83	3.89	2,400
2.75	2.83	2.91	2.99	3.06	3.14	3.21	3.29	3.36	3.43	3.50	3.57	3.63	3.70	3.76	3.82	3.88	3.94	3.99	2,500
2.84	2.93	3.01	3.09	3.16	3.24	3.31	3.39	3.46	3.53	3.60	3.67	3.73	3.80	3.86	3.92	3.98	4.04	4.09	2,600
3.03	3.12	3.20	3.28	3.36	3.44	3.51	3.59	3.66	3.73	3.80	3.87	3.93	4.00	4.06	4.12	4.17	4.22	4.27	2,800
3.21	3.30	3.39	3.47	3.55	3.63	3.71	3.78	3.85	3.92	3.99	4.06	4.12	4.18	4.24	4.29	4.34	4.39	4.43	3,000
3.39	3.48	3.56	3.64	3.72	3.80	3.88	3.95	4.02	4.09	4.16	4.22	4.28	4.34	4.39	4.44	4.48	4.52	4.56	3,200
3.55	3.64	3.72	3.80	3.88	3.96	4.04	4.11	4.18	4.25	4.31	4.36	4.41	4.46	4.51	4.55	4.58	4.65	4.65	3,400
3.71	3.80	3.89	3.97	4.04	4.12	4.19	4.26	4.32	4.38	4.44	4.49	4.53	4.57	4.61	4.66	4.69	4.71	4.71	3,600
3.85	3.94	4.03	4.11	4.18	4.25	4.32	4.38	4.43	4.49	4.54	4.58	4.61	4.65	4.68	4.72	4.74	4.75	4.72	3,800
3.98	4.07	4.16	4.23	4.30	4.37	4.43	4.48	4.53	4.58	4.63	4.66	4.68	4.70	4.72	4.73	4.74	4.73	4.71	4,000
4.12	4.20	4.28	4.35	4.41	4.48	4.54	4.58	4.61	4.65	4.68	4.70	4.71	4.73	4.74	4.75	4.74	4.72	4.65	4,200
4.24	4.32	4.39	4.45	4.50	4.56	4.61	4.64	4.67	4.70	4.72	4.72	4.72	4.74	4.71	4.71	4.69	4.65	4.54	4,400
4.34	4.41	4.48	4.53	4.58	4.63	4.67	4.69	4.71	4.73	4.74	4.74	4.71	4.70	4.65	4.64	4.59	4.53	4.39	4,600
4.43	4.50	4.57	4.61	4.64	4.68	4.71	4.71	4.71	4.71	4.71	4.72	4.69	4.65	4.55	4.53	4.46	4.37	4.20	4,800
4.52	4.58	4.63	4.66	4.70	4.72	4.73	4.77	4.73	4.71	4.67	4.66	4.62	4.56	4.42	4.38	4.28	4.15	3.95	5,000
4.59	4.64	4.68	4.70	4.72	4.74	4.73	4.74	4.72	4.70	4.60	4.57	4.50	4.41	4.24	4.19	4.05	3.90	3.66	5,200
4.65	4.68	4.71	4.75	4.75	4.75	4.70	4.72	4.67	4.60	4.48	4.45	4.35	4.23	4.04	3.96	3.80	3.61	3.31	5,400
4.68	4.71	4.73	4.77	4.75	4.73	4.66	4.64	4.58	4.49	4.35	4.30	4.16	4.02	3.77	3.67	3.47	3.26	2.90	5,600
4.71	4.72	4.73	4.75	4.73	4.68	4.58	4.55	4.46	4.36	4.18	4.10	3.94	3.76	3.48	3.35	3.11	2.85	2.44	5,800
4.74	4.73	4.72	4.72	4.67	4.61	4.48	4.44	4.32	4.19	3.97	3.87	3.69	3.46	3.13	2.97	2.69	2.39	1.92	6,000

Speed of small pulley [rpm]

Please observe the factors and transmission correction factors found on pages 14 and 15.

Performance Data

optibelt *ZR* Section H

Power rating P_N [kW] using a belt width of 1" ≙ 25.4 mm

optibelt
Power Transmission

Table 16

Number of teeth on small pulley	14 H	15 H	16 H	17 H	18 H	19 H	20 H	21 H	22 H	23 H	24 H	25 H	26 H	27 H	28 H	29 H	30 H	31 H
Pitch diameter [mm]	56.60	60.64	64.68	68.72	72.77	76.81	80.85	84.89	88.94	92.98	97.02	101.06	105.11	109.15	113.19	117.23	121.28	125.32
100	0.19	0.20	0.21	0.22	0.24	0.25	0.26	0.28	0.29	0.30	0.31	0.33	0.34	0.36	0.37	0.39	0.40	0.42
200	0.37	0.40	0.43	0.45	0.48	0.50	0.53	0.55	0.58	0.61	0.63	0.66	0.69	0.72	0.74	0.77	0.79	0.82
300	0.55	0.59	0.63	0.67	0.72	0.75	0.79	0.83	0.87	0.91	0.95	0.99	1.03	1.07	1.11	1.15	1.19	1.23
400	0.74	0.79	0.84	0.90	0.95	1.00	1.05	1.11	1.16	1.22	1.27	1.32	1.37	1.43	1.48	1.53	1.58	1.64
500	0.93	0.99	1.05	1.12	1.19	1.25	1.32	1.39	1.45	1.52	1.58	1.65	1.72	1.78	1.84	1.91	1.98	2.04
600	1.11	1.19	1.27	1.34	1.42	1.51	1.58	1.66	1.74	1.82	1.89	1.97	2.05	2.13	2.21	2.29	2.36	2.44
700	1.29	1.39	1.48	1.57	1.66	1.75	1.84	1.93	2.03	2.12	2.21	2.30	2.39	2.48	2.57	2.67	2.76	2.85
800	1.48	1.59	1.69	1.79	1.89	2.00	2.10	2.21	2.31	2.42	2.52	2.63	2.73	2.84	2.94	3.05	3.15	3.26
900	1.66	1.78	1.89	2.01	2.13	2.25	2.36	2.48	2.60	2.72	2.83	2.95	3.07	3.19	3.30	3.42	3.54	3.66
1,000	1.84	1.97	2.10	2.24	2.36	2.50	2.63	2.76	2.89	3.02	3.15	3.28	3.41	3.54	3.66	3.79	3.92	4.05
1,100	2.03	2.17	2.31	2.46	2.60	2.75	2.89	3.03	3.18	3.32	3.46	3.60	3.74	3.89	4.03	4.17	4.30	4.45
1,200	2.21	2.36	2.52	2.68	2.83	2.99	3.15	3.30	3.46	3.62	3.77	3.92	4.07	4.23	4.39	4.54	4.69	4.84
1,300	2.40	2.56	2.73	2.90	3.07	3.24	3.41	3.57	3.74	3.91	4.07	4.24	4.41	4.58	4.74	4.91	5.07	5.23
1,400	2.58	2.76	2.94	3.13	3.30	3.48	3.66	3.84	4.02	4.20	4.38	4.56	4.74	4.92	5.10	5.28	5.45	5.63
1,500	2.77	2.96	3.15	3.34	3.54	3.73	3.92	4.11	4.30	4.48	4.68	4.88	5.07	5.26	5.45	5.64	5.82	6.01
1,600	2.96	3.15	3.36	3.57	3.77	3.98	4.18	4.38	4.59	4.79	4.99	5.19	5.39	5.60	5.80	6.00	6.19	6.39
1,700	3.14	3.34	3.56	3.78	4.00	4.21	4.43	4.65	4.86	5.08	5.30	5.51	5.72	5.93	6.14	6.35	6.56	6.77
1,800	3.34	3.54	3.77	4.00	4.23	4.46	4.68	4.92	5.14	5.37	5.59	5.82	6.04	6.26	6.48	6.70	6.92	7.14
1,900	3.52	3.78	4.04	4.22	4.46	4.70	4.94	5.18	5.42	5.66	5.89	6.13	6.36	6.60	6.83	7.06	7.28	7.51
2,000	3.70	3.88	4.18	4.44	4.68	4.94	5.19	5.45	5.69	5.94	6.18	6.43	6.68	6.92	7.16	7.40	7.64	7.88
2,100	3.89	4.13	4.39	4.55	4.92	5.18	5.44	5.71	5.97	6.23	6.48	6.74	6.99	7.25	7.50	7.75	7.99	8.23
2,200	4.08	4.22	4.59	4.86	5.14	5.42	5.69	5.97	6.24	6.51	6.77	7.04	7.30	7.57	7.83	8.09	8.34	8.59
2,300	4.26	4.51	4.80	5.09	5.37	5.65	5.94	6.22	6.51	6.79	7.06	7.34	7.62	7.89	8.15	8.42	8.68	8.94
2,400	4.44	4.61	5.00	5.30	5.59	5.89	6.18	6.48	6.77	7.06	7.35	7.64	7.92	8.20	8.48	8.75	9.02	9.29
2,500	4.61	4.90	5.20	5.51	5.82	6.12	6.43	6.74	7.04	7.34	7.63	7.93	8.22	8.51	8.80	9.08	9.35	9.63
2,600	4.50	5.09	5.41	5.72	6.04	6.36	6.68	6.99	7.30	7.61	7.92	8.22	8.52	8.82	9.12	9.35	9.58	9.91
2,800	5.15	5.46	5.80	6.14	6.48	6.82	7.15	7.49	7.83	8.15	8.47	8.79	9.11	9.43	9.74	10.03	10.32	10.61
3,000	5.50	5.84	6.19	6.55	6.92	7.27	7.63	7.98	8.34	8.68	9.01	9.30	9.58	9.96	10.33	10.61	10.94	11.24
3,200	5.86	6.22	6.58	6.97	7.35	7.73	8.09	8.47	8.84	9.19	9.54	9.89	10.24	10.58	10.91	11.22	11.53	11.68
3,400	6.20	6.58	6.96	7.27	7.78	8.17	8.56	8.94	9.33	9.70	10.06	10.42	10.78	11.13	11.47	11.79	12.10	12.40
3,600	6.55	6.95	7.34	7.78	8.20	8.62	9.00	9.41	9.82	10.19	10.56	10.93	11.30	11.65	12.00	12.32	12.64	12.94
3,800	6.96	7.31	7.73	8.17	8.61	9.04	9.45	9.87	10.29	10.67	11.05	11.43	11.80	12.16	12.52	12.84	13.15	13.45
4,000	7.23	7.66	8.09	8.57	9.02	9.46	9.88	10.31	10.74	11.13	11.52	11.90	12.28	12.64	13.00	13.32	13.63	13.92
4,200	7.58	8.01	8.46	8.94	9.42	9.88	10.30	10.75	11.19	11.58	11.97	12.36	12.74	13.11	13.47	13.78	14.08	14.36
4,400	7.92	8.34	8.82	9.33	9.81	10.28	10.71	11.17	11.62	12.02	12.41	12.80	13.18	13.54	13.89	14.19	14.49	14.79
4,600	8.25	8.71	9.19	9.70	10.18	10.68	11.12	11.58	12.03	12.43	12.82	13.21	13.59	13.94	14.29	14.57	14.85	15.14
4,800	8.56	9.20	9.54	10.06	10.57	11.06	11.50	11.97	12.44	12.83	13.21	13.60	13.98	14.33	14.67	14.94	15.20	15.46
5,000	8.90	9.38	9.89	10.42	10.93	11.44	11.88	12.35	12.82	13.21	13.59	13.97	14.35	14.68	15.01	15.26	15.49	15.71
5,200	9.21	9.72	10.23	10.77	11.29	11.80	12.24	12.72	13.20	13.57	13.94	14.31	14.68	15.08	15.32	15.54	15.75	15.96
5,400	9.53	10.04	10.57	11.12	11.64	12.16	12.60	13.08	13.55	13.91	14.27	14.63	14.99	15.31	15.59	15.80	15.96	16.14
5,600	9.83	10.36	10.89	11.45	11.98	12.50	12.94	13.41	13.88	14.27	14.58	14.97	15.27	15.58	15.83	16.00	16.13	16.27
5,800	10.15	10.67	11.22	11.78	12.31	12.82	13.26	13.73	14.20	14.59	14.87	15.26	15.52	15.80	16.03	16.16	16.25	16.36
6,000	10.45	10.98	11.53	12.09	12.63	13.15	13.57	14.04	14.50	14.88	15.12	15.51	15.74	15.99	16.19	16.28	16.32	16.38

Speed of small pulley [rpm]

The use of these pulley/speed combinations will lead to a reduction in the service life of the belts.

Please observe the factors and transmission correction factors found on pages 14 and 15.

Performance Data

optibelt *ZR* Section H

Power rating P_N [kW] using a belt width of 1" ≙ 25.4 mm

optibelt Power Transmission

Table 17

32 H	33 H	34 H	35 H	36 H	37 H	38 H	39 H	40 H	41 H	42 H	43 H	44 H	45 H	46 H	47 H	48 H	Number of teeth on small pulley
129.36	133.40	137.45	141.49	145.53	149.57	153.62	157.66	161.70	165.74	169.79	173.83	177.87	181.91	185.96	190.00	194.04	Pitch diameter [mm]
0.43	0.45	0.46	0.47	0.48	0.50	0.51	0.52	0.53	0.55	0.56	0.57	0.58	0.60	0.61	0.62	0.63	100
0.84	0.87	0.90	0.93	0.95	0.98	1.00	1.03	1.05	1.08	1.11	1.14	1.16	1.19	1.22	1.25	1.27	200
1.27	1.31	1.35	1.39	1.42	1.46	1.50	1.54	1.58	1.62	1.66	1.70	1.74	1.78	1.82	1.86	1.89	300
1.69	1.74	1.79	1.84	1.89	1.95	2.00	2.05	2.10	2.16	2.21	2.26	2.31	2.37	2.42	2.47	2.52	400
2.10	2.17	2.23	2.30	2.36	2.43	2.50	2.57	2.63	2.70	2.76	2.83	2.89	2.96	3.02	3.09	3.15	500
2.52	2.59	2.68	2.76	2.83	2.91	2.99	3.07	3.15	3.23	3.31	3.39	3.46	3.54	3.62	3.70	3.77	600
2.94	3.03	3.12	3.21	3.30	3.39	3.48	3.57	3.66	3.76	3.85	3.94	4.03	4.12	4.21	4.30	4.39	700
3.36	3.47	3.57	3.67	3.77	3.88	3.98	4.08	4.18	4.29	4.39	4.49	4.59	4.69	4.79	4.89	4.99	800
3.77	3.89	4.00	4.12	4.23	4.35	4.46	4.58	4.69	4.81	4.92	5.03	5.14	5.26	5.37	5.48	5.59	900
4.18	4.31	4.44	4.57	4.69	4.82	4.94	5.07	5.19	5.32	5.44	5.57	5.69	5.82	5.94	6.07	6.19	1,000
4.59	4.73	4.87	5.01	5.15	5.29	5.42	5.56	5.69	5.83	5.97	6.11	6.24	6.38	6.51	6.64	6.77	1,100
4.99	5.14	5.29	5.44	5.59	5.74	5.89	6.04	6.19	6.34	6.48	6.63	6.77	6.92	7.07	7.22	7.36	1,200
5.39	5.56	5.72	5.88	6.04	6.20	6.36	6.52	6.68	6.84	6.99	7.15	7.30	7.46	7.61	7.77	7.92	1,300
5.80	5.97	6.14	6.31	6.48	6.65	6.82	6.99	7.16	7.33	7.50	7.67	7.83	7.99	8.15	8.31	8.47	1,400
6.19	6.38	6.56	6.74	6.92	7.10	7.28	7.46	7.64	7.82	7.99	8.17	8.34	8.51	8.68	8.85	9.02	1,500
6.58	6.78	6.97	7.17	7.36	7.55	7.74	7.93	8.11	8.30	8.48	8.66	8.84	9.02	9.20	9.38	9.55	1,600
6.97	7.18	7.38	7.58	7.78	7.98	8.18	8.38	8.57	8.76	8.95	9.14	9.33	9.52	9.70	9.89	10.07	1,700
7.36	7.57	7.78	7.99	8.20	8.41	8.61	8.82	9.02	9.22	9.42	9.62	9.81	10.01	10.20	10.39	10.58	1,800
7.73	7.96	8.18	8.40	8.62	8.84	9.05	9.26	9.47	9.68	9.88	10.08	10.28	10.48	10.67	10.87	11.06	1,900
8.11	8.34	8.57	8.80	9.03	9.25	9.47	9.69	9.90	10.11	10.32	10.53	10.74	10.94	11.14	11.34	11.53	2,000
8.47	8.71	8.95	9.19	9.42	9.65	9.87	10.10	10.32	10.54	10.75	10.97	11.18	11.39	11.59	11.80	12.00	2,100
8.84	9.09	9.33	9.58	9.82	10.05	10.28	10.51	10.74	10.96	11.18	11.40	11.62	11.83	12.03	12.23	12.43	2,200
9.20	9.46	9.71	9.96	10.21	10.45	10.68	10.92	11.15	11.37	11.59	11.81	12.03	12.24	12.44	12.65	12.85	2,300
9.55	9.81	10.07	10.33	10.58	10.82	11.06	11.30	11.53	11.76	11.98	12.21	12.43	12.64	12.84	13.05	13.25	2,400
9.90	10.17	10.43	10.69	10.95	11.20	11.44	11.68	11.92	12.15	12.38	12.61	12.83	13.03	13.23	13.43	13.63	2,500
10.24	10.51	10.78	11.05	11.31	11.56	11.80	12.05	12.29	12.52	12.74	12.96	13.18	13.39	13.59	13.79	13.99	2,600
10.90	11.18	11.45	11.73	12.00	12.25	12.50	12.75	12.99	13.22	13.44	13.66	13.88	14.07	14.26	14.45	14.64	2,800
11.53	11.81	12.09	12.37	12.65	12.90	13.14	13.39	13.63	13.85	14.06	14.28	14.49	14.67	14.85	15.03	15.20	3,000
12.14	12.42	12.70	12.98	13.26	13.50	13.74	13.98	14.22	14.42	14.62	14.82	15.02	15.20	15.36	15.53	15.66	3,200
12.70	12.98	13.26	13.54	13.82	14.05	14.28	14.51	14.74	14.95	15.14	15.32	15.48	15.62	15.78	15.91	16.01	3,400
13.24	13.52	13.79	14.07	14.34	14.56	14.77	14.99	15.20	15.40	15.50	15.59	15.67	15.82	15.96	16.07	16.14	3,600
13.74	14.01	14.28	14.55	14.81	15.03	15.22	15.40	15.58	15.72	15.78	15.80	15.85	15.99	16.16	16.23	16.24	3,800
14.20	14.49	14.74	14.98	15.22	15.42	15.60	15.76	15.90	15.97	16.03	16.11	16.11	16.20	16.29	16.35	16.35	4,000
14.63	14.90	15.15	15.35	15.58	15.85	15.91	16.04	16.13	16.25	16.27	16.29	16.29	16.32	16.38	16.35	16.34	4,200
15.01	15.27	15.49	15.67	15.87	16.01	1613	16.24	16.29	16.33	16.35	16.35	16.36	16.34	16.30	16.25	16.19	4,400
15.35	15.58	15.78	15.93	16.10	16.21	16.29	16.35	16.35	16.38	16.38	16.36	16.32	16.28	16.22	16.12	15.90	4,600
15.64	15.84	16.01	16.14	16.27	16.33	16.37	16.38	16.33	16.32	16.30	16.27	16.17	16.01	15.81	15.55	15.46	4,800
15.88	16.07	16.19	16.29	16.37	16.38	16.38	16.33	16.21	16.15	16.07	15.99	15.89	15.72	15.49	15.23	14.87	5,000
16.07	16.23	16.31	16.36	16.40	16.36	16.30	16.19	15.99	15.85	15.70	15.60	15.49	15.28	15.04	14.76		5,200
16.21	16.34	16.37	16.37	16.36	16.26	16.13	15.96	15.68	15.52	15.35	15.15	14.96	14.55	14.21			5,400
16.30	16.38	16.36	16.32	16.23	16.08	15.88	15.63	15.26	15.07	14.86	14.65						5,600
16.33	16.37	16.30	16.19	16.04	15.80	15.53	15.20	14.73	14.30	14.12							5,800
16.30	16.29	16.16	15.98	15.76	15.44	15.08	14.67										6,000

Speed of small pulley [rpm]

Please observe the factors and transmission correction factors found on pages 14 and 15.

Performance Data

optibelt *ZR* Section XH

Power rating P_N [kW] using a belt width of 1" ≙ 25.4 mm

optibelt Power Transmission

Table 18

Speed of small pulley [rpm]	Number of teeth on small pulley	18 XH	19 XH	20 XH	21 XH	22 XH	23 XH	24 XH	25 XH	26 XH	27 XH	28 XH	29 XH
	Pitch diameter [mm]	127.34	134.41	141.49	148.56	155.64	162.71	169.79	176.86	183.94	191.01	198.08	205.16
	100	0.57	0.60	0.63	0.66	0.69	0.73	0.75	0.79	0.83	0.86	0.88	0.91
	200	1.13	1.19	1.25	1.32	1.38	1.45	1.51	1.57	1.63	1.70	1.76	1.82
	300	1.70	1.79	1.88	1.98	2.07	2.17	2.26	2.36	2.45	2.55	2.64	2.73
	400	2.26	2.39	2.51	2.59	2.76	2.89	3.01	3.14	3.26	3.39	3.51	3.63
	500	2.82	2.98	3.13	3.25	3.44	3.59	3.74	3.90	4.06	4.21	4.36	4.52
	600	3.38	3.57	3.74	3.90	4.12	4.30	4.48	4.67	4.85	5.03	5.21	539
	700	3.93	4.15	4.36	4.55	4.79	5.00	5.21	5.42	5.62	5.83	6.04	6.25
	800	4.48	4.62	4.97	5.21	5.45	5.69	5.93	6.17	6.41	6.64	6.87	7.10
	900	5.03	5.30	5.57	5.84	6.11	6.37	6.64	6.90	7.15	7.42	7.68	7.93
	1,000	5.57	5.87	6.16	6.45	6.75	7.03	7.33	7.62	7.90	8.19	8.47	8.74
	1,100	6.11	6.43	6.75	7.07	7.39	7.70	8.02	8.32	8.62	8.93	9.24	9.53
	1,200	6.65	6.99	7.33	7.67	8.02	8.35	8.68	9.01	9.33	9.65	9.97	10.32
	1,300	7.17	7.54	7.90	8.27	8.63	8.98	9.33	9.68	10.03	10.36	10.68	11.00
	1,400	7.68	8.08	8.47	8.84	9.23	9.60	9.97	10.32	10.68	11.03	11.38	11.71
	1,500	8.21	8.60	9.01	9.40	9.81	10.19	10.59	10.94	11.32	11.68	12.04	12.37
	1,600	8.70	9.12	9.55	9.96	10.38	10.78	11.18	11.54	11.94	12.31	12.67	12.73
	1,700	9.18	9.63	10.07	10.49	10.94	11.33	11.76	12.13	12.53	12.90	13.26	13.60
	1,800	9.66	10.11	10.58	11.01	11.47	11.88	12.32	12.69	13.10	13.46	13.82	14.16
	1,900	10.13	10.60	11.06	11.52	11.99	12.41	12.85	13.36	13.91	14.12	14.35	14.89
	2,000	10.57	11.05	11.53	12.00	12.49	12.91	13.35	13.73	14.13	14.47	14.82	15.14
	2,100	11.02	11.50	11.99	12.48	12.97	13.40	13.82	14.20	14.59	14.93	15.28	15.57
	2,200	11.41	11.92	12.43	12.93	13.43	13.96	14.49	14.76	15.02	15.35	15.67	15.94
	2,300	11.87	12.36	12.86	13.38	13.87	14.29	14.70	15.05	15.42	15.71	16.02	16.26
	2,400	12.28	12.76	13.26	13.76	14.27	14.68	15.08	15.42	15.77	16.04	16.32	16.53
	2,500	12.67	13.15	13.64	14.14	14.66	15.06	15.45	15.76	16.09	16.33	16.58	16.74
	2,600	13.05	13.52	14.01	14.51	15.04	15.41	15.77	16.06	16.37	16.57	16.78	16.90
	2,800	13.73	14.20	14.66	15.16	15.69	16.02	16.33	16.56	16.78	16.89	17.0Z	17.03
	3,000	14.35	14.77	15.21	15.71	16.22	16.47	16.73	16.87	17.01	17.01	17.02	16.87
	3,200	14.90	15.28	15.66	16.14	16.63	16.81	16.97	17.01	17.02	16.90	16.76	16.45
	3,400	15.36	15.68	15.99	16.45	16.91	16.98	17.04	16.95	16.84	16.54	16.25	15.73
	3,600	15.82	16.03	16.23	16.64	17.06	17.01	16.94	16.68	16.43	15.94	15.46	14.72
	3,800	16.05	16.19	16.35	16.70	17.06	16.86	16.64	15.96	15.97	15.15	14.34	13.37
	4,000	16.26	16.29	16.33	16.62	17.89	16.53	16.15	15.50	14.86	13.91	12.94	
	4,200	16.35	16.35	16.16	16.37	16.58	16.01	15.45	14.75	13.67	12.60		
	4,400	16.26	16.22	15.83	15.96	16.08	15.30	14.52	13.24	11.94			

The use of these pulley/speed combinations will lead to a reduction in the service life of the belts.

Please observe the factors and transmission correction factors found on pages 14 and 15.

Performance Data

optibelt *ZR* Section XH

Power rating P_N [kW] using a belt width of 1" ≙ 25.4 mm

optibelt Power Transmission

Table 19

30 XH	31 XH	32 XH	33 XH	34 XH	35 XH	36 XH	37 XH	38 XH	39 XH	40 XH	Number of teeth on small pulley
212.23	219.31	226.38	233.46	240.53	247.61	254.68	261.75	268.63	275.90	282.98	Pitch diameter [mm]
0.94	0.97	1.00	1.04	1.07	1.10	1.13	1.16	1.19	1.22	1.25	100
1.88	1.95	2.01	2.08	2.14	2.20	2.26	2.33	2.39	2.45	2.51	200
2.82	2.92	3.01	3.11	3.20	3.29	3.38	3.47	3.56	3.65	3.74	300
3.74	3.87	4.00	4.13	4.25	4.37	4.49	4.61	4.73	4.85	4.97	400
4.67	4.84	5.01	5.16	5.30	5.45	5.59	5.74	5.88	6.02	6.16	500
5.57	5.75	5.93	6.11	6.28	6.46	6.63	6.81	6.98	7.16	7.33	600
6.46	6.67	6.87	7.07	7.27	7.47	7.67	7.87	8.07	8.27	8.47	700
7.33	7.56	7.79	8.01	8.23	8.45	8.67	8.89	9.11	9.33	9.55	800
8.18	8.43	8.68	8.92	9.16	9.40	9.63	9.87	10.11	10.35	10.58	900
9.01	9.28	9.55	9.81	10.06	10.31	10.56	10.82	11.07	11.32	11.57	1,000
9.81	10.10	10.38	10.65	10.91	11.18	11.44	11.71	11.97	12.23	12.49	1,100
10.66	10.92	11.18	11.46	11.73	12.00	12.27	12.54	12.81	13.08	13.35	1,200
11.32	11.63	11.94	12.22	12.49	12.77	13.04	13.32	13.59	13.86	14.13	1,300
12.04	12.36	12.67	12.94	13.21	13.48	13.75	14.02	14.29	14.56	14.82	1,400
12.70	13.03	13.35	13.62	13.88	14.14	14.40	14.67	14.93	15.19	15.45	1,500
12.79	13.42	14.04	14.29	14.53	14.77	15.01	15.26	15.50	15.74	15.98	1,600
13.94	14.25	14.55	14.79	15.02	15.25	15.48	15.71	15.94	16.17	16.40	1,700
14.49	14.79	15.08	15.28	15.48	15.68	15.88	16.08	16.28	16.48	16.67	1,800
15.43	15.50	15.56	15.74	15.91	16.08	16.25	16.42	16.59	16.76	16.93	1,900
15.45	15.72	15.98	16.12	16.25	16.38	16.51	16.65	16.78	16.91	17.04	2,000
15.85	16.09	16.32	16.41	16.53	16.59	16.77	16.88	16.98	17.01	17.02	2,100
16.20	16.41	16.61	16.72	16.82	16.84	16.95	17.03	17.01	16.98	16.87	2,200
16.49	16.66	16.82	16.88	16.95	16.98	17.02	16.95	16.84	16.74	16.64	2,300
16.73	16.85	16.97	17.03	17.04	17.01	16.98	16.83	16.66	16.40	16.15	2,400
16.89	16.97	17.04	17.02	16.93	16.87	16.70	16.40	16.22	15.90	15.58	2,500
17.01	17.02	17.02	16.95	16.83	16.68	16.55	16.15	15.80	15.31	14.86	2,600
17.02	16.88	16.76	16.55	16.25	15.91	15.48	14.97	14.39	13.66	12.94	2,800
16.74	16.44	16.15	15.76	15.25	14.69	13.99	13.27				3,000
16.15	15.65	15.17	14.56	13.81	12.98						3,200
15.23	14.46	13.79	12.94								3,400
13.97	13.10										3,600
12.41											3,800
											4,000
											4,200
											4,400

Speed of small pulley [rpm]

Please observe the factors and transmission correction factors found on pages 14 and 15.

Performance Data

optibelt *ZR* Section XXH

Power rating P_N [kW] using a belt width of 1" ≙ 25.4 mm

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Table 20

Number of teeth on small pulley	18 XXH	19 XXH	20 XXH	21 XXH	22 XXH	23 XXH	24 XXH	25 XXH	26 XXH	27 XXH	28 XXH	29 XXH
Pitch diameter [mm]	181.91	192.02	202.13	212.23	222.34	232.45	242.55	252.66	262.77	272.87	282.98	293.08
100	0.99	1.05	1.10	1.16	1.22	1.27	1.32	1.38	1.43	1.49	1.54	1.60
200	1.98	1.09	2.20	2.31	2.42	2.53	2.64	2.75	2.86	2.97	3.08	3.19
300	2.97	3.14	3.30	3.46	3.62	3.79	3.95	4.11	4.27	4.44	4.60	4.76
400	3.95	4.17	4.38	4.59	4.80	5.02	5.24	5.46	5.67	5.88	6.09	6.30
500	4.95	5.21	5.45	5.73	5.98	6.25	6.51	6.77	7.03	7.29	7.55	7.81
600	5.88	6.20	6.51	6.83	7.14	7.45	7.76	8.07	8.37	8.67	8.97	9.27
700	6.83	7.19	7.56	7.92	8.27	8.62	8.97	9.32	9.67	10.01	10.35	10.69
800	7.76	8.18	8.57	8.98	9.37	9.77	10.16	10.54	10.92	11.29	11.66	12.03
900	8.72	9.18	9.57	10.01	10.44	10.88	11.30	11.71	12.11	12.51	12.91	13.31
1,000	9.57	10.02	10.55	11.02	11.49	11.95	12.13	12.71	13.28	13.70	14.11	14.52
1,100	10.44	10.97	11.49	12.05	12.64	13.04	13.43	13.90	14.37	14.79	15.21	15.63
1,200	11.40	11.85	12.40	12.92	13.45	13.95	14.45	14.91	15.38	15.80	16.22	16.64
1,300	12.12	12.70	13.28	13.81	14.37	14.60	14.83	15.57	16.32	16.73	17.14	17.55
1,400	12.90	13.51	14.12	14.66	15.23	15.73	16.26	16.70	17.18	17.57	17.95	18.34
1,500	13.66	14.28	14.91	15.46	16.04	16.54	17.05	17.71	17.96	18.31	18.66	19.01
1,600	14.39	15.03	15.68	16.23	17.04	17.28	17.78	18.38	18.64	18.95	19.25	19.56
1,700	15.07	15.73	16.40	16.93	17.49	17.95	18.43	18.81	19.21	19.46	19.70	19.95
1,800	15.71	16.37	17.06	17.58	18.12	18.55	19.00	19.33	19.68	19.93	20.12	20.24
1,900	16.31	16.98	17.67	18.16	18.68	19.07	19.48	19.74	20.04	20.13	20.25	20.30
2,000	16.88	17.54	18.23	18.69	19.17	19.51	19.86	20.05	20.28	20.35	20.38	20.28
2,100	17.39	18.05	18.73	19.14	19.58	19.84	20.14	20.25	20.39	20.29	20.18	20.00
2,200	17.84	18.50	19.17	19.54	19.91	20.11	20.32	20.33	20.37	20.22	19.98	19.60
2,300	18.25	18.90	19.55	19.84	20.16	20.28	20.39	20.30	20.21	19.76	19.45	18.94
2,400	18.60	19.22	19.86	20.09	20.32	20.30	20.35	20.12	19.91	19.47	18.91	18.19
2,500	18.90	19.50	22.34	21.37	20.39	20.28	20.19	19.80	19.45	18.75	18.00	17.11
2,600	19.15	19.72	20.28	20.32	20.37	20.12	19.91	19.36	18.84	18.04	17.10	
2,800	19.44	19.92	20.40	20.21	20.02	19.46	18.96	18.04	17.12	15.89		
3,000	19.49	19.85	20.19	19.74	19.24	18.32	17.43	16.06	14.66			

Speed of small pulley [rpm]

The use of these pulley/speed combinations will lead to a reduction in the service life of the belts.

Please observe the factors and transmission correction factors found on pages 14 and 15.

Performance Data

optibelt *ZR* Section XXH

Power rating P_N [kW] using a belt width of 1" ≙ 25.4 mm

optibelt Power Transmission

Table 21

30 XXH	31 XXH	32 XXH	33 XXH	34 XXH	35 XXH	36 XXH	37 XXH	38 XXH	39 XXH	40 XXH	Number of teeth on small pulley
303.19	313.30	323.40	333.51	343.62	353.72	363.83	373.94	384.04	394.15	404.25	Pitch diameter [mm]
1.65	1.70	1.76	1.81	1.87	1.92	1.98	2.05	2.14	2.20	2.20	100
3.30	3.39	3.50	3.61	3.73	3.82	3.93	4.07	4.20	4.41	4.38	200
4.92	5.08	5.32	5.40	5.56	5.71	5.87	6.05	6.22	6.38	6.51	300
6.51	6.73	6.93	7.14	7.35	7.54	7.75	7.97	8.19	8.39	8.57	400
8.06	8.32	8.57	8.82	9.08	9.31	9.55	9.82	10.08	10.31	10.54	500
9.57	9.86	10.15	10.43	10.73	11.00	11.28	11.56	11.86	12.14	12.40	600
11.02	11.34	11.67	11.98	12.32	12.60	12.91	13.22	13.53	13.83	14.12	700
12.40	12.75	13.10	13.34	13.79	14.12	14.39	14.75	15.06	15.39	15.68	800
13.70	14.08	14.44	14.59	15.15	15.49	15.82	16.12	16.55	16.76	17.05	900
14.93	15.30	15.67	16.02	16.40	16.72	16.98	17.24	17.65	17.94	18.23	1,000
16.04	16.42	16.71	17.05	17.49	17.71	18.00	18.29	18.55	18.86	19.17	1,100
17.05	17.41	17.76	18.08	18.43	18.71	18.97	19.23	19.45	19.65	19.86	1,200
17.96	18.21	18.53	18.81	19.21	19.39	19.55	19.74	19.89	20.08	20.28	1,300
18.72	19.01	19.29	19.34	19.80	19.97	20.08	20.20	20.32	20.36	20.39	1,400
19.36	19.52	19.74	19.92	20.19	20.20	20.21	20.23	20.21	20.19	20.18	1,500
19.86	20.03	20.19	20.29	20.38	20.33	20.28	20.23	20.05	19.86	19.64	1,600
20.19	20.21	20.26	20.30	20.34	20.01	19.78	19.66	19.34	19.04	18.73	1,700
20.37	20.38	20.33	20.28	20.06	19.73	19.40	19.07	18.59	18.02	17.43	1,800
20.37	20.27	19.98	19.74	19.53	18.97	18.41	17.84	17.15	16.33	15.50	1,900
20.19	19.95	19.63	19.16	18.73	18.03	17.33	16.62	15.70	14.65	13.58	2,000
19.81	19.31	18.80	18.20	17.65	16.66	15.67	14.67				2,100
19.24	18.66	17.98	17.17	16.23	15.22						2,200
18.46	17.59	16.65									2,300
17.43	16.44										2,400
											2,500
											2,600
											2,800
											3,000

Speed of small pulley [rpm]

The use of these pulley/speed combinations will lead to a reduction in the service life of the belts.

Please observe the factors and transmission correction factors found on pages 14 and 15.

Design Hints

Flanges/Minimum Pulley Diameters

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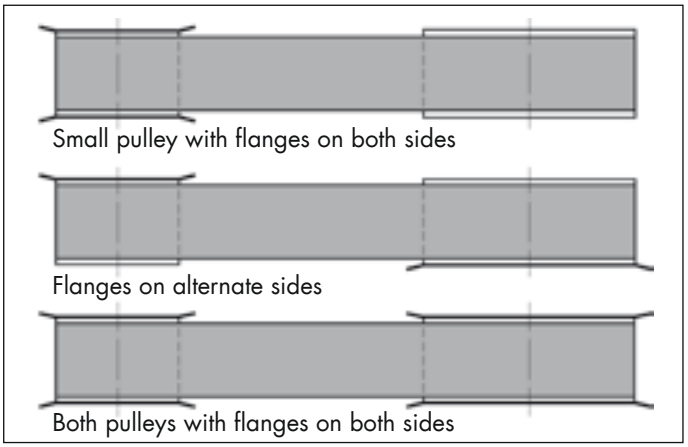
Flanges

The pulleys may be fitted with flanges on one or both sides to assist the smooth running of the timing belt.

If the drive centre distance is ≥ 8 d_{wk} then one pulley should be equipped with flanges on both sides.

We recommend the use of standard pulleys. See the range on pages 44 to 55. If this is not possible for design reasons, special pulleys may be employed. See page 57.



Minimum Adjustment Range for Non-Restrained Fit

Table 22

Section	Flanges on both pulleys [mm]	Flanges on one pulley [mm]
MXL	11	9
XL	17	13
L, H	22	17
XH	48	37

Minimum Adjustment Range x for the Tension of Timing Belts

$x = 0.004 \cdot a_{nom}$

Please also consult software:
Optibelt CAP Drive Calculation and data
Optibelt CAD 2D / 3D
online at: www.optibelt.com

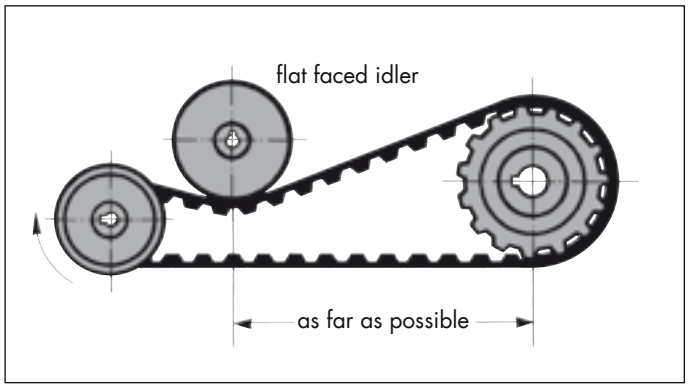
Maximum Timing Belt Width

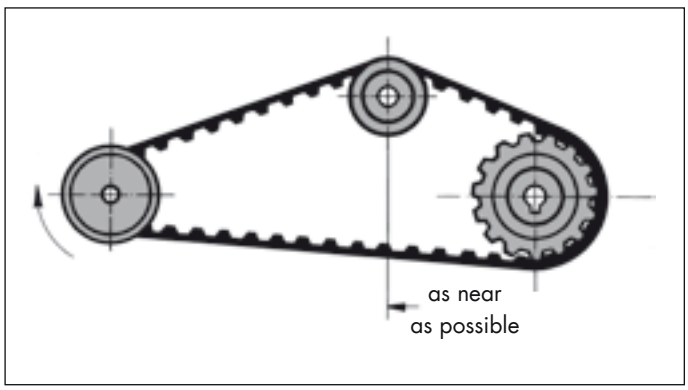
The maximum timing belt width should not exceed the pitch diameter of the smallest pulley being used.

Tension Idlers

Idlers are either toothed or flat faced pulleys that do not transmit power within the drive system. Because they create additional bending stresses within the belt, their use should be restricted to the following applications:

- Diameter of the idler ≥ the smallest pulley in the drive system
- Width of the idler ≥ widths of the timing pulleys that are located in the drive
- Always locate any idlers in the slack side of the drive
- Inside idlers:
  ≤ 40 teeth always use a toothed pulley
  > 40 teeth a flat belt pulley can be used
- Because they run on the back of the belt, flat pulleys must always be used as outside idlers
- Do not develop flat pulleys in a spherical manner under no circumstances
- Ensure that the idler is positioned to ensure that the maximum possible number of teeth are in mesh on the smallest drive pulley
- Keep the arc of contact on idlers to a minimum





Design Hints

optibelt ZR D Double Sided Timing Belts

to ISO 5296

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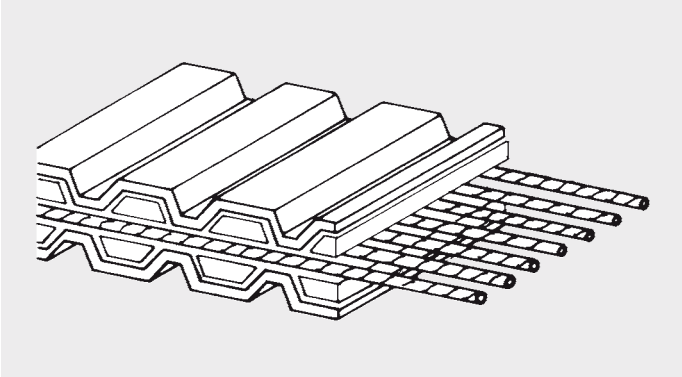
Construction



Tension Cord

As on standard belts, the tension cord consists of continuous, spirally wound glass fibre. This material ensures high tensile strength with the minimum stretch. Exceptional flexibility is achieved by embedding it centrally.

Teeth

The teeth are arranged directly opposite each other and are manufactured from a medium hard, shear- and wear-resistant rubber compound. They mesh exactly with the tooth pitch of the pulley with the minimum resistance. As long as six teeth or more are in mesh, their strength usually exceeds the tensile strength of the tension cord.

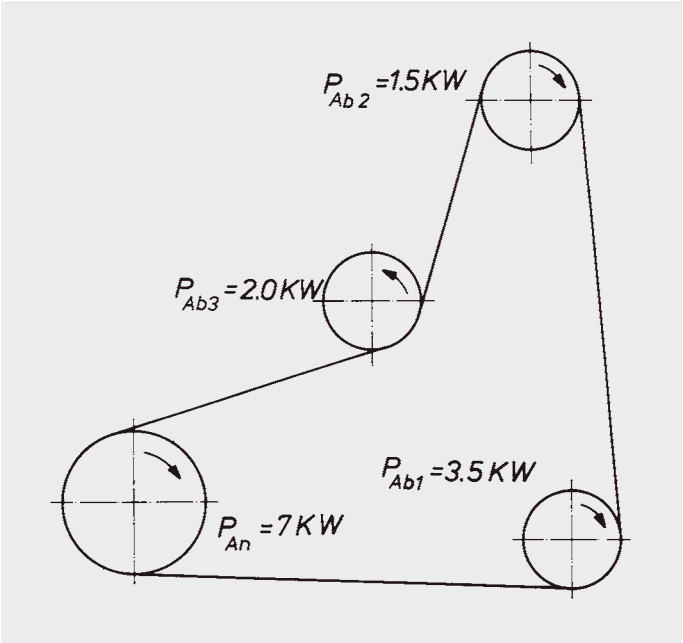
Fabric Cover

Both sides of the teeth are covered with a tough, friction-resistant fabric. This fabric with its low friction coefficient is therefore characterised by a long operational life.

Drive Design

The protective covering on both tooth faces and the resultant identical power transmission capability of both sides of the belt, means that the distribution of the power to be transmitted is not inhibited. The maximum permitted nominal power rating can be transmitted from either the inner or the outer tooth face. With several driven pulleys the power can be distributed in any combination through both sides of the belt. The total power transmitted cannot, however, exceed the maximum permitted levels.

Example:



The design must be based on the nominal power values for standard belts (see pages 22 to 33). For the sizes available see pages 10 to 12.

Design Hints

Installation and Maintenance

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Safety Hints

Correctly designed geometric and performing drives using Optibelt ZR Timing Belts ensure a high level of operational safety and optimum belt life.

It has been found in practice that unsatisfactory service life is frequently attributable to installation and maintenance errors. We recommend that the following precautions be taken:

- **Toothed Timing Pulleys**
  The teeth should be clean and comply with standard specifications.

- **Alignment**
  All shafts and pulleys should be aligned before belt installation.
  Maximum deviation in shaft parallel alignment:

Table 23

Belt width designation	Shaft misalignment
≤ 100	≤ ± 1°
> 100 ≤ 200	≤ ± 0.5°
> 200 ≤ 400	≤ ± 0.25°
> 400	≤ ± 0.15°

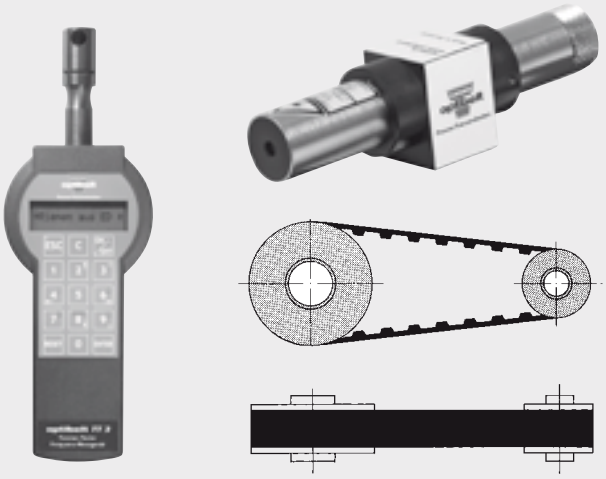
- **Timing Belt Sets**
  Timing belts which run in pairs or in multiples on the one drive system must always be ordered as sets. Please contact the Application Engineering Specialist Department.

- **Installation**
  Before installation, the drive centre distance should be reduced to enable the timing belts to be fitted with absolutely no force. If this is not possible the timing belts must be fitted together with one or both of the pulleys. Any use of force during the fitting of the belt will result in damage to the low-stretch tension cord and other components; this damage may not be immediately apparent.

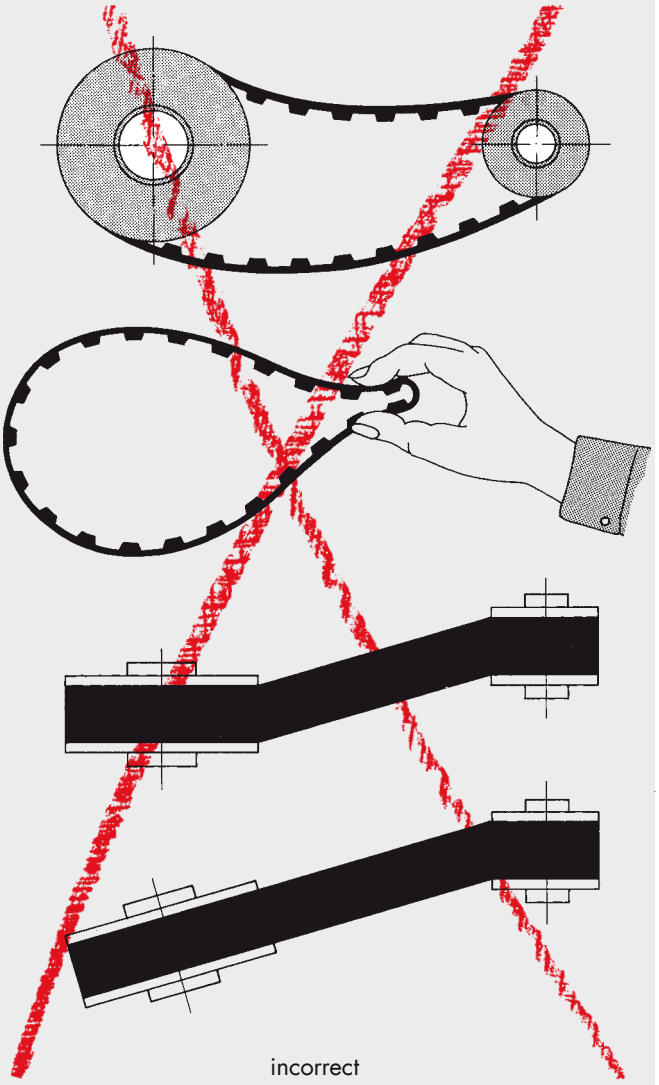
- **Tensioning**
  Tensioning should be carried out in accordance with the guidelines on page 20. Once fitted, no further checking or adjustment is necessary.

- **Idlers**
  Idlers should be avoided. If this is not possible, our recommendations on page 34 of this Technical Manual should be followed.

- **Maintenance**
  Optibelt ZR Timing Belts require virtually no maintenance if they are used under normal environmental conditions.



correct



incorrect

Design Hints

Length Measuring Conditions

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Measuring the Pitch Length to ISO 5296

The timing belt is placed over two measuring pulleys of equal size with the same tooth pitch as the belt.

The permitted tolerances for the measuring pulleys may be found in table 24.

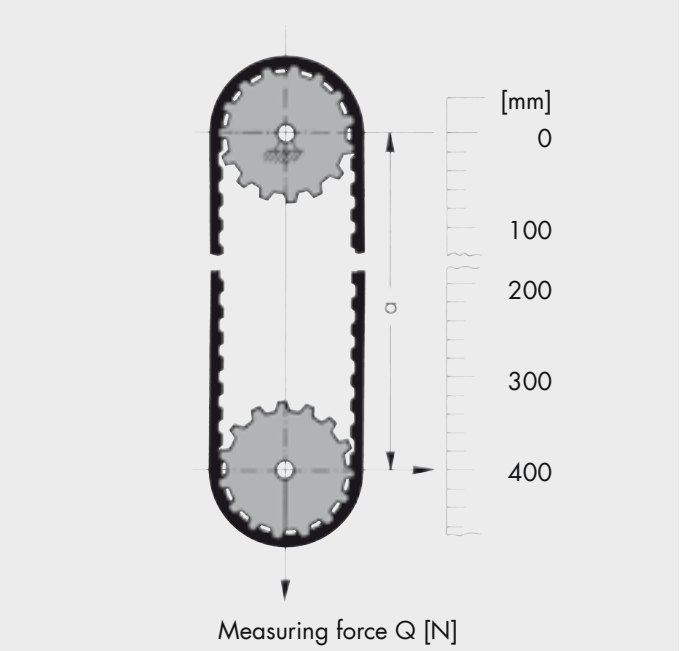
The moveable measuring pulley is loaded with the measuring force Q (see table 25).

The pulleys should be rotated under load at least twice before measuring the drive centre distance a, to ensure that the belt is properly seated and the total measuring force is equally distributed over both belt spans.

The effective length of the timing belt is given by twice the centre distance a plus the pitch circumference of one of the measuring pulleys.

$$L_w = 2\,a + U_w$$

Arrangement for Measuring the Belt Length



Clearance between the Measuring Pulley and the Belt Tooth

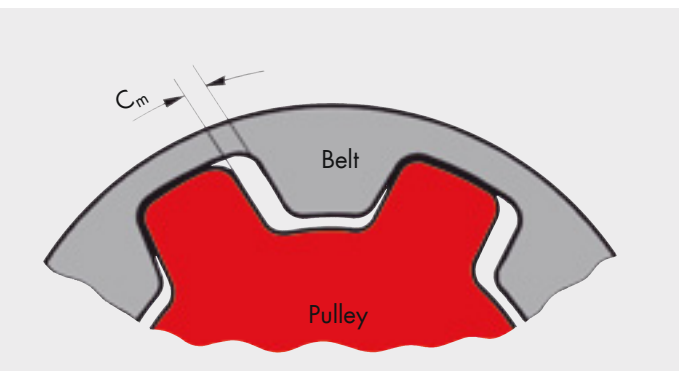


Table 24: Pulleys for measuring the belt length to ISO 5296

Section	Number of teeth	Pitch circumference U_w [mm]	Outside diameter d_a [mm]	Run-out tolerance of the outside diameter T. I. R. [1] [mm]	Side wobble tolerance T. I. R. [1] [mm]	Min. clearance C_m [mm]
MXL	20	40.64	12.428 ± 0.013	0.013	0.025	0.30
XL	10	50.80	15.662 ± 0.013	0.013	0.025	0.30
L	16	152.40	47.748 ± 0.013	0.013	0.025	0.33
H	20	254.00	79.479 ± 0.013	0.013	0.025	0.38
XH	24	533.40	166.992 ± 0.025	0.013	0.051	0.53
XXH	24	762.00	239.504 ± 0.025	0.013	0.076	0.64

[1] Maximum total fluctuation

Table 25: Total measuring force

Width designation	Belt width [mm]	Measuring force Q [N]					
		MXL	**XL**	**L**	**H**	**XH**	**XXH**
012	3.2	13					
019	4.8	20					
025	6.4	27	36				
031	7.9		44				
037	9.5		53				
050	12.7			105			
075	19.1			180	445		
100	25.4			245	620		
150	38.1				980		
200	50.8				1340	2000	2500
300	76.2				2100	3100	3900
400	101.6					4450	5600
500	127.0						7100

Design Hints

Problems – Causes – Remedies

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Problems	Causes	Remedies
Severe wear on the belt tooth faces	Incorrect belt tension Tooth pitch selection error Overloading	Adjust belt tension Check section selected, and replace if necessary Use wider belts with higher power transmission capability
Excessive wear in the land between the timing belt teeth	Excessive belt tension Drive design too weak Incorrect pulleys	Reduce the tension Increase belt width or pulley diameters Replace pulleys
Unusual wear on the edges of the belt	Shafts not parallel Incorrect flanged pulleys Drive centre distance varying during running	Realign the shafts Check design and replace Strengthen mountings and chassis
Belt teeth shearing off	Too few teeth in mesh Overloading	Increase diameter of the small pulley or choose wider belts Redesign using wider belts or larger pulleys
Excessive lateral belt movement	Shafts not parallel Pulleys not in line Shock loading with belt tension too great	Realign the shafts Realign pulleys Reduce the belt tension
Flanges becoming detached	Pulleys not in line Very high lateral pressure of the timing belt Incorrect flange installation	Realign the pulleys Realign the shafts Install flanges correctly
Apparent belt stretch	Compliant storage	Adjust belt tension, reinforce and secure bearing support
Excessive operating noise	Incorrect shaft alignment Belt tension too high Pulley diameter too small Belt overloaded Belt width too great at higher speeds	Realign shafts Reduce the tension Increase pulley diameter Increase belt width or number of teeth in mesh Reduce the belt width by redesign using larger belt section
Unusual wear on the pulleys	Unsuitable material Incorrect tooth pitch Insufficient surface hardness	Use stronger materials Replace pulleys Use harder material or carry out surface hardening
Top surface of the belt brittle and cracking	Ambient temperature above +100 °C Unacceptable radiation	Replace belt with extra heat-resistant construction Screen or use suitable belt construction
Cracks in the belt surface	Ambient temperature below –30 °C	Replace belt with extra cold-resistant construction
Softening of belt surface	Effects of contamination	Screen or use suitable belt construction

Pulleys

Dimensions and Tolerances

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Optibelt ZRS Standard Pulleys

Optibelt ZRS standard pulleys are manufactured to ISO 5294 using a gear cutting process. This ensures minimum tooth clearance and a precise tooth engagement. The following figures and tables show the dimensions and tolerances of the Optibelt ZRS Standard Pulleys.

Hobbing Cutter for Pulleys with Involute Tooth Patterns to ISO 5294

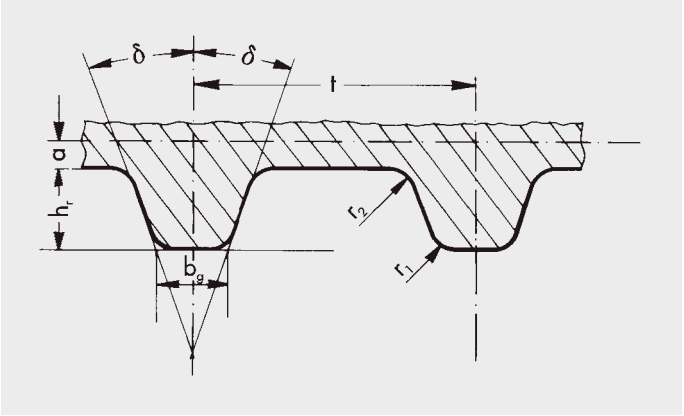

Table 26: Dimensions and permitted deviations of the hobbing cutter for pulleys with involute tooth patterns to ISO 5294

Section	Number of teeth	t [mm] ± 0.003	δ [°] ± 0.12	h_r [mm] + 0.05 0	b_g [mm] + 0.05 0	r_1 [mm] ± 0.03	r_2 [mm] ± 0.03	2 a [mm]
MXL	≥ 10	2.032	20	0.66	0.84	0.25	0.13	0.508
XL	≥ 10	5.080	20	1.40	1.27	0.61	0.61	0.508
L	≥ 10	9.525	20	2.13	3.10	0.86	0.53	0.762
H	14–19	12.700	20	2.59	4.24	1.47	1.04	1.372
	>						1.42	
XH	≥ 18	22.225	20	6.88	7.59	2.01	1.93	2.794
XXH	≥ 18	31.750	20	10.29	11.61	2.69	2.82	3.048

Table 27: Tolerances for the outside diameter of the pre-machined blanks

Outside diameter d_a [mm]	Tolerances [mm]
≤ 100	+ 0.3 + 0.2
> 100 ≤ 200	+ 0.4 + 0.3
> 200 ≤ 300	+ 0.5 + 0.4
> 300 ≤ 500	+ 0.7 + 0.5
> 500	+ 0.9 + 0.7

Permitted Tolerances in Tooth Pitch

The permitted tolerances in the distance between two teeth and the sum of the deviations within a 90° arc on a pulley are given in the following table. These tolerances are understood to be the distance between the equivalent points on the right and the left side respectively of two adjacent teeth.

Table 28

Outside diameter d_a [mm]	Permitted tolerance in tooth pitch	
	between two adjacent teeth [mm]	total within 90° arc [mm]
≤ 25.40	0.03	0.05
> 25.40 ≤ 50.80	0.03	0.08
> 50.80 ≤ 101.60	0.03	0.10
> 101.60 ≤ 177.80	0.03	0.13
> 177.80 ≤ 304.80	0.03	0.15
> 304.80 ≤ 508.00	0.03	0.18
> 508.00	0.03	0.20

Pulleys

Dimensions and Tolerances

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Table 29: Pulley widths to ISO 5294

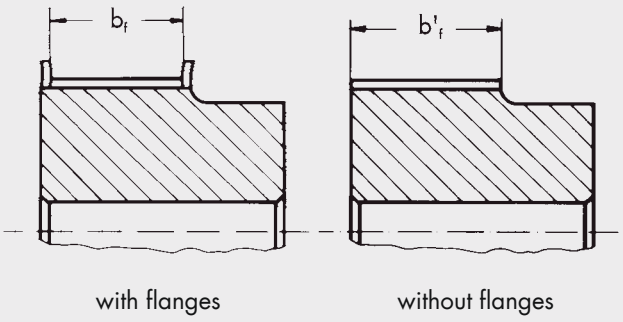
Section	Pulley width designation	Nominal pulley width [mm]	Smallest pulley width with flanges b_f [mm]	Smallest pulley width without flanges b'_f [mm]
MXL	012	3.2	3.8	5.6
	019	4.8	5.3	7.1
	025	6.4	7.1	8.9
XL	025	6.4	7.1	8.9
	031	7.9	8.6	10.4
	037	9.5	10.4	12.2
L	050	12.7	14.0	17.0
	075	19.1	20.3	23.3
	100	25.4	26.7	29.7
H	075	19.1	20.3	24.6
	100	25.4	26.7	31.2
	150	38.1	39.4	43.9
	200	50.8	52.8	57.3
	300	76.2	79.0	83.5
XH	200	50.8	56.6	62.6
	300	76.2	83.8	89.8
	400	101.6	110.7	116.7
XXH	200	50.8	56.6	64.1
	300	76.2	83.8	91.3
	400	101.6	110.7	118.2
	500	127.0	137.7	145.2

Table 30: Permitted tolerances for the outside diameter to ISO 5294

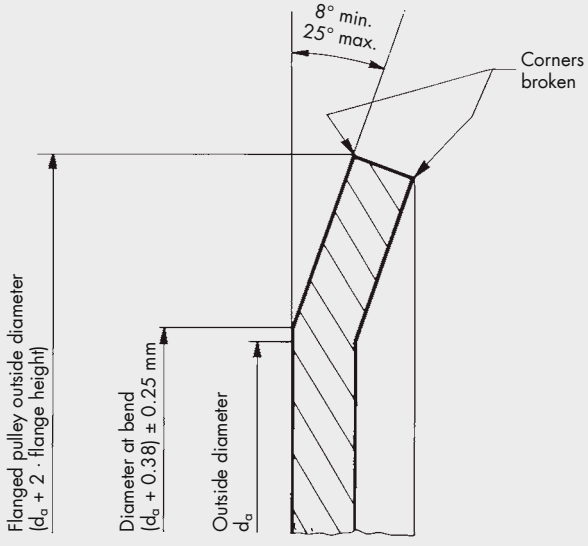
Outside diameter d_a [mm]	Permitted tolerances [mm]
≤ 25.40	+ 0.05 0
> 25.40 ≤ 50.80	+ 0.08 0
> 50.80 ≤ 101.60	+ 0.10 0
> 101.60 ≤ 177.80	+ 0.13 0
> 177.80 ≤ 304.80	+ 0.15 0
> 304.80 ≤ 508.00	+ 0.18 0
> 508.00	+ 0.20 0

Table 31: Minimum flange height to ISO 5294

Section	Minimum flange height [mm]
MXL	0.5
XL	1.0
L	1.5
H	2.0
XH	4.8
XXH	6.1



Flange dimensions to ISO 5294



Note

The minimum width for pulleys without flanges (b'_f) can be reduced if the drive alignment can be guaranteed; however it may not be less than the dimension (b_f) for the pulley with flanges.

Pulleys

Dimensions and Tolerances

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Table 32: Axial circular run-out to ISO 5294

Outside diameter d_a [mm]	Maximum total fluctuation [mm]
≤ 101.60	0.10
> 101.60 ≤ 254.00	0.01 mm per 10 mm outside diameter
> 254.00	0.25 mm + 0.0005 mm per mm outside diameter above 254.00 mm

Table 33: Radial circular run-out to ISO 5294

Outside diameter d_a [mm]	Maximum total fluctuation [mm]
≤ 203.20	0.13
> 203.20	0.13 mm + 0.0005 mm per mm outside diameter above 203.20 mm

Please also consult software:
Optibelt CAP Drive Calculation and data
Optibelt CAD 2D / 3D
online at: www.optibelt.com

Pulleys running at rim speeds in excess of 30 m/s require dynamic balancing up to $1.8 \cdot 10^{-5}$ Nm.

Parallelism

The teeth should run parallel to the axis of the bore with a tolerance of not more than 0.001 mm per millimetre width.

Taper

The taper may not exceed 0.001 mm per millimetre of the width of the driving face and at the same time should not exceed the permitted outside diameter tolerances given in table 32.

Timing Belt Pulleys

Pitch Diameter and Outside Diameter [mm]

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Table 34

Number of teeth	Type MXL		Type XL		Type L		Type H		Type XH		Type XXH	
	pitch diameter	outside diameter	pitch diameter	outside diameter	pitch diameter	outside diameter	pitch diameter	outside diameter	pitch diameter	outside diameter	pitch diameter	outside diameter
10	6.47	5.96	16.17	15.66	30.32	29.56						
11	7.11	6.61	17.79	17.28	33.35	32.59						
12	7.76	7.25	19.40	18.89	36.38	35.62						
13	8.41	7.90	21.02	20.51	39.41	38.65						
14	9.06	8.55	22.64	22.13	42.45	41.69	56.60	55.23				
15	9.70	9.19	24.26	23.75	45.48	44.72	60.64	59.27				
16	10.35	9.84	25.87	25.36	48.51	47.75	64.68	63.31				
17	11.00	10.49	27.49	26.98	51.54	50.78	68.72	67.35				
18	11.64	11.14	29.11	28.60	54.57	53.81	72.77	71.40	127.34	124.55	181.91	178.87
19	12.29	11.78	30.72	30.21	57.61	56.85	76.81	75.44	134.41	131.62	192.02	188.98
20	12.94	12.43	32.34	31.83	60.64	59.88	80.85	79.48	141.49	138.70	202.13	199.09
21	13.58	13.08	33.96	33.45	63.67	62.91	84.89	83.52	148.56	145.77	212.23	209.18
22	14.23	13.72	35.57	35.06	66.70	65.94	88.94	87.57	155.64	152.83	222.34	219.29
23	14.88	14.37	37.19	36.68	69.73	68.97	92.98	91.61	162.71	159.92	232.45	229.40
24	15.52	15.02	38.81	38.30	72.77	72.01	97.02	95.65	169.79	167.00	242.55	239.50
25	16.17	15.66	40.43	39.92	75.80	75.04	101.06	99.69	176.86	174.07	252.66	249.61
26	16.82	16.31	42.04	41.53	78.83	78.07	105.11	103.74	183.94	181.13	262.77	259.72
27	17.46	16.96	43.67	43.16	81.86	81.10	109.15	107.78	191.01	188.22	272.87	269.82
28	18.11	17.60	45.28	44.77	84.89	84.13	113.19	111.82	198.08	195.29	282.98	279.93
29	18.75	18.24	46.89	46.38	87.93	87.17	117.23	115.86	205.16	202.37	293.08	290.03
30	19.40	18.90	48.51	48.00	90.96	90.20	121.28	119.91	212.23	209.44	303.19	300.14
31	20.04	19.53	50.13	49.62	93.99	93.23	125.32	123.95	219.31	216.52	313.30	310.25
32	20.70	20.19	51.74	51.23	97.02	96.26	129.36	127.99	226.38	223.59	323.40	320.35
33	21.34	20.83	53.36	52.85	100.05	99.29	133.40	132.03	233.46	230.67	333.51	330.46
34	21.99	21.49	54.98	54.47	103.08	102.32	137.45	136.08	240.53	237.74	343.62	340.57
35	22.63	22.12	56.60	56.09	106.12	105.36	141.49	140.12	247.61	244.82	353.72	350.67
36	23.29	22.78	58.21	57.70	109.15	108.39	145.53	144.16	254.68	251.89	363.83	360.78
37	23.93	23.42	59.83	59.32	112.18	111.42	149.57	148.20	261.75	258.95	373.94	370.89
38	24.59	24.08	61.45	60.94	115.21	114.45	153.62	152.25	268.83	266.04	384.04	380.99
39	25.22	24.71	63.06	62.55	118.24	117.48	157.66	156.29	275.90	273.11	394.15	391.10
40	25.87	25.36	64.68	64.17	121.28	120.52	161.70	160.33	282.98	280.19	404.25	401.21
41	26.52	26.00	66.30	65.79	124.31	123.55	165.74	164.37	290.05	287.26	414.36	411.31
42	27.18	26.67	67.91	67.40	127.34	126.58	169.79	168.42	297.13	294.34	424.47	421.42
43	27.81	27.30	69.53	69.02	130.37	129.61	173.83	172.46	304.20	301.41	434.57	431.52
44	28.45	27.94	71.15	70.64	133.40	132.64	177.87	176.50	311.28	308.48	444.68	441.63
45	29.11	28.60	72.77	72.26	136.44	135.68	181.91	180.54	318.35	315.54	454.79	451.74
46	29.74	29.23	74.38	73.87	139.47	138.71	185.96	184.59	325.42	322.63	464.89	461.84
47	30.40	29.89	76.00	75.49	142.50	141.74	190.00	188.63	332.50	329.69	475.00	471.95
48	31.05	30.54	77.62	77.11	145.53	144.76	194.04	192.67	339.57	336.78	485.11	482.07
49	31.70	31.19	79.23	78.72	148.56	147.80	198.08	196.71	346.65	343.86	495.21	492.16
50	32.33	31.83	80.85	80.34	151.60	150.84	202.13	200.76	353.72	350.93	505.32	502.27
51	33.00	32.50	82.47	81.96	154.63	153.87	206.17	204.80	360.80	358.01	515.42	512.37
52	33.63	33.12	84.08	83.57	157.66	156.90	210.21	208.84	367.87	365.07	525.53	522.48
53	34.29	33.79	85.70	85.19	160.69	159.93	214.25	212.88	374.95	372.16	535.64	532.59
54	34.94	34.43	87.32	86.81	163.72	162.96	218.30	216.93	382.02	379.22	545.74	542.70
55	35.60	35.09	88.94	88.43	166.75	165.99	222.34	220.97	389.09	386.30	555.85	552.81
56	36.22	35.72	90.55	90.04	169.79	169.03	226.38	225.01	396.17	393.38	565.96	562.91
57	36.86	36.36	92.17	91.66	172.82	172.06	230.42	229.14	403.24	400.45	576.06	573.01
58	37.52	37.02	93.79	93.28	175.85	175.09	234.47	233.10	410.32	407.53	586.17	583.12
59	38.16	37.65	95.40	94.89	178.88	178.12	238.51	237.14	417.39	414.60	596.27	593.22
60	38.81	38.30	97.02	96.51	181.91	181.15	242.55	241.18	424.47	421.67	606.38	603.33
61	39.46	38.95	98.64	98.13	184.95	184.19	246.59	245.22	431.54	428.75	616.49	613.44
62	40.10	39.59	100.25	99.74	187.98	187.22	250.64	249.27	438.62	435.83	626.59	623.54
63	40.73	40.22	101.87	101.36	191.01	190.25	254.68	253.31	445.69	442.90	636.70	633.65
64	41.39	40.89	103.49	102.98	194.04	193.28	258.72	257.35	452.76	449.96	646.81	643.76
65	42.04	41.53	105.11	104.60	197.07	196.31	262.77	261.40	459.84	457.05	656.91	653.86
66	42.69	42.18	106.72	106.21	200.11	199.35	266.81	265.44	466.91	464.12	667.02	663.97
67	43.32	42.82	108.34	107.83	203.14	202.38	270.85	269.48	473.99	471.20	677.13	674.08
68	43.97	43.46	109.96	109.45	206.17	205.41	274.89	273.52	481.06	478.27	687.23	684.18
69	44.62	44.11	111.57	111.06	209.20	208.44	278.94	277.57	488.14	485.34	697.34	694.29
70	45.29	44.78	113.19	112.68	212.23	211.47	282.98	281.61	495.21	492.42	707.44	704.39
71	45.92	45.41	114.81	114.30	215.27	214.51	287.02	285.65	502.29	499.49	717.55	714.50
72	46.57	46.06	116.43	115.92	218.30	217.54	291.06	289.69	509.36	506.57	727.66	724.61
73	47.22	46.71	118.04	117.53	221.33	220.57	295.11	293.74	516.43	513.64	737.76	734.71
74	47.85	47.39	119.66	119.15	224.36	223.60	299.15	297.78	523.51	520.72	747.87	744.82

Timing Belt Pulleys

Pitch Diameter and Outside Diameter [mm]

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Table 35

Number of teeth	Type MXL		Type XL		Type L		Type H		Type XH		Type XXH	
	pitch diameter	outside diameter	pitch diameter	outside diameter	pitch diameter	outside diameter	pitch diameter	outside diameter	pitch diameter	outside diameter	pitch diameter	outside diameter
75	48.51	48.00	121.28	120.77	227.39	226.63	303.19	301.82	530.58	527.79	757.98	754.93
76	49.15	48.64	122.89	122.38	230.42	229.66	307.23	305.86	537.66	534.87	768.08	765.03
77	49.81	49.30	124.51	124.00	233.46	232.70	311.28	309.91	544.73	541.93	778.19	775.14
78	50.43	49.93	126.13	125.62	236.49	235.73	315.32	313.95	551.81	549.02	788.30	785.25
79	51.10	50.60	127.74	127.23	239.52	238.76	319.36	317.99	558.88	556.08	798.40	795.35
80	51.73	51.22	129.36	128.85	242.55	241.79	323.40	322.03	565.96	563.17	808.51	805.46
81	52.39	51.88	130.98	130.47	245.58	244.82	327.45	326.08	573.03	570.24	818.61	815.56
82	53.04	52.54	132.60	132.09	248.62	247.86	331.49	330.12	580.10	577.31	828.72	825.67
83	53.68	53.18	134.21	133.70	251.65	250.89	335.53	334.16	587.18	584.39	838.83	835.78
84	54.32	53.81	135.83	135.32	254.68	253.92	339.57	338.20	594.25	591.46	848.93	845.88
85	55.00	54.49	137.45	136.94	257.71	256.95	343.62	342.25	601.33	598.54	859.04	855.99
86	55.62	55.11	139.06	138.55	260.74	259.98	347.66	346.29	608.40	605.61	869.15	866.10
87	56.25	55.73	140.68	140.17	263.78	263.02	351.70	350.33	615.48	612.69	879.25	876.20
88	56.93	56.41	142.30	141.79	266.81	266.05	355.74	354.37	622.55	619.76	889.36	886.31
89	57.55	57.04	143.91	143.40	269.84	269.08	359.79	358.42	629.63	626.84	899.46	896.42
90	58.20	57.69	145.53	145.02	272.87	272.11	363.83	362.46	636.70	633.91	909.57	906.53
91	58.85	58.34	147.15	146.64	275.90	275.14	367.87	366.50	643.71	640.98	919.68	916.64
92	59.51	59.00	148.77	148.26	278.94	278.18	371.91	370.54	650.85	648.06	929.78	926.73
93	60.14	59.62	150.38	149.87	281.97	281.21	375.96	374.59	657.92	655.13	939.89	935.54
94	60.81	60.30	152.00	151.49	285.00	284.24	380.00	378.63	665.00	662.20	949.99	946.94
95	61.44	60.93	153.62	153.11	288.03	287.27	384.04	382.67	672.07	669.28	960.10	957.05
96	62.08	61.57	155.23	154.72	291.06	290.30	388.08	386.71	679.15	676.35	970.21	967.16
97	62.74	62.23	156.85	156.34	294.09	293.33	392.13	390.76	686.22	683.43	980.32	977.27
98	63.40	62.88	158.47	157.96	297.13	296.37	396.17	394.80	693.30	690.51	990.42	987.37
99	64.01	63.50	160.08	159.57	300.16	299.40	400.21	398.84	700.37	697.58	1,000.53	997.48
100	64.67	64.16	161.70	161.19	303.19	302.43	404.25	402.88	707.44	704.65	1,010.63	1,007.58
101	65.32	64.81	163.32	162.81	306.22	305.46	408.30	406.93	714.52	711.73	1,020.74	1,017.69
102	65.95	65.44	164.94	164.43	309.25	308.49	412.34	410.97	721.59	718.80	1,030.85	1,027.80
103	66.62	66.12	166.55	166.04	312.29	311.53	416.38	415.01	728.67	725.88	1,040.95	1,037.90
104	67.25	66.74	168.17	167.66	315.32	314.56	420.42	419.05	735.74	732.94	1,051.06	1,048.01
105	67.91	67.39	169.79	169.28	318.35	317.59	424.47	423.10	742.82	740.03	1,061.17	1,058.12
106	68.55	68.04	171.40	170.89	321.38	320.62	428.51	427.14	749.89	747.10	1,071.27	1,068.22
107	69.20	68.70	173.02	172.51	324.41	323.65	432.55	431.18	756.97	754.18	1,081.38	1,078.33
108	69.86	69.34	174.64	174.13	327.45	326.69	436.59	435.22	764.04	761.25	1,091.49	1,088.44
109	70.51	69.99	176.25	175.74	330.48	329.72	440.64	439.27	771.11	768.32	1,101.59	1,098.54
110	71.13	70.63	177.87	177.36	333.50	332.74	444.68	443.31	778.19	775.40	1,111.70	1,108.65
111	71.81	71.31	179.49	178.98	336.54	335.78	448.72	447.35	785.26	782.47	1,121.80	1,118.75
112	72.44	71.93	181.11	180.60	339.57	338.81	452.76	451.39	792.34	789.53	1,131.91	1,128.86
113	73.09	72.58	182.72	182.21	342.61	341.85	456.81	455.44	799.41	796.62	1,142.02	1,138.97
114	73.75	73.34	184.34	183.83	345.64	344.88	460.85	459.48	806.49	803.70	1,152.12	1,149.07
115	74.37	73.86	185.96	185.45	348.67	347.91	464.89	463.52	813.56	810.77	1,162.23	1,159.18
116	75.02	74.51	187.57	187.06	351.70	350.94	468.93	467.56	820.64	817.83	1,172.34	1,169.29
117	75.68	75.17	189.19	188.68	354.73	353.97	472.98	471.61	827.71	824.92	1,182.44	1,179.39
118	76.33	75.82	190.81	190.30	357.76	357.00	477.02	475.65	834.78	831.99	1,192.55	1,189.50
119	76.95	76.43	192.42	191.91	360.80	360.04	481.06	479.69	841.86	839.06	1,202.66	1,199.62
120	77.63	77.11	194.04	193.53	363.83	363.07	485.10	483.73	848.93	846.14	1,212.76	1,209.71

Pulleys

optibelt ZRS Sections XL, L for Cylindrical Bores

Standard Timing Belt Pulleys

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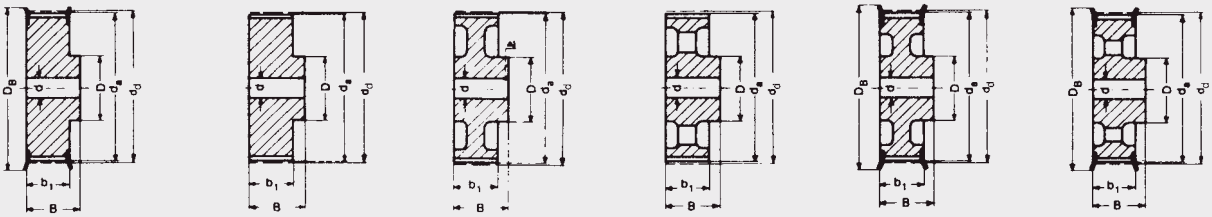
Power Transmission



Section XL – Tooth pitch 5.08 mm and width code 025, 031, 037 – belt width 6.4 mm, 7.9 mm, 9.5 mm

Designation	Number of teeth	Type	Material	d_w [mm]	d_a [mm]	D_B [mm]	b_1 [mm]	B [mm]	D [mm]	Pilot bored d [mm]	Finish bored d_{max} [mm]	Setscrew	Weight [≈ kg]
10 XL 037	10	6F	St	16.17	15.66	23	14.3	19.8	9.5	5	6.4	M3	0.02
11 XL 037	11	6F	St	17.79	17.28	23	14.3	19.8	9.5	5	6.4	M3	0.02
12 XL 037	12	6F	St	19.40	18.89	25	14.3	19.8	12.7	5	7.9	M3	0.03
14 XL 037	14	6F	St	22.64	22.13	28	14.3	19.8	14.3	6	9.5	M4	0.04
15 XL 037	15	6F	St	24.26	23.75	28	14.3	19.8	15.9	6	11.1	M4	0.04
16 XL 037	16	6F	St	25.87	25.36	32	14.3	19.8	17.5	6	12.7	M4	0.05
18 XL 037	18	6F	St	29.11	28.60	36	14.3	19.8	19.0	6	14.3	M4	0.06
20 XL 037	20	6F	St	32.34	31.83	38	14.3	22.2	23.8	6	17.5	M4	0.08
21 XL 037	21	6F	St	33.96	33.45	38	14.3	22.2	23.8	6	17.5	M4	0.09
22 XL 037	22	6F	St	35.57	35.06	42	14.3	22.2	25.4	6	19.1	M4	0.10
24 XL 037	24	6F	St	38.81	38.30	44	14.3	22.2	27.0	6	20.6	M4	0.12
26 XL 037	26	6F	St	42.04	41.53	48	14.3	22.2	30.0	6	23.0	M4	0.14
28 XL 037	28	6F	St	45.28	44.77	51	14.3	22.2	30.2	6	23.0	M4	0.16
30 XL 037	30	6F	St	48.51	48.00	54	14.3	22.2	34.9	6	23.0	M4	0.19
32 XL 037	32	6	Al	51.74	51.23	—	14.3	25.4	38.0	8	23.0	M4	0.11
36 XL 037	36	6	Al	58.21	57.70	—	14.3	25.4	38.0	8	23.0	M4	0.13
40 XL 037	40	6	Al	64.68	64.17	—	14.3	25.4	38.0	8	23.0	M4	0.17
42 XL 037	42	6W	Al	67.91	67.40	—	14.3	25.4	38.0	8	23.0	M4	0.13
44 XL 037	44	6W	Al	71.15	70.64	—	14.3	25.4	38.0	8	23.0	M4	0.15
48 XL 037	48	6W	Al	77.62	77.11	—	14.3	25.4	38.0	8	23.0	M4	0.16
60 XL 037	60	6A	Al	97.02	96.51	—	14.3	25.4	38.0	8	23.0	M4	0.18
72 XL 037	72	6A	Al	116.43	115.92	—	14.3	25.4	38.0	8	23.0	M4	0.23

Section L – Tooth pitch 9.525 mm and width code 050 – belt width 12.7 mm

10 L 050	10	6F	St	30.32	29.56	36	19	26	22	6	13	—	0.11
12 L 050	12	6F	St	36.38	35.62	42	19	26	28	6	17	—	0.19
13 L 050	13	6F	St	39.41	38.65	44	19	26	30	6	19	—	0.21
14 L 050	14	6F	St	42.45	41.68	48	19	26	33	8	20	—	0.25
15 L 050	15	6F	St	45.48	44.72	51	19	26	36	8	23	—	0.30
16 L 050	16	6F	St	48.51	47.75	54	19	26	38	8	23	—	0.33
17 L 050	17	6F	St	51.54	50.78	57	19	26	40	10	24	—	0.36
18 L 050	18	6F	St	54.57	53.81	60	19	26	40	10	24	—	0.41
19 L 050	19	6F	St	57.61	56.84	60	19	26	40	10	24	—	0.45
20 L 050	20	6F	St	60.64	59.88	66	19	26	46	10	28	—	0.50
21 L 050	21	6F	St	63.67	62.91	71	19	26	46	10	28	—	0.55
22 L 050	22	6F	St	66.70	65.94	75	19	26	50	10	30	—	0.62
24 L 050	24	6F	St	72.77	72.00	79	19	26	50	12	30	—	0.68
26 L 050	26	6F	St	78.83	78.07	87	19	26	50	12	30	—	0.82
28 L 050	28	6F	St	84.89	84.13	91	19	26	50	12	30	—	0.92
30 L 050	30	6F	St	90.96	90.20	97	19	26	50	12	30	—	1.10
32 L 050	32	6F	St	97.02	96.26	103	19	26	50	12	30	—	1.20
36 L 050	36	6WF	GG	109.15	108.24	115	19	26	50	12	30	—	1.00
40 L 050	40	6WF	GG	121.28	120.51	127	19	26	50	12	30	—	1.10
44 L 050	44	6AF	GG	133.40	132.64	140	19	26	50	12	30	—	1.20
48 L 050	48	6AF	GG	145.53	144.77	152	19	26	50	12	30	—	1.30
60 L 050	60	6A	GG	181.91	181.15	—	19	28	50	15	30	—	1.30
72 L 050	72	6A	GG	218.30	217.53	—	19	28	50	15	30	—	1.70
84 L 050	84	6A	GG	254.68	253.92	—	19	28	50	15	30	—	1.90

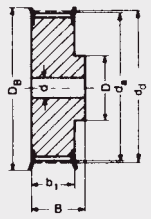
Al = aluminium St = steel GG = cast iron Subject to technical changes.

Pulleys

optibelt ZRS Sections XL, L for Cylindrical Bores

Standard Timing Belt Pulleys

optibelt
Power Transmission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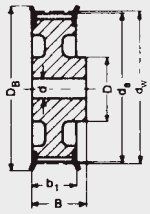
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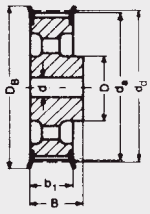
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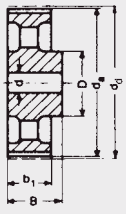
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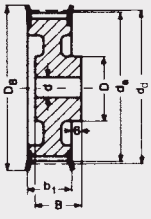
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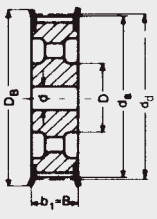

Type 10AF

Section L – Tooth pitch 9.525 mm and width code 075 – belt width 19.1 mm

Designation	Number of teeth	Type	Material	d_w [mm]	d_a [mm]	D_B [mm]	b_1 [mm]	B [mm]	D [mm]	Pilot bored d [mm]	Finish bored d_{max} [mm]	Weight [≈ kg]
10 L 075	10	6F	St	30.32	29.59	36	25	32	22	6	13	0.15
12 L 075	12	6F	St	36.38	35.62	42	25	32	28	8	17	0.23
13 L 075	13	6F	St	39.41	38.65	44	25	32	30	8	19	0.26
14 L 075	14	6F	St	42.45	41.68	48	25	32	33	8	20	0.32
15 L 075	15	6F	St	45.48	44.72	51	25	32	36	8	23	0.35
16 L 075	16	6F	St	48.51	47.75	54	25	32	38	8	23	0.42
17 L 075	17	6F	St	51.54	50.78	57	25	32	40	10	24	0.45
18 L 075	18	6F	St	54.57	53.81	60	25	32	40	10	24	0.51
19 L 075	19	6F	St	57.61	56.84	60	25	32	40	10	24	0.57
20 L 075	20	6F	St	60.64	59.88	66	25	32	46	10	28	0.63
21 L 075	21	6F	St	63.67	62.91	71	25	32	46	10	28	0.70
22 L 075	22	6F	St	66.70	65.94	75	25	32	50	10	30	0.75
24 L 075	24	6F	St	72.77	72.00	79	25	32	50	12	30	0.85
26 L 075	26	6F	St	78.83	78.07	87	25	32	50	12	30	1.00
28 L 075	28	6F	St	84.89	84.13	91	25	32	50	12	30	1.20
30 L 075	30	6F	St	90.96	90.20	97	25	32	50	12	30	1.40
32 L 075	32	6F	St	97.02	96.26	103	25	32	50	12	30	1.50
36 L 075	36	6WF	GG	109.15	108.38	115	25	32	55	12	32	1.30
40 L 075	40	6WF	GG	121.28	120.51	127	25	32	60	12	35	1.60
44 L 075	44	6AF	GG	133.40	132.64	140	25	32	60	12	35	1.70
48 L 075	48	6AF	GG	145.53	144.77	152	25	32	60	12	35	1.90
60 L 075	60	6A	GG	181.91	181.15	—	26	35	60	15	35	1.80
72 L 075	72	6A	GG	218.30	217.53	—	26	35	60	15	35	2.30
84 L 075	84	6A	GG	254.68	253.92	—	26	35	60	15	35	2.50

Section L – Tooth pitch 9.525 mm and width code 100 – belt width 25.4 mm

10 L 100	10	6F	St	30.32	29.59	36	31	38	22	6	13	0.81
12 L 100	12	6F	St	36.38	35.62	42	31	38	28	8	17	0.29
13 L 100	13	6F	St	39.41	38.65	44	31	38	30	8	19	0.30
14 L 100	14	6F	St	42.45	41.68	48	31	38	33	8	20	0.38
15 L 100	15	6F	St	45.48	44.72	51	31	38	36	8	23	0.40
16 L 100	16	6F	St	48.51	47.75	54	31	38	38	8	23	0.51
17 L 100	17	6F	St	51.54	50.78	57	31	38	40	10	24	0.54
18 L 100	18	6F	St	54.57	53.81	60	31	38	40	10	24	0.62
19 L 100	19	6F	St	57.61	56.84	60	31	38	40	10	24	0.69
20 L 100	20	6F	St	60.64	59.88	66	31	38	46	10	28	0.76
21 L 100	21	6F	St	63.67	62.91	71	31	38	46	10	28	0.82
22 L 100	22	6F	St	66.70	65.94	75	31	38	50	10	30	0.92
24 L 100	24	6F	St	72.77	72.00	79	31	38	50	12	30	1.10
26 L 100	26	6F	St	78.83	78.07	87	31	38	50	12	30	1.30
28 L 100	28	6F	St	84.89	84.13	91	31	38	50	12	30	1.40
30 L 100	30	6F	St	90.96	90.20	97	31	38	50	12	30	1.70
32 L 100	32	6F	St	97.02	96.26	103	31	38	50	12	30	1.80
36 L 100	36	6CWF	GG	109.15	108.38	115	32	32	55	12	32	1.50
40 L 100	40	6CWF	GG	121.28	120.51	127	32	32	60	12	35	1.80
44 L 100	44	10AF	GG	133.40	132.64	140	32	32	60	12	35	1.90
48 L 100	48	10AF	GG	145.53	144.77	152	32	32	60	12	35	2.10
60 L 100	60	6A	GG	181.91	181.15	—	32	35	60	15	35	2.00
72 L 100	72	6A	GG	218.30	217.53	—	32	35	60	15	35	2.50
84 L 100	84	6A	GG	254.68	253.92	—	32	35	60	15	35	2.70

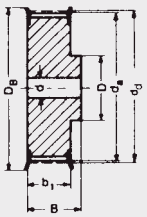
St = steel GG = cast iron Subject to technical changes.

Pulleys

optibelt ZRS Section H for Cylindrical Bores

Standard Timing Belt Pulleys

optibelt
Power Transmission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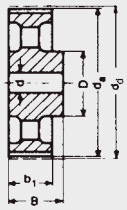
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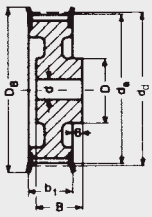
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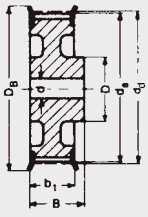
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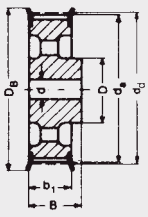

Type 6AF

Section H – Tooth pitch 12.7 mm and width code 075 – belt width 19,1 mm

Designation	Number of teeth	Type	Material	d_w [mm]	d_a [mm]	D_B [mm]	b_1 [mm]	B [mm]	D [mm]	Pilot bored d [mm]	Finish bored d_{max} [mm]	Weight [≈ kg]
14 H 075	14	6F	St	56.59	55.22	64.0	26.4	40	40	10	24	0.50
16 H 075	16	6F	St	64.67	63.31	70.0	26.4	40	46	10	26	0.60
18 H 075	18	6F	St	72.77	71.39	79.0	26.4	40	54	12	32	0.80
19 H 075	19	6F	St	76.81	75.44	82.5	26.4	40	58	12	35	1.00
20 H 075	20	6F	St	80.85	79.48	86.0	26.4	40	62	12	35	1.10
21 H 075	21	6F	St	84.89	83.52	91.0	26.4	40	67	12	38	1.20
22 H 075	22	6F	St	88.93	87.56	94.0	26.4	40	70	12	38	1.40
24 H 075	24	6F	St	97.03	95.65	102.0	26.4	40	75	12	42	1.60
26 H 075	26	6F	St	105.11	103.73	112.0	26.4	40	80	15	45	1.80
28 H 075	28	6F	St	113.18	111.82	120.0	26.4	40	80	15	45	2.00
30 H 075	30	6F	St	121.29	119.90	128.0	26.4	40	80	15	45	2.10
32 H 075	32	6F	St	129.30	127.99	135.0	26.4	40	70	15	45	2.20
36 H 075	36	6F	St	145.54	144.16	152.0	26.4	40	80	15	45	2.40
40 H 075	40	6F	St	161.70	160.33	168.0	26.4	40	80	20	45	2.80
44 H 075	44	6A	GG	177.88	176.50	184.0	26.4	40	80	20	45	2.70
48 H 075	48	6A	GG	194.03	192.67	200.0	26.4	40	90	20	50	3.00

Section H – Tooth pitch 12.7 mm and width code 100 – belt width 25.4 mm

14 H 100	14	6F	St	56.60	55.22	63	31	41	40	10	24	0.65
16 H 100	16	6F	St	64.68	63.31	71	31	41	46	10	28	0.85
18 H 100	18	6F	St	72.77	71.39	79	31	41	54	12	32	1.10
19 H 100	19	6F	St	76.81	75.44	83	31	41	58	12	34	1.20
20 H 100	20	6F	St	80.85	79.48	87	31	41	62	12	35	1.40
21 H 100	21	6F	St	84.89	83.52	91	31	41	67	12	38	1.60
22 H 100	22	6F	St	88.94	87.56	93	31	41	70	12	41	1.70
24 H 100	24	6F	St	97.02	95.65	103	31	41	75	12	45	2.00
26 H 100	26	6CWF	GG	105.11	103.73	111	32	32	55	15	32	1.40
28 H 100	28	6CWF	GG	113.19	111.82	119	32	32	60	15	35	1.60
30 H 100	30	6CWF	GG	121.28	119.90	127	32	32	60	15	35	1.70
32 H 100	32	6WF	GG	129.36	127.99	135	32	40	70	20	40	2.20
36 H 100	36	6WF	GG	145.53	144.16	152	32	40	80	20	45	3.00
40 H 100	40	6AF	GG	161.70	160.33	168	32	40	80	20	45	2.80
44 H 100	44	6AF	GG	177.87	176.50	184	32	40	80	20	45	3.10
48 H 100	48	6AF	GG	194.04	192.67	200	32	40	80	20	45	3.30
60 H 100	60	6A	GG	242.55	241.18	—	34	45	80	20	45	5.50
72 H 100	72	6A	GG	291.06	289.69	—	34	45	80	20	45	7.10
84 H 100*	84	6A	GG	339.57	338.20	—	34	45	80	20	45	8.20
96 H 100*	96	6A	GG	388.08	386.71	—	34	45	80	20	45	9.90
120 H 100*	120	6A	GG	485.10	483.73	—	34	50	90	20	50	13.10

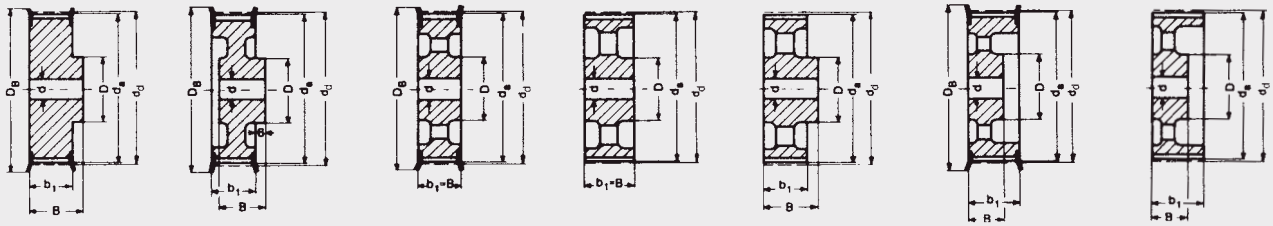
*Non stock items. St = steel GG = cast iron Subject to technical changes.

Pulleys

optibelt ZR5 Section H for Cylindrical Bores

Standard Timing Belt Pulleys

optibelt
Power Transmission



Type 6F | Type 6CWF | Type 10AF | Type 10A | Type 6A | Type 11AF | Type 11A

Section H – Tooth pitch 12.7 mm and width code 150 – belt width 38.1 mm

Designation	Number of teeth	Type	Material	d_w [mm]	d_a [mm]	D_B [mm]	b_1 [mm]	B [mm]	D [mm]	Pilot bored d [mm]	Finish bored d_{max} [mm]	Weight [≈ kg]
14 H 150	14	6F	St	56.60	55.22	63	44	54	40	12	24	0.82
16 H 150	16	6F	St	64.68	63.31	71	44	54	46	12	28	1.10
18 H 150	18	6F	St	72.77	71.39	79	44	54	54	12	32	1.50
19 H 150	19	6F	St	76.81	75.44	83	44	54	58	12	34	1.70
20 H 150	20	6F	St	80.85	79.48	87	44	54	62	12	35	1.80
21 H 150	21	6F	St	84.89	83.52	91	44	54	67	12	38	2.20
22 H 150	22	6F	St	88.94	87.56	93	44	54	70	12	41	2.30
24 H 150	24	6F	St	97.02	95.65	103	44	54	75	12	45	2.60
26 H 150	26	6CWF	GG	105.11	103.73	111	45	35	55	15	32	1.70
28 H 150	28	6CWF	GG	113.19	111.82	119	45	35	60	15	35	1.90
30 H 150	30	6CWF	GG	121.28	119.90	127	45	35	60	15	35	2.10
32 H 150	32	6CWF	GG	129.36	127.99	135	45	45	70	20	40	2.60
36 H 150	36	6CWF	GG	145.53	144.16	152	45	45	80	20	45	3.20
40 H 150	40	10AF	GG	161.70	160.33	168	45	45	80	20	45	3.80
44 H 150	44	10AF	GG	177.87	176.50	184	45	45	80	20	45	3.70
48 H 150	48	10AF	GG	194.04	192.67	200	45	45	80	20	45	4.00
60 H 150	60	10A	GG	242.55	241.18	—	46	46	85	20	48	5.10
72 H 150	72	10A	GG	291.06	289.69	—	46	46	85	20	48	7.90
84 H 150*	84	10A	GG	339.57	338.20	—	46	46	85	20	48	8.90
96 H 150*	96	10A	GG	388.08	386.71	—	46	46	85	20	48	10.10
120 H 150*	120	6A	GG	485.10	483.73	—	46	55	95	24	55	17.20

Section H – Tooth pitch 12.7 mm and width code 200 – belt width 50.8 mm

14 H 200	14	6F	St	56.60	55.22	63	58	68	40	12	24	1.1
16 H 200	16	6F	St	64.68	63.31	71	58	68	46	15	28	1.4
18 H 200	18	6F	St	72.77	71.39	79	58	68	54	15	32	1.8
19 H 200	19	6F	St	76.81	75.44	83	58	68	58	15	34	2.1
20 H 200	20	6F	St	80.85	79.48	87	58	68	62	15	35	2.3
21 H 200	21	6F	St	84.89	83.52	91	58	68	67	15	38	2.6
22 H 200	22	6F	St	88.94	87.56	93	58	68	70	15	41	2.8
24 H 200	24	6F	St	97.02	95.65	103	58	68	75	15	45	3.4
26 H 200	26	6CWF	GG	105.11	103.73	111	58	42	60	15	35	2.3
28 H 200	28	6CWF	GG	113.19	111.82	119	58	42	60	15	35	2.5
30 H 200	30	6CWF	GG	121.28	119.90	127	58	42	70	15	40	2.9
32 H 200	32	6CWF	GG	129.36	127.99	135	58	47	70	20	40	3.2
36 H 200	36	6CWF	GG	145.53	144.16	152	58	47	80	20	45	3.8
40 H 200	40	11AF	GG	161.70	160.33	168	58	45	80	20	45	4.1
44 H 200	44	11AF	GG	177.87	176.50	184	58	45	80	20	45	4.4
48 H 200	48	11AF	GG	194.04	192.67	200	58	45	85	20	48	5.1
60 H 200	60	11A	GG	242.55	241.18	—	60	50	90	20	50	7.1
72 H 200	72	11A	GG	291.06	289.69	—	60	50	90	20	50	8.0
84 H 200*	84	11A	GG	339.57	338.20	—	60	50	90	20	50	12.0
96 H 200*	96	11A	GG	388.08	386.71	—	60	50	90	20	50	13.6
120 H 200*	120	10A	GG	485.10	483.73	—	60	60	100	24	57	16.6

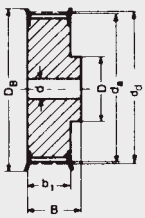
*Non stock items. St = steel GG = cast iron Subject to technical changes.

Pulleys

optibelt ZRS Sections H, XH for Cylindrical Bores

Standard Timing Belt Pulleys

optibelt
Power Transmission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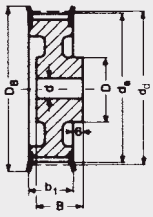
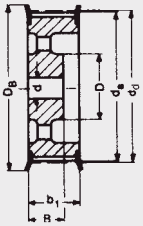
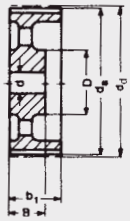
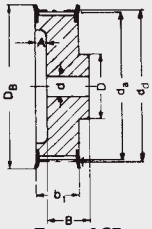

Type 6CWF


Type 11AF


Type 11A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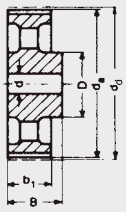

Type 6A

Section H – Tooth pitch 12.7 mm and width code 300 – belt width 76.2 mm

Designation	Number of teeth	Type	Material	d_w [mm]	d_a [mm]	D_B [mm]	b_1 [mm]	B [mm]	D [mm]	A [mm]	Pilot bored d [mm]	Finish bored d_{max} [mm]	Weight [≈ kg]
16 H 300	16	6F	St	64.68	63.31	71	84	94	46	—	15	28	2.0
18 H 300	18	6F	St	72.77	71.39	79	84	94	54	—	15	32	2.6
19 H 300	19	6F	St	76.81	75.44	83	84	94	58	—	15	34	2.9
20 H 300	20	6F	St	80.85	79.48	87	84	94	62	—	15	35	3.2
21 H 300	21	6F	St	84.89	83.52	91	84	94	67	—	15	38	3.6
22 H 300	22	6F	St	88.94	87.56	93	84	94	70	—	15	41	4.0
24 H 300	24	6F	St	97.02	95.65	103	84	94	75	—	15	45	4.7
26 H 300	26	6CWF	GG	105.11	103.73	111	84	57	60	—	15	35	3.3
28 H 300	28	6CWF	GG	113.19	111.82	119	84	57	60	—	15	35	3.6
30 H 300	30	6CWF	GG	121.28	119.90	127	84	57	70	—	15	40	4.2
32 H 300	32	6CWF	GG	129.36	127.99	135	84	57	70	—	20	40	4.3
36 H 300	36	6CWF	GG	145.53	144.16	152	84	57	80	—	20	45	5.2
40 H 300	40	11AF	GG	161.70	160.33	168	84	55	80	—	20	45	5.6
44 H 300	44	11AF	GG	177.87	176.50	184	84	55	80	—	20	45	5.9
48 H 300	48	11AF	GG	194.04	192.67	200	84	55	85	—	20	48	6.6
60 H 300	60	11A	GG	242.55	241.18	—	86	55	100	—	20	57	9.9
72 H 300	72	11A	GG	291.06	289.69	—	86	55	100	—	20	57	13.0
84 H 300*	84	11A	GG	339.57	338.20	—	86	55	100	—	20	57	15.1
96 H 300*	96	11A	GG	388.08	386.71	—	86	55	100	—	20	57	18.2
120 H 300*	120	11A	GG	485.10	483.73	—	86	65	110	—	24	62	26.0

Section XH – Tooth pitch 22.225 mm and width code 200 – belt width 50.8 mm

18 XH 200*	18	6CF	GG	127.34	124.55	142	64.4	60	85	18	20	50	5.0
20 XH 200*	20	6CF	GG	141.49	138.69	155	64.4	60	95	18	20	55	6.0
22 XH 200*	22	6CF	GG	155.64	152.84	170	64.4	60	110	18	20	65	7.2
24 XH 200*	24	6CF	GG	169.79	166.69	184	64.4	60	125	18	25	70	8.6
26 XH 200*	26	6CF	GG	183.94	181.14	198	64.4	60	140	18	25	80	10.1
28 XH 200*	28	6CWF	GG	198.08	195.29	212	64.4	60	120	18	25	70	9.6
30 XH 200*	30	6CWF	GG	212.23	209.44	227	64.4	60	120	18	25	70	10.4
32 XH 200*	32	6CWF	GG	226.38	223.59	240	64.4	60	130	18	25	75	11.2
40 XH 200*	40	6CWF	GG	282.98	280.18	297	64.4	60	140	18	25	80	16.0
48 XH 200*	48	6A	GG	339.57	336.78	—	65.0	80	150	—	30	85	18.4
60 XH 200*	60	6A	GG	424.47	421.67	—	65.0	80	150	—	30	85	24.3
72 XH 200*	72	6A	GG	509.36	506.57	—	65.0	80	150	—	40	85	28.1
84 XH 200*	84	6A	GG	594.25	591.46	—	65.0	80	160	—	40	90	31.9
96 XH 200*	96	6A	GG	679.15	676.35	—	65.0	80	160	—	40	90	37.0

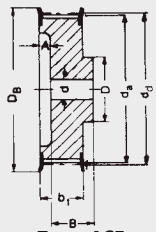
*Non stock items. St = steel GG = cast iron Subject to technical changes.

Pulleys

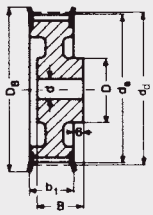
optibelt ZR5 Sections H, XH for Cylindrical Bores

Standard Timing Belt Pulleys

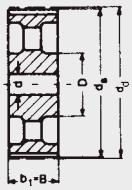
optibelt
Power Transmission



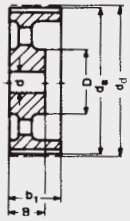
Type 6CF



Type 6CWF



Type 10A



Type 11A

Section XH – Tooth pitch 22.225 mm and width code 300 – belt width 76.2 mm

Designation	Number of teeth	Type	Material	d_w [mm]	d_a [mm]	D_B [mm]	b_1 [mm]	B [mm]	D [mm]	A [mm]	Pilot bored d [mm]	Finish bored d_{max} [mm]	Weight [≈ kg]
18 XH 300*	18	6CF	GG	127.34	124.55	142	91.4	70	85	35	20	50	6.8
20 XH 300*	20	6CF	GG	141.49	138.69	155	91.4	70	95	35	20	55	7.4
22 XH 300*	22	6CF	GG	155.64	152.84	170	91.4	70	110	35	20	65	9.0
24 XH 300*	24	6CF	GG	169.79	166.69	184	91.4	70	125	35	25	70	10.6
26 XH 300*	26	6CF	GG	183.94	181.14	198	91.4	70	140	35	25	80	13.0
28 XH 300*	28	6CWF	GG	198.08	195.29	212	91.4	70	120	35	25	70	12.0
30 XH 300*	30	6CWF	GG	212.23	209.44	227	91.4	70	120	35	25	70	13.0
32 XH 300*	32	6CWF	GG	226.38	223.59	240	91.4	70	130	35	25	75	14.7
40 XH 300*	40	6CWF	GG	282.98	280.18	297	91.4	70	140	35	25	80	19.9
48 XH 300*	48	10A	GG	339.57	336.78	—	92.0	92	150	—	30	85	22.5
60 XH 300*	60	10A	GG	424.47	421.67	—	92.0	92	150	—	30	85	31.5
72 XH 300*	72	10A	GG	509.36	506.57	—	92.0	92	150	—	40	85	36.4
84 XH 300*	84	10A	GG	594.25	591.46	—	92.0	92	160	—	40	90	43.4
96 XH 300*	96	10A	GG	679.15	676.35	—	92.0	92	160	—	40	90	48.5

Section XH – Tooth pitch 22.225 mm and width code 400 – belt width 101.6 mm

18 XH 400*	18	6CF	GG	127.34	124.55	142	118.4	85	85	47	20	50	8.5
20 XH 400*	20	6CF	GG	141.49	138.69	155	118.4	85	95	47	20	55	9.4
22 XH 400*	22	6CF	GG	155.64	152.84	170	118.4	85	110	47	20	65	11.5
24 XH 400*	24	6CF	GG	169.79	166.69	184	118.4	85	125	47	25	70	13.4
26 XH 400*	26	6CF	GG	183.94	181.14	198	118.4	85	140	47	25	80	15.6
28 XH 400*	28	6CWF	GG	198.08	195.29	212	118.4	85	120	47	25	70	14.5
30 XH 400*	30	6CWF	GG	212.23	209.44	227	118.4	85	120	47	25	70	16.0
32 XH 400*	32	6CWF	GG	226.38	223.59	240	118.4	85	130	47	25	75	18.0
40 XH 400*	40	6CWF	GG	282.98	280.18	297	118.4	85	140	47	25	80	24.0
48 XH 400*	48	11A	GG	339.57	336.78	—	119.0	92	150	—	30	85	30.8
60 XH 400*	60	11A	GG	424.47	421.67	—	119.0	92	150	—	30	85	36.2
72 XH 400*	72	11A	GG	509.36	506.57	—	119.0	92	150	—	40	85	42.7
84 XH 400*	84	11A	GG	594.25	591.46	—	119.0	92	160	—	40	90	49.7
96 XH 400*	96	11A	GG	679.15	676.35	—	119.0	92	160	—	40	90	59.9

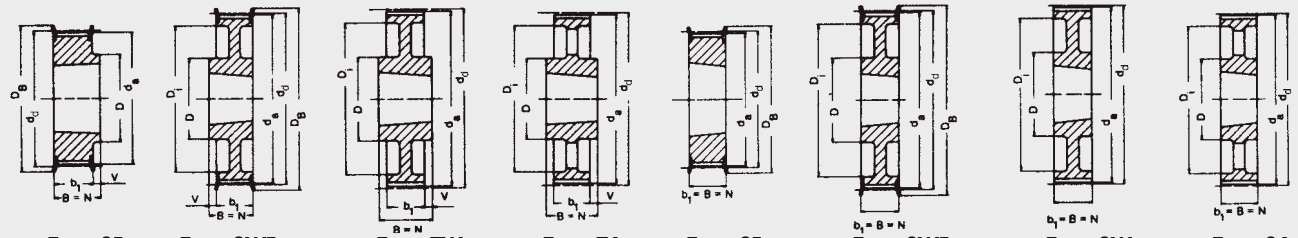
*Non stock items. GG = cast iron Subject to technical changes.

Pulleys

optibelt *ZRS* Section L for optibelt *TB* Taper Bushes

Standard Timing Belt Pulleys

optibelt
Power Transmission



Type 8F | Type 8WF | Type 7W | Type 7A | Type 3F | Type 3WF | Type 3W | Type 3A

Section L – Tooth pitch 9.525 mm and width code 050 – belt width 12.7 mm

Designation	Number of teeth	Type	Material	d_w [mm]	d_a [mm]	D_B [mm]	b_1 [mm]	B [mm]	N [mm]	V [mm]	Z [mm]	D [mm]	D_1 [mm]	Taper bush	Weight without bush [≈ kg]
TB 18 L 050	18	8F	St	54.57	53.81	60	19	22	22	3.0	—	44	—	1108	0.2
TB 19 L 050	19	8F	St	57.61	56.84	60	19	22	22	3.0	—	44	—	1108	0.2
TB 20 L 050	20	8F	St	60.64	59.88	66	19	22	22	3.0	—	48	—	1108	0.2
TB 21 L 050	21	8F	St	63.67	62.91	71	19	22	22	3.0	—	48	—	1108	0.3
TB 22 L 050	22	8F	St	66.70	65.94	75	19	22	22	3.0	—	51	—	1108	0.3
TB 23 L 050	23	8F	St	69.73	68.97	79	19	22	22	3.0	—	54	—	1108	0.4
TB 24 L 050	24	8F	St	72.77	72.00	79	19	22	22	3.0	—	54	—	1108	0.4
TB 25 L 050	25	8F	St	75.80	75.04	83	19	22	22	3.0	—	56	—	1108	0.5
TB 26 L 050	26	8F	St	78.83	78.07	87	19	22	22	3.0	—	60	—	1108	0.5
TB 27 L 050	27	8F	St	81.86	81.10	87	19	22	22	3.0	—	65	—	1108	0.6
TB 28 L 050	28	8F	St	84.89	84.13	91	19	22	22	3.0	—	65	—	1108	0.6
TB 30 L 050	30	8F	St	90.96	90.20	97	19	22	22	3.0	—	70	—	1108	0.8
TB 32 L 050	32	8F	St	97.02	96.26	103	19	22	22	3.0	—	74	—	1108	0.9
TB 36 L 050	36	8F	GG	109.15	108.39	115	19	22	22	3.0	—	87	—	1108	1.2
TB 40 L 050	40	8F	GG	121.28	120.51	127	19	25	25	6.0	—	97	—	1610	1.5
TB 48 L 050	48	8WF	GG	145.53	144.77	152	19	25	25	6.0	—	88	124	1610	2.3
TB 60 L 050	60	7W	GG	181.91	181.15	—	19	25	25	3.0	—	92	166	1610	2.0
TB 72 L 050	72	7A	GG	218.30	217.53	—	19	25	25	3.0	—	92	202	1610	3.0
TB 84 L 050	84	7A	GG	254.68	253.90	—	19	25	25	3.0	—	92	236	1610	4.0
TB 96 L 050	96	7A	GG	291.06	290.30	—	19	32	32	6.5	—	106	270	2012	5.5
TB 120 L 050	120	7A	GG	363.83	363.07	—	19	32	32	6.5	—	106	343	2012	6.8

Section L – Tooth pitch 9.525 mm and width code 075 – belt width 19.1 mm

Designation	Number of teeth	Type	Material	d_w [mm]	d_a [mm]	D_B [mm]	b_1 [mm]	B [mm]	N [mm]	V [mm]	Z [mm]	D [mm]	D_1 [mm]	Taper bush	Weight without bush [≈ kg]
TB 18 L 075	18	3F	St	54.57	53.81	60	25	25	25	—	—	—	—	1108	0.2
TB 19 L 075	19	3F	St	57.61	56.84	60	25	25	25	—	—	—	—	1108	0.3
TB 20 L 075	20	3F	St	60.64	59.88	66	25	25	25	—	—	—	—	1108	0.3
TB 21 L 075	21	3F	St	63.67	62.91	71	25	25	25	—	—	—	—	1108	0.4
TB 22 L 075	22	3F	St	66.70	65.94	75	25	25	25	—	—	—	—	1108	0.4
TB 23 L 075	23	3F	St	69.73	68.97	79	25	25	25	—	—	—	—	1108	0.4
TB 24 L 075	24	3F	St	72.77	72.00	79	25	25	25	—	—	—	—	1108	0.5
TB 25 L 075	25	3F	St	75.80	75.04	83	25	25	25	—	—	—	—	1108	0.6
TB 26 L 075	26	3F	St	78.83	78.07	87	25	25	25	—	—	—	—	1108	0.6
TB 27 L 075	27	3F	St	81.86	81.10	87	25	25	25	—	—	—	—	1108	0.7
TB 28 L 075	28	3F	St	84.89	84.13	91	25	25	25	—	—	—	—	1108	0.7
TB 30 L 075	30	3F	St	90.96	90.20	97	25	25	25	—	—	—	—	1108	0.9
TB 32 L 075	32	3F	St	97.02	96.26	103	25	25	25	—	—	—	—	1108	1.0
TB 36 L 075	36	3F	GG	109.15	108.39	115	25	25	25	—	—	—	—	1610	1.2
TB 40 L 075	40	3F	GG	121.28	120.51	127	25	25	25	—	—	—	—	1610	1.7
TB 48 L 075	48	3WF	GG	145.53	144.77	152	25	25	25	—	—	92	124	1610	2.5
TB 60 L 075	60	3W	GG	181.91	181.15	—	25	25	25	—	—	92	166	1610	3.0
TB 72 L 075	72	3A	GG	218.30	217.53	—	25	25	25	—	—	92	202	1610	4.0
TB 84 L 075	84	7A	GG	254.68	253.90	—	25	32	32	3.5	—	106	236	2012	5.2
TB 96 L 075	96	7A	GG	291.06	290.30	—	25	32	32	3.5	—	106	270	2012	6.5
TB 120 L 075	120	7A	GG	363.83	363.07	—	25	32	32	3.5	—	106	343	2012	7.6

Taper bush	1108	1610	2012
Bore d_2 [mm] from ... to ...	10-28	14-42	14-50

St = steel
GG = cast iron
Subject to technical changes.

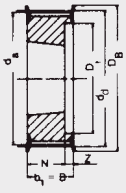
Bore diameters d_2 see page 56.

Pulleys

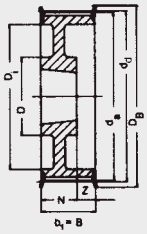
optibelt *ZRS* Section L for optibelt *TB* Taper Bushes

Standard Timing Belt Pulleys

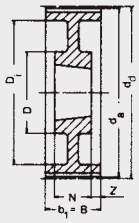
optibelt
Power Transmission



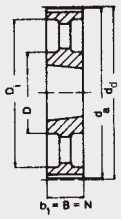
Type 5F



Type 5WF



Type 9W



Type 3A

Section L – Tooth pitch 9.525 mm and width code 100 – belt width 25.4 mm

Designation	Number of teeth	Type	Material	d_w [mm]	d_a [mm]	D_B [mm]	b_1 [mm]	B [mm]	N [mm]	V [mm]	Z [mm]	D [mm]	D_1 [mm]	Taper bush	Weight without bush [≈ kg]
TB 18 L 100	18	5F	St	54.57	53.81	60	31	31	22	—	9.0	—	38	1108	0.2
TB 19 L 100	19	5F	St	57.61	56.84	60	31	31	22	—	9.0	—	38	1108	0.3
TB 20 L 100	20	5F	St	60.64	59.88	66	31	31	22	—	9.0	—	45	1108	0.4
TB 21 L 100	21	5F	St	63.67	62.91	71	31	31	22	—	9.0	—	47	1108	0.4
TB 22 L 100	22	5F	St	66.70	65.94	75	31	31	22	—	9.0	—	51	1108	0.4
TB 23 L 100	23	5F	St	69.73	68.97	79	32	32	22	—	10.0	—	54	1108	0.5
TB 24 L 100	24	5F	St	72.77	72.00	79	32	32	22	—	10.0	—	54	1108	0.6
TB 25 L 100	25	5F	St	75.80	75.04	83	32	32	22	—	10.0	—	56	1108	0.6
TB 26 L 100	26	5F	St	78.83	78.07	87	32	32	22	—	10.0	—	60	1108	0.7
TB 27 L 100	27	5F	St	81.86	81.10	87	32	32	22	—	10.0	—	62	1108	0.8
TB 28 L 100	28	5F	St	84.89	84.13	91	32	32	22	—	10.0	—	65	1108	0.8
TB 30 L 100	30	5F	St	90.96	90.20	97	32	32	25	—	7.0	—	71	1210	0.9
TB 32 L 100	32	5F	St	97.02	96.26	103	32	32	25	—	7.0	—	75	1210	1.0
TB 36 L 100	36	5F	GG	109.15	108.39	115	32	32	25	—	7.0	—	89	1610	1.4
TB 40 L 100	40	5F	GG	121.28	120.51	127	32	32	25	—	7.0	—	101	1610	1.7
TB 48 L 100	48	5WF	GG	145.53	144.77	152	32	32	25	—	7.0	92	124	1610	2.7
TB 60 L 100	60	9W	GG	181.91	181.15	—	32	32	25	—	3.5	92	166	1610	2.4
TB 72 L 100	72	3A	GG	218.30	217.53	—	32	32	32	—	—	106	202	2012	4.4
TB 84 L 100	84	3A	GG	254.68	253.90	—	32	32	32	—	—	106	236	2012	6.0
TB 96 L 100	96	3A	GG	291.06	290.30	—	32	32	32	—	—	106	270	2012	7.1
TB 120 L 100	120	3A	GG	363.83	363.07	—	32	32	32	—	—	106	343	2012	8.5

Taper bush	1108	1210	1610	2012
Bore d_2 [mm] from ... to ...	10-28	11-32	14-42	14-50

St = steel
GG = cast iron
Subject to technical changes.

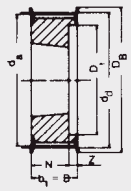
Bore diameters d_2 see page 56.

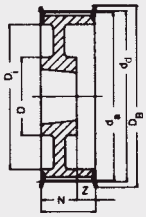
Pulleys

optibelt *ZRS* Section H for optibelt *TB* Taper Bushes

Standard Timing Belt Pulleys

optibelt
Power Transmission


Type 5F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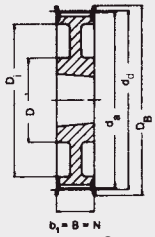
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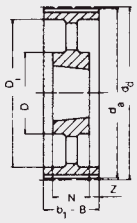
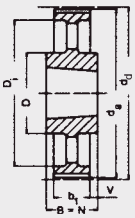

Type 9A


Type 7A

Section H – Tooth pitch 12.7 mm and width code 100 – belt width 25.4 mm

Designation	Number of teeth	Type	Material	d_w [mm]	d_a [mm]	D_B [mm]	b_1 [mm]	B [mm]	N [mm]	V [mm]	Z [mm]	D [mm]	D_1 [mm]	Taper bush	Weight without bush [≈ kg]
TB 16 H 100	16	5F	St	64.68	63.31	71	31	31	22	–	9.0	–	45	1108	0.4
TB 18 H 100	18	5F	St	72.77	71.39	79	31	31	25	–	6.0	–	52	1210	0.5
TB 19 H 100	19	5F	St	76.81	75.44	83	31	31	25	–	6.0	–	56	1210	0.6
TB 20 H 100	20	5F	St	80.55	79.48	87	31	31	25	–	6.0	–	60	1210	0.7
TB 21 H 100	21	5F	GG	84.89	83.52	91	32	32	25	–	7.0	–	63	1210	0.8
TB 22 H 100	22	5F	GG	88.94	87.56	93	32	32	25	–	7.0	–	67	1210	0.9
TB 23 H 100	23	5F	GG	92.98	91.61	97	32	32	25	–	7.0	–	71	1610	0.9
TB 24 H 100	24	5F	GG	97.02	95.65	103	32	32	25	–	7.0	–	75	1610	1.0
TB 25 H 100	25	5F	GG	101.06	99.69	106	32	32	25	–	7.0	–	79	1610	1.0
TB 26 H 100	26	5F	GG	105.11	103.73	111	32	32	25	–	7.0	–	83	1610	1.2
TB 27 H 100	27	5F	GG	109.15	107.78	115	32	32	25	–	7.0	–	87	1610	1.3
TB 28 H 100	28	5F	GG	113.19	111.82	119	32	32	25	–	7.0	–	91	1610	1.5
TB 30 H 100	30	5F	GG	121.28	119.90	127	32	32	25	–	7.0	–	99	1610	1.7
TB 32 H 100	32	5WF	GG	129.36	127.99	135	32	32	25	–	7.0	92	108	1610	2.0
TB 36 H 100	36	5WF	GG	145.53	144.16	152	32	32	25	–	7.0	92	124	1610	2.7
TB 40 H 100	40	5WF	GG	161.70	160.33	168	32	32	25	–	7.0	92	140	1610	3.6
TB 44 H 100	44	3WF	GG	177.87	176.50	184	32	32	32	–	–	106	153	2012	3.8
TB 48 H 100	48	3WF	GG	194.04	192.67	200	32	32	32	–	–	106	169	2012	3.2
TB 60 H 100	60	9A	GG	242.55	241.18	–	34	34	32	–	1.0	106	223	2012	4.8
TB 72 H 100	72	9A	GG	291.06	289.69	–	34	34	32	–	1.0	106	270	2012	5.7
TB 84 H 100*	84	9A	GG	339.57	338.20	–	34	34	32	–	1.0	106	318	2012	6.8
TB 96 H 100*	96	7A	GG	388.08	386.71	–	34	45	45	5.5	–	119	366	2517	8.2
TB 120 H 100*	120	7A	GG	485.10	483.73	–	34	45	45	5.5	–	119	462	2517	12.1

Section H – Tooth pitch 12.7 mm and width code 150 – belt width 38.1 mm

TB 18 H 150	18	5F	St	72.77	71.39	79	45	45	25	–	20.0	–	53	1210	0.6
TB 19 H 150	19	5F	St	76.81	75.44	83	45	45	25	–	20.0	–	56	1210	0.7
TB 20 H 150	20	5F	St	80.55	79.48	87	45	45	25	–	20.0	–	60	1210	0.8
TB 21 H 150	21	5F	GG	84.89	83.52	91	45	45	25	–	20.0	–	64	1210	1.0
TB 22 H 150	22	5F	GG	88.94	87.56	93	45	45	25	–	20.0	–	68	1210	1.2
TB 23 H 150	23	5F	GG	92.98	91.61	97	45	45	25	–	20.0	–	71	1610	1.3
TB 24 H 150	24	5F	GG	97.02	95.65	103	45	45	25	–	20.0	–	74	1610	1.2
TB 25 H 150	25	5F	GG	101.06	99.69	106	45	45	25	–	20.0	–	78	1610	1.2
TB 26 H 150	26	5F	GG	105.11	103.73	111	45	45	25	–	20.0	–	82	1610	1.4
TB 27 H 150	27	5F	GG	109.15	107.78	115	45	45	25	–	20.0	–	87	1610	1.6
TB 28 H 150	28	5F	GG	113.19	111.82	119	45	45	25	–	20.0	–	91	1610	1.8
TB 30 H 150	30	5F	GG	121.28	119.90	127	45	45	25	–	20.0	–	99	1610	2.0
TB 32 H 150	32	5WF	GG	129.36	127.99	135	45	45	25	–	20.0	92	108	1610	2.3
TB 36 H 150	36	5WF	GG	145.53	144.16	152	45	45	25	–	20.0	92	124	1610	3.1
TB 40 H 150	40	5WF	GG	161.70	160.33	168	45	45	25	–	20.0	92	140	1610	4.0
TB 44 H 150	44	5WF	GG	177.87	176.50	184	45	45	32	–	13.0	106	153	2012	4.4
TB 48 H 150	48	5WF	GG	194.04	192.67	200	45	45	32	–	13.0	106	169	2012	4.8
TB 60 H 150	60	9A	GG	242.55	241.18	–	46	46	32	–	7.0	106	223	2012	5.4
TB 72 H 150	72	9A	GG	291.06	289.69	–	46	46	32	–	7.0	106	270	2012	6.5
TB 84 H 150*	84	9A	GG	339.57	338.20	–	46	46	32	–	7.0	106	320	2012	8.4
TB 96 H 150*	96	9A	GG	388.08	386.71	–	46	46	45	–	0.5	119	366	2517	11.0
TB 120 H 150*	120	9A	GG	485.10	483.73	–	46	46	45	–	0.5	119	462	2517	14.8

Taper bush	1108	1210	1610	2012	2517
Bore d_2 [mm] from ... to ...	10-28	11-32	14-42	14-50	16-60

St = steel
GG = cast iron
Subject to technical changes.

Bore diameters d_2 see page 56.

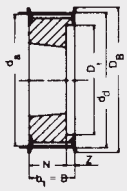
*Non stock items.

Pulleys

optibelt *ZRS* Section H for optibelt *TB* Taper Bushes

Standard Timing Belt Pulleys

optibelt
Power Transmission



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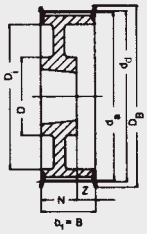

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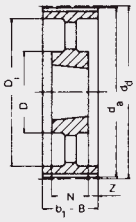
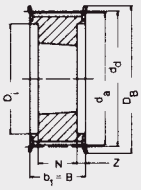
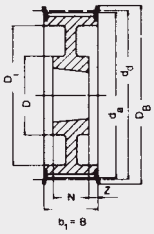


Type 9A



Type 4F



Type 4WF

Section H – Tooth pitch 12.7 mm and width code 200 – belt width 50.8 mm

Designation	Number of teeth	Type	Material	d_w [mm]	d_a [mm]	D_B [mm]	b_1 [mm]	B [mm]	N [mm]	V [mm]	Z [mm]	D [mm]	D_1 [mm]	Taper bush	Weight without bush [≈ kg]
TB 18 H 200	18	5F	St	72.77	71.39	79	58	58	25	–	33.0	–	52	1210	0.8
TB 19 H 200	19	5F	St	76.81	75.44	83	58	58	25	–	33.0	–	56	1610	0.9
TB 20 H 200	20	5F	St	80.55	79.48	87	58	58	25	–	33.0	–	60	1610	1.0
TB 21 H 200	21	5F	GG	84.89	83.52	91	58	58	25	–	33.0	–	64	1610	1.7
TB 22 H 200	22	5F	GG	88.94	87.56	93	58	58	25	–	33.0	–	68	1610	1.5
TB 23 H 200	23	5F	GG	92.98	91.61	97	58	58	25	–	33.0	–	71	1610	1.8
TB 24 H 200	24	5F	GG	97.02	95.65	103	58	58	25	–	33.0	–	74	1610	1.5
TB 25 H 200	25	5F	GG	101.06	99.69	106	58	58	25	–	33.0	–	78	1610	1.5
TB 26 H 200	26	5F	GG	105.11	103.73	111	58	58	25	–	33.0	–	82	1610	1.8
TB 27 H 200	27	5F	GG	109.15	107.78	115	58	58	25	–	33.0	–	87	1610	1.9
TB 28 H 200	28	5F	GG	113.19	111.82	119	58	58	25	–	33.0	–	91	1610	1.9
TB 30 H 200	30	5F	GG	121.28	119.90	127	58	58	25	–	33.0	–	99	1610	2.3
TB 32 H 200	32	5F	GG	129.36	127.99	135	58	58	32	–	26.0	–	107	2012	3.0
TB 36 H 200	36	5WF	GG	145.53	144.16	152	58	58	32	–	26.0	102	124	2012	3.0
TB 40 H 200	40	5WF	GG	161.70	160.33	168	58	58	32	–	26.0	106	140	2012	3.6
TB 44 H 200	44	5WF	GG	177.87	176.50	184	58	58	32	–	26.0	106	153	2012	4.5
TB 48 H 200	48	5WF	GG	194.04	192.67	200	58	58	45	–	13.0	119	169	2517	4.6
TB 60 H 200	60	9A	GG	242.55	241.18	–	60	60	45	–	7.5	119	223	2517	7.0
TB 72 H 200	72	9A	GG	291.06	289.69	–	60	60	45	–	7.5	119	270	2517	8.0
TB 84 H 200*	84	9A	GG	339.57	338.20	–	60	60	45	–	7.5	119	320	2517	9.0
TB 96 H 200*	96	9A	GG	388.08	386.71	–	60	60	45	–	7.5	119	366	2517	11.5
TB 120 H 200*	120	9A	GG	485.10	483.73	–	60	60	45	–	7.5	119	462	2517	15.4

Section H – Tooth pitch 12.7 mm and width code 300 – belt width 76.2 mm

TB 20 H 300	20	4F	St	80.55	79.48	87	84	84	38	–	23.0	–	65	1615	1.5
TB 21 H 300	21	4F	GG	84.89	83.52	91	84	84	38	–	23.0	–	66	1615	1.2
TB 22 H 300	22	4F	GG	88.94	87.56	93	84	84	38	–	23.0	–	67	1615	1.6
TB 23 H 300	23	4F	GG	92.98	91.61	97	84	84	38	–	23.0	–	71	1615	1.8
TB 24 H 300	24	4F	GG	97.02	95.65	103	84	84	38	–	23.0	–	75	1615	2.1
TB 25 H 300	25	4F	GG	101.06	99.69	106	84	84	38	–	23.0	–	79	1615	2.0
TB 26 H 300	26	4F	GG	105.11	103.73	111	84	84	38	–	23.0	–	83	1615	2.7
TB 27 H 300	27	4F	GG	109.15	107.78	115	84	84	32	–	26.0	–	87	2012	3.0
TB 28 H 300	28	4F	GG	113.19	111.82	119	84	84	32	–	26.0	–	91	2012	2.4
TB 30 H 300	30	4F	GG	121.28	119.90	127	84	84	32	–	26.0	–	99	2012	2.9
TB 32 H 300	32	4F	GG	129.36	127.99	135	84	84	45	–	19.5	–	107	2517	3.3
TB 36 H 300	36	4F	GG	145.53	144.16	152	84	84	45	–	19.5	–	124	2517	4.5
TB 40 H 300	40	4F	GG	161.70	160.33	168	84	84	45	–	19.5	–	137	2517	6.0
TB 44 H 300	44	4WF	GG	177.87	176.50	184	86	86	45	–	20.5	119	153	2517	6.6
TB 48 H 300	48	4WF	GG	194.04	192.67	200	86	86	45	–	20.5	119	169	2517	7.6
TB 60 H 300	60	9A	GG	242.55	241.18	–	86	86	45	–	20.5	119	223	2517	8.4
TB 72 H 300	72	9A	GG	291.06	289.69	–	86	86	45	–	20.5	119	270	2517	10.4
TB 84 H 300*	84	9A	GG	339.57	338.20	–	86	86	45	–	20.5	119	320	2517	12.5
TB 96 H 300*	96	9A	GG	388.08	386.71	–	86	86	76	–	5.0	150	362	3030	14.2
TB 120 H 300*	120	9A	GG	485.10	483.73	–	86	86	76	–	5.0	150	460	3030	18.8

Taper bush	1210	1610	1615	2012	2517	3030
Bore d_2 [mm] from ... to ...	11-32	14-42	14-42	14-50	16-60	35-75

St = steel
GG = cast iron
Subject to technical changes.

Bore diameters d_2 see page 56.

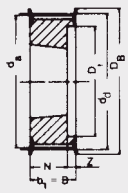
*Non stock items.

Pulleys

optibelt *ZRS* Section XH for optibelt *TB* Taper Bushes

Standard Timing Belt Pulleys

optibelt
Power Transmission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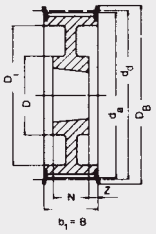
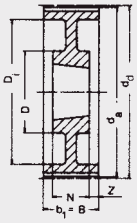
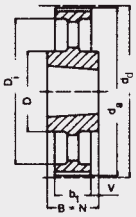
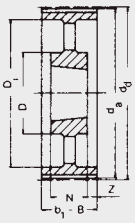

Type 4WF


Type 9W


Type 7A


Type 9A

Section XH – Tooth pitch 22.225 mm and width code 200 – belt width 50.8 mm

Designation	Number of teeth	Type	Material	d_w [mm]	d_a [mm]	D_B [mm]	b_1 [mm]	B [mm]	N [mm]	V [mm]	Z [mm]	D [mm]	D_1 [mm]	Taper bush	Weight without bush [≈ kg]
TB 18 XH 200*	18	5F	GG	127.34	124.55	138	64	64	45	–	20.0	–	95	2517	2.6
TB 20 XH 200*	20	5F	GG	141.49	138.69	154	64	64	45	–	20.0	–	110	2517	3.6
TB 22 XH 200*	22	5F	GG	155.64	152.84	168	64	64	45	–	20.0	–	120	2517	4.8
TB 24 XH 200*	24	5F	GG	169.79	166.69	183	64	64	45	–	20.0	–	135	2517	6.1
TB 26 XH 200*	26	5F	GG	183.94	181.14	198	64	64	45	–	20.0	–	150	2517	7.4
TB 28 XH 200*	28	4WF	GG	198.08	195.29	211	64	64	45	–	10.0	120	165	2517	9.0
TB 30 XH 200*	30	4WF	GG	212.23	209.44	226	64	64	45	–	10.0	120	180	2517	8.6
TB 32 XH 200*	32	4WF	GG	226.38	223.59	240	64	64	45	–	10.0	120	195	2517	9.8
TB 40 XH 200*	40	4WF	GG	282.98	280.18	296	64	64	51	–	7.0	160	245	3020	13.3
TB 48 XH 200*	48	9W	GG	339.57	336.78	–	64	64	51	–	6.5	160	300	3020	19.0

Section XH – Tooth pitch 22.225 mm and width code 300 – belt width 76.2 mm

Designation	Number of teeth	Type	Material	d_w [mm]	d_a [mm]	D_B [mm]	b_1 [mm]	B [mm]	N [mm]	V [mm]	Z [mm]	D [mm]	D_1 [mm]	Taper bush	Weight without bush [≈ kg]
TB 18 XH 300*	18	5F	GG	127.34	124.55	138	90	90	45	–	45.0	–	95	2517	3.7
TB 20 XH 300*	20	5F	GG	141.49	138.69	154	90	90	45	–	45.0	–	110	2517	4.7
TB 22 XH 300*	22	5F	GG	155.64	152.84	168	90	90	45	–	45.0	–	120	2517	6.0
TB 24 XH 300*	24	5F	GG	169.79	166.69	183	90	90	45	–	45.0	–	135	2517	7.6
TB 26 XH 300*	26	5F	GG	183.94	181.14	198	90	90	45	–	45.0	–	150	2517	9.8
TB 28 XH 300*	28	5F	GG	198.08	195.29	211	90	90	51	–	39.0	–	165	3020	11.6
TB 30 XH 300*	30	5F	GG	212.23	209.44	226	90	90	51	–	39.0	–	180	3020	11.9
TB 32 XH 300*	32	5F	GG	226.38	223.59	240	90	90	51	–	39.0	–	195	3020	13.8
TB 40 XH 300*	40	4WF	GG	282.98	280.18	296	90	90	51	–	19.5	160	245	3020	19.5
TB 48 XH 300*	48	9W	GG	339.57	336.78	–	90	90	51	–	19.5	160	300	3020	27.0

Taper bush	2517	3020
Bore d_2 [mm] from ... to ...	16-60	25-75

GG = cast iron
Subject to technical changes.

Bore diameters d_2 see page 56.

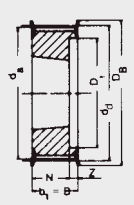
*Non stock items.

Pulleys

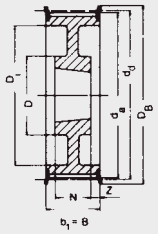
optibelt ZRS Section XH for optibelt TB Taper Bushes

Standard Timing Belt Pulleys

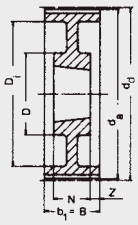
optibelt
Power Transmission



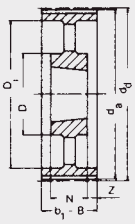
Type 5F



Type 4WF



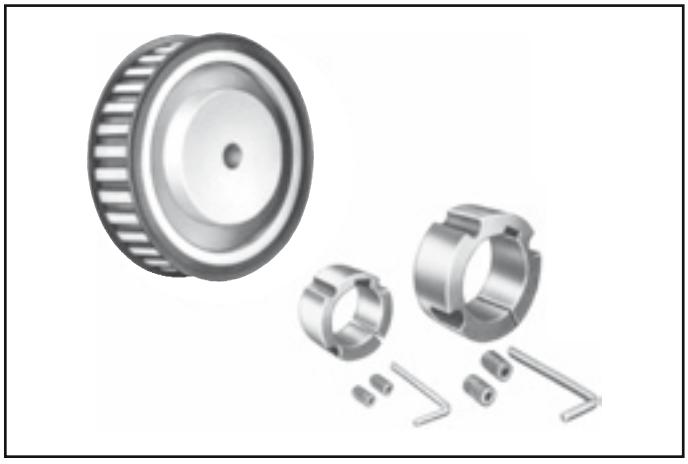
Type 9W



Type 9A

Section XH – Tooth pitch 22.225 mm and width code 400 – belt width 101.6 mm

Designation	Number of teeth	Type	Material	d_w [mm]	d_a [mm]	D_B [mm]	b_1 [mm]	B [mm]	N [mm]	V [mm]	Z [mm]	D [mm]	D_1 [mm]	Taper bush	Weight without bush [≈ kg]
TB 20 XH 400*	20	5F	GG	141.49	138.69	154	119	119	45	—	74	—	110	2517	6.0
TB 22 XH 400*	22	5F	GG	155.64	152.84	168	119	119	45	—	74	—	120	2517	7.2
TB 24 XH 400*	24	5F	GG	169.79	166.69	183	119	119	51	—	68	—	135	3020	8.4
TB 26 XH 400*	26	5F	GG	183.94	181.14	198	119	119	51	—	68	—	150	3020	10.3
TB 28 XH 400*	28	5F	GG	198.08	195.29	211	119	119	51	—	68	—	165	3020	12.3
TB 30 XH 400*	30	5F	GG	212.23	209.44	226	119	119	51	—	68	—	180	3020	14.3
TB 32 XH 400*	32	5F	GG	226.38	223.59	240	119	119	51	—	68	—	195	3020	19.9
TB 40 XH 400*	40	4WF	GG	282.98	280.18	296	119	119	89	—	15	190	245	3535	24.6
TB 48 XH 400*	48	9W	GG	339.57	336.78	—	119	119	89	—	15	190	300	3535	30.0



Optibelt TB Taper Bushes

Optibelt TB Taper Bushes provide simple assembly of the pulleys onto the shafts – both with and without fitted keys.

Taper bush	2517	3020	3535
Bore d_2 [mm] from ... to ...	16-60	25-75	35-90

GG = cast iron
Subject to technical changes.

Bore diameters d_2 see page 56.

*Non stock items.

Pulleys

optibelt *TB* Taper Bushes

optibelt
Power Transmission

Taper bushes with metric bores. Keyways to DIN 6885 part 1

	Taper bush									Material: EN-GJL 200 – DIN EN 1561						
	1008	1108	1210	1215	1310	1610	1615	2012	2517	3020	3030	3525	3535	4040	4545	5050
Bore diameter d_2 **[mm]**	10 11 12 14 16 18 19 20 22 24▲ 25▲	10 11 12 14 16 18 19 20 22 24 25 28▲	11 12 14 16 18 19 20 22 24 25 28 30 32	11 12 14 16 18 19 20 22 24 25 28 30 32	14 16 18 19 20 22 24 25 28 30 32 35	14 16 18 19 20 22 24 25 28 30 32 35 38 40 42▲	14 16 18 19 20 22 24 25 28 30 32 35 38 40 42▲	14 16 18 19 20 22 24 25 28 30 32 35 38 40 42 45 48 50	16 18 19 20 22 24 25 28 30 32 35 38 40 42 45 48 50 55 60	25 28 30 32 35 38 40 42 45 48 50 55 60 65 70 75	35 38 40 42 45 48 50 55 60 65 70 75	35 38 40 42 45 48 50 55 60 65 70 75 80 85 90	35 38 40 42 45 48 50 55 60 65 70 75 80 85 90 95 100	40 42 45 48 50 55 60 65 70 75 80 85 90 95 100	55 60 65 70 75 80 85 90 95 100 105 110	70 75 80 85 90 95 100 105 110 115 120 125
Hexagon socket screws [inch]	$^1/_4$ x $^1/_2$	$^1/_4$ x $^1/_2$	$^3/_8$ x $^5/_8$	$^3/_8$ x $^5/_8$	$^3/_8$ x $^5/_8$	$^3/_8$ x $^5/_8$	$^3/_8$ x $^5/_8$	$^7/_{16}$ x $^7/_8$	$^1/_2$ x 1	$^5/_8$ x 1$^1/_4$	$^5/_8$ x 1$^1/_4$	$^1/_2$ x 1$^1/_2$	$^1/_2$ x 1$^1/_2$	$^5/_8$ x 1$^3/_4$	$^3/_4$ x 2	$^7/_8$ x 2$^1/_4$
Tightening torque [Nm]	5.7	5.7	20	20	20	20	20	31	49	92	92	115	115	172	195	275
Bush length [mm]	22.3	22.3	25.4	38.1	25.4	25.4	38.1	31.8	44.5	50.8	76.2	63.5	88.9	101.6	114.3	127.0
Weight at $d_{2\ min}$ [≈ kg]	0.12	0.16	0.28	0.39	0.32	0.41	0.60	0.75	1.06	2.50	3.75	3.90	5.13	7.68	12.70	15.17

From 3525: Hexagon head screw ▲ These bores have shallow keyways.

Shallow keyways for taper bushes

Bore diameter d_2 [mm]	Keyway width b [mm]	Keyway depth t_2 [mm]	Bore diameter d_2 [mm]	Keyway width b [mm]	Keyway depth t_2 [mm]
24	8	2.0	28	8	2.0
25	8	1.3	42	12	2.2

Taper bushes with inch bores. Keyways to BS 46 part 1

	Taper bush									Material: EN-GJL 200 – DIN EN 1561						
	1008	1108	1210	1215	1310	1610	1615	2012	2517	3020	3030	3525	3535	4040	4545	5050
Bore diameter d_2 **[inch]**	$^3/_8$* $^1/_2$ $^5/_8$ $^3/_4$ $^7/_8$* 1▲	$^3/_8$* $^1/_2$ $^5/_8$ $^3/_4$ $^7/_8$ 1 1$^1/_8$▲*	$^1/_2$ $^5/_8$ $^3/_4$ $^7/_8$ 1 1$^1/_8$ 1$^1/_4$	$^5/_8$* $^3/_4$ $^7/_8$ 1 1$^1/_8$ 1$^1/_4$	$^1/_2$* $^5/_8$* $^3/_4$* $^7/_8$* 1* 1$^1/_8$ 1$^1/_4$ 1$^3/_8$	$^1/_2$ $^5/_8$ $^3/_4$ $^7/_8$ 1 1$^1/_8$ 1$^1/_4$ 1$^3/_8$ 1$^1/_2$ 1$^5/_8$	$^1/_2$ $^5/_8$ $^3/_4$ $^7/_8$* 1 1$^1/_8$ 1$^1/_4$ 1$^3/_8$ 1$^1/_2$ 1$^5/_8$▲*	$^5/_8$* $^3/_4$ $^7/_8$ 1 1$^1/_8$ 1$^1/_4$ 1$^3/_8$ 1$^1/_2$ 1$^5/_8$ 1$^3/_4$ 1$^7/_8$ 2	$^3/_4$ $^7/_8$ 1 1$^1/_8$ 1$^1/_4$ 1$^3/_8$ 1$^1/_2$ 1$^5/_8$ 1$^3/_4$ 1$^7/_8$ 2 2$^1/_8$ 2$^1/_4$ 2$^3/_8$ 2$^1/_2$	1$^1/_4$ 1$^3/_8$ 1$^1/_2$ 1$^5/_8$ 1$^3/_4$* 1$^7/_8$ 2 2$^1/_8$* 2$^1/_4$ 2$^3/_8$ 2$^1/_2$ 2$^5/_8$ 2$^3/_4$ 2$^7/_8$ 3	1$^1/_4$ 1$^3/_8$ 1$^1/_2$ 1$^5/_8$ 1$^3/_4$* 1$^7/_8$ 2 2$^1/_8$* 2$^1/_4$ 2$^3/_8$ 2$^1/_2$ 2$^5/_8$* 2$^3/_4$* 2$^7/_8$ 3	1$^1/_2$* 1$^5/_8$* 1$^3/_4$* 1$^7/_8$* 2* 2$^1/_8$* 2$^1/_4$* 2$^3/_8$* 2$^1/_2$* 2$^5/_8$* 2$^3/_4$* 2$^7/_8$* 3* 3$^1/_8$* 3$^1/_4$* 3$^3/_8$* 3$^1/_2$▲*	1$^1/_2$ 1$^5/_8$ 1$^3/_4$ 1$^7/_8$ 2 2$^1/_8$ 2$^1/_4$ 2$^3/_8$ 2$^1/_2$ 2$^5/_8$ 2$^3/_4$ 2$^7/_8$ 3 3$^1/_8$ 3$^1/_4$ 3$^3/_8$ 3$^1/_2$▲*	1$^3/_4$* 1$^7/_8$* 2* 2$^1/_8$* 2$^1/_4$* 2$^3/_8$* 2$^1/_2$* 2$^5/_8$* 2$^3/_4$* 2$^7/_8$* 3* 3$^1/_4$* 3$^3/_8$* 3$^1/_2$* 3$^3/_4$* 4* 4$^1/_4$▲* 4$^1/_2$▲*	2$^1/_4$* 2$^3/_8$* 2$^1/_2$* 2$^3/_4$* 2$^7/_8$* 3* 3$^1/_4$* 3$^1/_2$* 3$^3/_4$* 4* 4$^1/_4$* 4$^1/_2$* 4$^3/_4$* 5▲*
Hexagon socket screws [inch]	$^1/_4$ x $^1/_2$	$^1/_4$ x $^1/_2$	$^3/_8$ x $^5/_8$	$^3/_8$ x $^5/_8$	$^3/_8$ x $^5/_8$	$^3/_8$ x $^5/_8$	$^3/_8$ x $^5/_8$	$^7/_{16}$ x $^7/_8$	$^1/_2$ x 1	$^5/_8$ x 1$^1/_4$	$^5/_8$ x 1$^1/_4$	$^1/_2$ x 1$^1/_2$	$^1/_2$ x 1$^1/_2$	$^5/_8$ x 1$^3/_4$	$^3/_4$ x 2	$^7/_8$ x 2$^1/_4$
Tightening torque [Nm]	5.7	5.7	20	20	20	20	20	31	49	92	92	115	115	172	195	275
Bush length [mm]	22.3	22.3	25.4	38.1	25.4	25.4	38.1	31.8	44.5	50.8	76.2	63.5	88.9	101.6	114.3	127.0
Weight at $d_{2\ min}$ [≈ kg]	0.12	0.16	0.28	0.39	0.32	0.41	0.60	0.75	1.06	2.50	3.75	3.90	5.13	7.68	12.70	15.17

From 3525: Hexagon head screw * Non stock items. ▲ These bores have shallow keyways.

Pulleys

optibelt ZRS Recommended Special Designs

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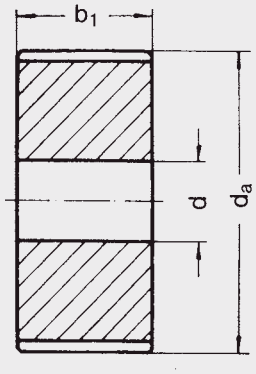
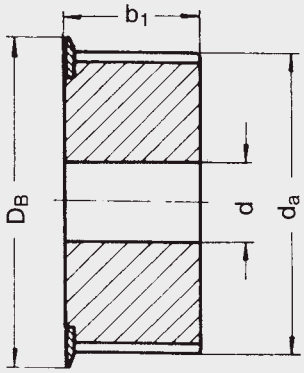
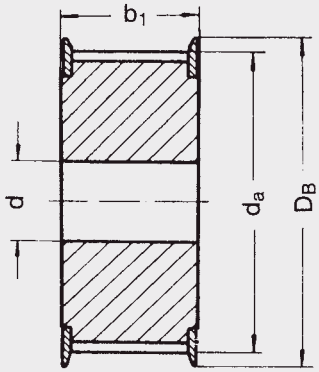
Power Transmission



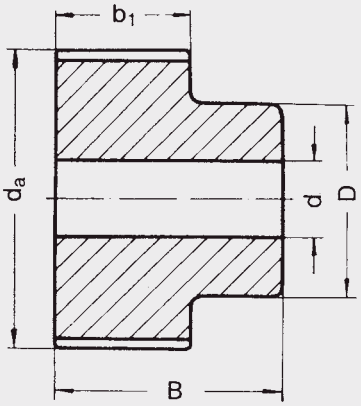
OB construction



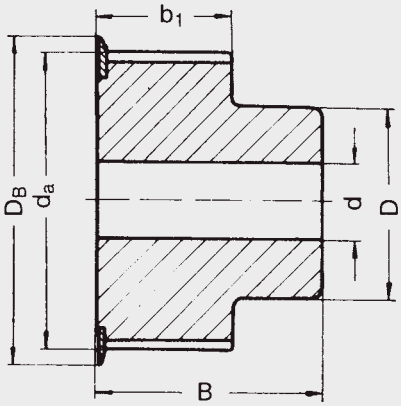
EB construction



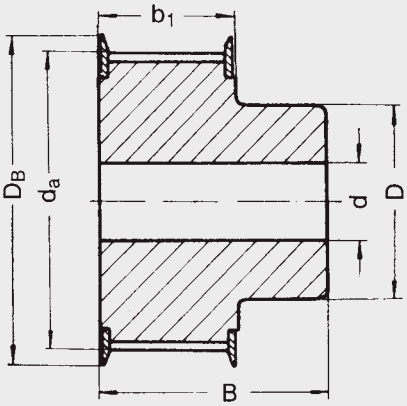
ZB construction



OBN construction



EBN construction



ZBN construction

Materials

Steel, cast iron, aluminium;
other materials on request

Boring

All pulleys are pilot bored.
Available with finished bore to
DIN H7 tolerance if required.

The required dimensions are to be found on pages 39 to 55.

Abbreviations

OB = without flanges
EB = one flange
ZB = two flanges
OBN = without flange, with hub
EBN = one flange, with hub
ZBN = two flanges, with hub

Attachments

Overview of Standards

optibelt
Power Transmission

Federal Republic of Germany

DIN 109 Sheet 1 – Drive Elements; Circumferential Speeds
DIN 109 Sheet 2 – Drive Elements; Centre Distances for V-Belt Drives
DIN 111 – Pulleys for Flat Transmission Belts; Dimensions, Nominal Torque
DIN 111 Sheet 2 – Pulleys for Flat Transmission Belts; Classification for Electrical Machines
DIN 2211 Sheet 1 – Grooved Pulleys for Narrow V-Belts; Dimensions, Materials
DIN 2211 Sheet 2 – Grooved Pulleys for Narrow V-Belts; Inspections of Grooves
DIN 2211 Sheet 3 – Grooved Pulleys for Narrow V-Belts; Classification for Electrical Machines
DIN 2215 – Endless V-Belts, Classical Sections; Minimum Datum Diameter of the Pulleys, Internal and Datum Belt Length
DIN 2216 – Open-Ended V-Belts; Dimensions
DIN 2217 Sheet 1 – V-Belt Pulleys for Classical Sections; Dimensions, Materials
DIN 2217 Sheet 2 – V-Belt Pulleys for Classical Sections; Inspections of Grooves
DIN 2218 – Endless V-Belts, Classical Sections for Mechanical Engineering; Calculation of Drives, Performance Data
DIN 7716 – Rubber Products; Requirements for Storage, Cleaning and Maintenance
DIN 7719 Part 1 – Endless Wide V-Belts for Industrial Speed Changers; Belts and Groove Sections for Corresponding Pulleys
DIN 7719 Part 2 – Endless Wide V-Belts for Industrial Speed Changers; Measurement of Centre Distance Variations
DIN 7721 Part 1 – Synchronous Belt Drives, Metric Pitch; Synchronous Belts
DIN 7721 Part 2 – Synchronous Belt Drives, Metric Pitch; Tooth Space Profile of Synchronous Pulleys
DIN 7722 – Endless Hexagonal Belts for Agricultural Machines and Groove Sections of Corresponding Pulleys
DIN 7753 Part 1 – Endless Narrow V-Belts for Mechanical Engineering; Dimensions
DIN 7753 Part 2 – Endless Narrow V-Belts for Mechanical Engineering; Drive Calculation, Performance Data
DIN 7753 Part 3 – Endless Narrow V-Belts for the Automotive Industry; Dimensions
DIN 7753 Part 4 – Endless Narrow V-Belts for the Automotive Industry; Fatigue Testing
DIN 7867 – V-Ribbed Belts and Pulleys
DIN/ISO 5290 – Grooved Pulleys for Joined Narrow V-Belts; Groove Sections: 9J; 15J; 20J; 25J
DIN/ISO 5294 – Synchronous Belt Drives; Pulleys
DIN/ISO 5296 – Synchronous Belt Drives; Belts
DIN 22100-7 – Articles from Synthetics for Use in Underground Mines, Paragraph 5.4 – V-Belts
DIN EN 60695-11-10 – Fire Hazard Testing

ISO – International Organization for Standardization

ISO 22 – Widths of Flat Transmission Belts and Corresponding Pulleys
ISO 63 – Flat Belt Drives; Lengths
ISO 99 – Diameter of the Belt Pulleys for Flat Belts
ISO 100 – Bulging Height of the Belt Pulleys for Flat Belts
ISO 155 – Belt Pulleys; Limiting Values for Adjustment of Centre Distances
ISO 254 – Quality, Finish and Balance of Belt Pulleys
ISO 255 – Pulleys for Classical V-Belts and Narrow V-Belts; Geometric Testing of Grooves
ISO 1081 – Vocabulary from V-Belts, V-Ribbed Belts and Pulleys
ISO 1604 – Endless Speed Changer Belts and Pulleys for Mechanical Engineering
ISO 1813 – Electrical Conductibility of V-Belts, Kraftbands, V-Ribbed Belts, Wide V-Belts, Double Section V-Belts
ISO 2230 – Please Consult DIN 7716
ISO 2790 – Narrow V-Belt Drives for the Automotive Industry; Dimensions
ISO 3410 – Endless Speed Changer Belts and Pulleys for Agricultural Machinery
ISO 4183 – Grooved Pulleys for Classical V-Belts and Narrow V-Belts
ISO 4184 – Classical V-Belts and Narrow V-Belts; Lengths
ISO 5256 – Synchronous Belt Drives; Belt Tooth Pitch Code Part 1 MXL; XL; L; H; XH; XXH Part 2 MXL; XXL Metric Dimension
ISO 5287 – Narrow V-Belts for the Automotive Industry; Fatigue Testing
ISO 5288 – Vocabulary from Timing Belt Drives
ISO 5289 – Endless Double Section V-Belts and Pulleys for Agricultural Machinery
ISO 5290 – Grooved Pulleys for Joined Narrow V-Belts; Sections: 9J; 15J; 20J; 25J
ISO 5291 – Grooved Pulleys for Joined Classical V-Belts; Sections: AJ; BJ; CJ; DJ
ISO 5292 – Industrial V-Belt Drives; Calculations of the Performance Data and Centre Distance
ISO 5294 – Synchronous Belt Drives; Pulleys – "Inch Pitch"
ISO 5295 – Timing Belts; Calculations of the Performance Data and Centre Distance – "Inch Pitch"
ISO 5296 – Synchronous Belt Drives; Belts – "Inch Pitch"
ISO 8370-1 – Dynamic Test to Determine Pitch Zone Location with V-Belts
ISO 8370-2 – Dynamic Test to Determine Pitch Zone Location with V-Ribbed Belts
ISO/DIS 8419 – Belt Drives, Joined Narrow V-Belts; Lengths in Effective System; 9N/J, 15N/J, 25N/J
ISO 9010 – Synchronous Belt Drives – Automotive Belts
ISO 9011 – Synchronous Belt Drives – Automotive Pulleys
ISO 9563 – Antistatic Endless Synchronous Belts; Electrical Conductibility; Characteristics and Testing Method
ISO 9980 – Belt Drives; V-Belt Pulleys; Geometric Inspection of Grooves
ISO 9981 – Belt Drives – Pulleys and V-Ribbed Belts for the Automotive Industry; PK Section
ISO 9982 – Belt Drives; Pulleys and V-Ribbed Belts for Industrial Requirements; Geometric Data PH, PJ, PK, PL and PM
ISO 11749 – Belt Drives – V-Ribbed Belts for the Automotive Industry, Fatigue Testing
ISO 12046 – Synchronous Belt Drives, Automotive Belts; Physical Characteristics
ISO/CD 13050 – Synchronous Belt Drives, Curvilinear Timing Belts
ISO/CD 17396 – Synchronous Belt Drives; Metric Pitch, Sections T and AT

USA

RMA/MPTA IP-20 – Classical V-Belts and Sheaves (A; B; C; D; Cross Sections)
RMA/MPTA IP-21 – Double (Hexagonal) Belts (AA; BB; CC; DD Cross Sections)
RMA/MPTA IP-22 – Narrow Multiple V-Belts (3V; 5V; and 8V Cross Sections)
RMA/MPTA IP-23 – Single V-Belts (2L; 3L; 4L; and 5L Cross Sections)
RMA/MPTA IP-24 – Synchronous Belts (MXL; XL; L; H; XH; and XXH Belt Sections)
RMA/MPTA IP-25 – Variable Speed V-Belts (12 Cross Sections)
RMA/MPTA IP-26 – V-Ribbed Belts (PH; PJ; PK; PL; and PM Cross Sections)
RMA/MPTA IP-27 – Curvilinear Toothed Synchronous Belts (8M – 14M Pitches)
ASAE S 211.... – V-Belt Drives for Agricultural Machines
SAE J636b – V-Belts and Pulleys
SAE J637 – Automotive V-Belt Drives

Data Sheet

for Calculating/Checking Drive Installations

with optibelt *ZR* Timing Belts

optibelt
Power Transmission

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Fax +49 (0) 5271/ 9762 00
info@optibelt.com
www.optibelt.com

Company

(stamp)

for test ☐ new drive ☐
for pilot production ☐ existing drive ☐
for series production ☐ requirement:_____ per annum

The parameters printed below in bold face are the minimum necessary for a drive design, where the other parameters cannot be determined by means of further data. Special conditions or factors should also be noted.

Quantity	Optibelt Type	Designation	Construction if necessary
	timing belt		
	driver pulley		
	driven pulley		

LOAD

DRIVER UNIT

Prime mover (e.g. 3-cyl. diesel):_____
Daily operating time: _____ hours
Steady running ☐ Shock or pulsating running ☐
Number of starts/stops per hour ☐
and/or reverses under load: _____ per day ☐
Full load starting torque M_A = _____ M_N or M_A = _____ Nm

Max. driver power **P_{An} = _____ kW at n_1 = _____ rpm**
or max. driver torque M_{An} = _____ Nm at n = _____ rpm

DRIVEN UNIT

Driven machine (e.g. milling machine): _____

Light duty drive, shock-free and steady running ☐
Medium duty drive, intermittent operation with low to medium shock load ☐
Heavy duty drive, intermittent operation with medium to high shock load ☐
Very heavy duty drive, continuous operation with high shock load ☐

Basic drive service factor c_0 =_____

Max. driven power P_{Ab} = _____ kW at n_2 = _____ rpm
or max. output drive torque M_{Ab} = _____ Nm at n = _____ rpm
max./min. driven speed **n_{2max} = _____ rpm / n_{2min} = _____ rpm**

GEOMETRY

Pitch diameter d_{w1} or number of teeth z_1 of driver pulley
d_{w1} = _____mm or z_1 = _____
Max. const. width B = _____mm max. const. height = _____ mm
pilot bored ☐ finish bored with keyway ☐ taper bushed ☐
Bore diameter d = _____mm Tolerance range:_____
Max. static shaft loading S_a =_____N

Pitch diameter d_{w2} or number of teeth z_2 of driven pulley
d_{w2} = _____mm or z_2 = _____
Max. const. width B = _____mm max. const. height = _____ mm
pilot bored ☐ finish bored with keyway ☐ taper bushed ☐
Bore diameter d = _____mm Tolerance range:_____
Max. static shaft loading S_a =_____N

Drive ratio i = _____ i_{min} = _____ i_{max} = _____
Centre distance **a = _____ mm** a_{min} = _____ mm a_{max} = _____mm

Centres adjustable ☐ or centres not adjustable ☐ then
Tensioner or idler pulley: inside ☐ Arrangement: slack side ☐
outside ☐ tight side ☐
Pulley d_w = _____ mm Idler and pulley correction factor c_6 = _____
or flat pulley d_a = _____ mm

OPERATING CONDITIONS

Arrangement of shafts: horizontal ☐ or vertical ☐
Ambient temperature ☐ T = _____ °C T_{min} = _____ °C T_{max} = _____ °C
Normal air humidity ☐ Relative humidity: _____ %
Contaminant (if any): solid ☐ material (e.g. dust, swarf): _____
liquid ☐ material (e.g. water, oil): _____
gas ☐ material (e.g. sulphur vapour): _____

For the design of multiple pulley systems, please let us have a sketch with the coordinates of the shafts and the load information for each pulley and idler.

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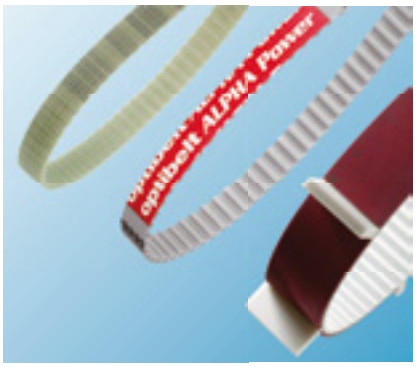
Notes on the proposed drive arrangement:

optibelt



Lieferprogramm
Product Range

optibelt
Power Transmission

1 **optibelt *RED POWER II***
5 **optibelt *KB RED POWER II***
Hochleistungs-Schmalkeilriemen, wartungsfrei
High performance wedge belts, maintenance-free

2 **optibelt *BLUE POWER***
6 **optibelt *KB BLUE POWER***
Hochleistungs-Schmalkeilriemen
High performance wedge belts

3 **optibelt *SK***
7 **optibelt *KB SK***
Schmalkeilriemen
Wedge belts

4 **optibelt *VB***
8 **optibelt *KB VB***
Klassische Keilriemen
Classical V-belts

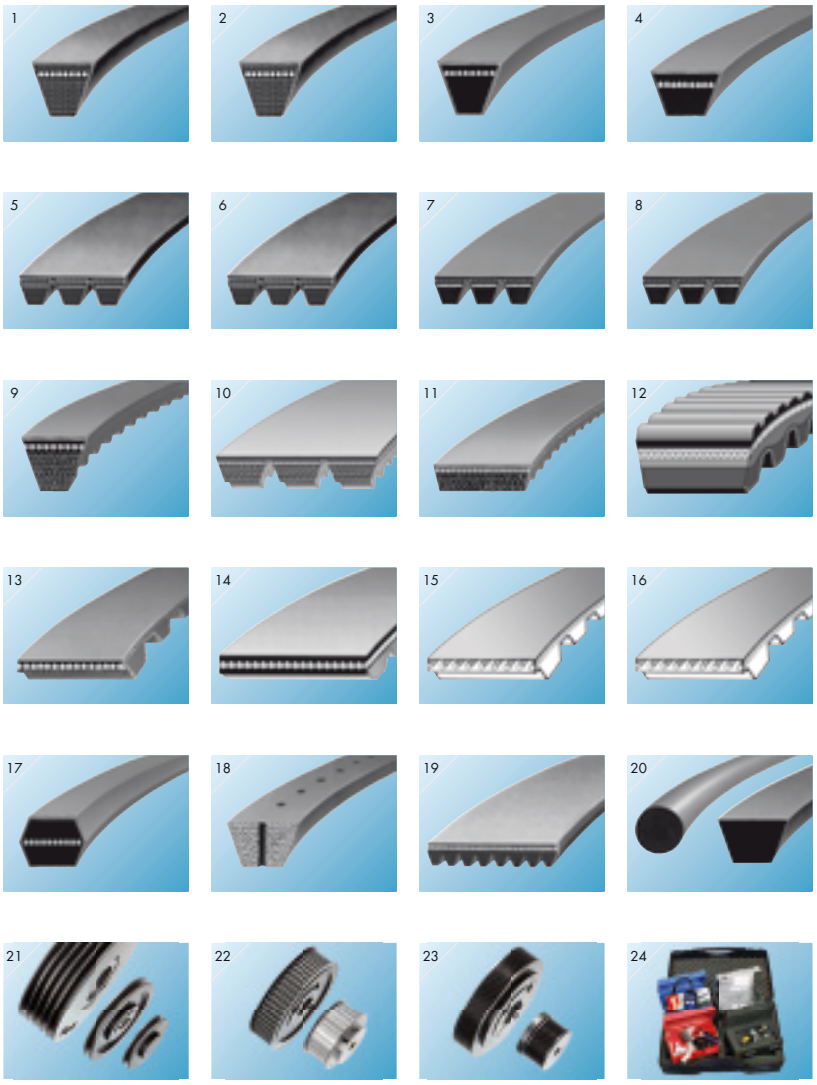
9 **optibelt *Super X-POWER M=S***
Keilriemen, flankenoffen, formgezahnt
V-belts, raw edge, moulded cogged

10 **optibelt *Super KBX-POWER***
Kraftbänder, flankenoffen
Kraftbands, raw edge

11 **optibelt *SUPER VX***
Breitkeilriemen, flankenoffen, formgezahnt
Variable speed belts, raw edge, moulded cogged

12 **optibelt *SUPER DVX***
Doppel-Breitkeilriemen, flankenoffen, formgezahnt
Double section variable speed belts, raw edge, moulded cogged

13 **optibelt *ZR***
optibelt *ZR linear*
Zahnriemen aus Chloropren
Chloroprene timing belts



14 **optibelt *OMEGA HL***
optibelt *OMEGA HP*
optibelt *OMEGA FanPower*
optibelt *OMEGA*
optibelt *OMEGA linear*
Zahnriemen aus Chloropren
Chloroprene timing belts

15 **optibelt *ALPHA Power***
16 **optibelt *ALPHA***
optibelt *ALPHA linear / V*
optibelt *ALPHAflex*
Zahnriemen aus Polyurethan
Polyurethane timing belts

17 **optibelt *DK***
Doppelkeilriemen
Double section V-belts

18 **optimat *DE***
Endliche Keilriemen DIN 2216, gelocht
Open-ended V-belting, punched

19 **optibelt *RB***
Rippenbänder
Ribbed belts

20 **optibelt *RR / RR PLUS***
Kunststoffrundriemen
Plastic round section belting

20 **optibelt *KK***
Kunststoffkeilriemen
Plastic V-belting

21 **optibelt *KS***
Keilrillenscheiben
V-grooved pulleys

22 **optibelt *ZRS***
Zahnriemenscheiben
Timing belt pulleys

23 **optibelt *RBS***
Rippenbandscheiben
Ribbed belt pulleys

24 **optibelt *SERVICE KIT***