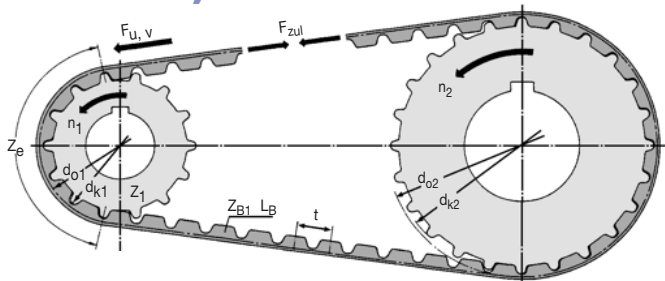


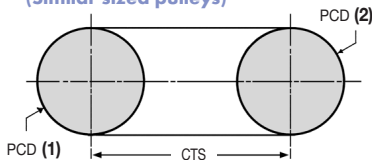
FORMULAE, TERMS & DEFINITIONS



Centre distance	a (mm)	Pulley width	B (mm)
Acceleration torque	M_B (Nm)	Pitch	t (mm)
Acceleration time	t_B (s)	Velocity	v (m/s)
Bore	d (mm)	Peripheral force	F_U (N)
Density	ρ (kg/dm ³)	Angular velocity	ω (s ⁻¹)
Torque	M (Nm)	Pitch circle diameter	d_0 (mm)
RPM	n (min ⁻¹)	No. of teeth when i = 1	z
Outside diameter	d_K (mm)	No. of teeth of small pulley	z_1
Power	P (kW)	No. of teeth of large pulley	z_2
Moment of inertia	J (kgm ²)	No. of teeth on the belt	Z_B
Belt length	L_B (mm)	No. of teeth in mesh	z_e
Ratio	i	PCD (small pulley)	d_{o1}
Allowable tensile load	F_{zul} (N)	PCD (large pulley)	d_{o2}
Belt width	b (cm)		

TOTAL BELT LENGTH

(Similar sized pulleys)



If the number of teeth on the two mating pulleys/sprockets are within 5 teeth of each other then the belt/chain length can be calculated as follows:-

$$TBL = \frac{(PCD (1) + PCD (2))}{0.6366} + (2 \times CTS) \quad (\text{in mm})$$

$$\text{TOTAL No. of TEETH or links} = \frac{TBL}{\text{PITCH OF PULLEY (SPROCKET) mm}}$$

$$\text{PCD mm} \\ d_o \text{ mm} = \frac{\text{No. of Teeth} \times \text{Pitch mm}}{\pi}$$

Exact CTS when $i = 1$

$$a = \frac{Z_B - Z_1}{2} \times t \quad (\text{in mm})$$

Exact CTS when $i \neq 1$

$$a = K + \sqrt{K^2 - \frac{(d_{o2} - d_{o1})^2}{8}}$$

$$K = \frac{L_B}{4} - .392699 (d_{o2} + d_{o1}) \quad (\text{in mm})$$



FORMULAE, TERMS & DEFINITIONS

BELT LIFE: The expected belt life is between 10,000 and 15,000 hours, if installed correctly and not overloaded.

Belt length with $i \neq 1$

$$L_B \approx \frac{t}{2} (Z_2 + Z_1) + 2a + \frac{1}{4a} \left[\frac{(Z_2 - Z_1)t}{\pi} \right]^2$$

Belt length with $i = 1$

$$L_B = 2a + \pi \cdot d_o \\ = 2a + z \cdot t$$

Peripheral force

$$F_U = \frac{2 \cdot 10^3 \cdot M}{d_o} \\ = \frac{19,1 \cdot 10^6 \cdot P}{n \cdot d_o} \\ = \frac{10^3 \cdot P}{v}$$

Torque

$$M = \frac{d_o \cdot F_U}{2 \cdot 10^3} \\ = \frac{9,55 \cdot 10^3 \cdot P}{n} \\ = \frac{d_o \cdot P}{2 \cdot v}$$

Power

$$P = \frac{M \cdot n}{9,55 \cdot 10^3} \\ = \frac{F_U \cdot d_o \cdot n}{19,1 \cdot 10^6} \\ = \frac{F_U \cdot v}{10^3}$$

Angular velocity

$$\omega = \frac{\pi \cdot n}{30}$$

Rpm

$$n = \frac{19,1 \cdot 10^3 \cdot v}{d_o}$$

Velocity

$$v = \frac{d_o \cdot n}{19,1 \cdot 10^3}$$

Mass moment of inertia

$$J = 98,2 \cdot 10^{-15} \cdot B \cdot e \cdot (d_k^4 - d^4)$$

Acceleration torque

$$M_B = \frac{J \cdot \alpha n}{9,55 \cdot t_B}$$

CONVERSION OF NON-STANDARD UNITS

FORCE	1kp = 1 kg • 9.81 m/s ² = 9.81 N = 1 daN
TORQUE	1kpm = 9.81 kgm ² /s ² = 9.81 Nm = 1 daNm
POWER	1HP = 75 kpm/s = 0.736 kW
CENTRIFUGAL FORCE	1 [GD ²] = 4 [J] when GD ² in kpm and J in kgm ²

Only the units listed above should be used in the formulae, as they are approved SI units. The unit of force, the Newton, is very important: 1N is the force required to accelerate a body with a mass of 1kg to 1m/s². → 1N = kg • 1 m/s².



TIMING BELT CALCULATIONS Technical Section

The belt width (in cm) required to transmit known peripheral force F_U , torque M or power P without exceeding the maximum allowable tooth shear strength is calculated using any of the following formulae and the values on the following pages:-

Belt width required in cm = b

$$b = \frac{F_U}{z_e \cdot F_{U\text{spez}}} \quad \text{in cm}$$

$$b = \frac{100 \cdot M}{z_1 \cdot z_e \cdot M_{\text{spez}}} \quad \text{in cm}$$

$$b = \frac{1000 \cdot P}{z_1 \cdot z_e \cdot P_{\text{spez}}} \quad \text{in cm}$$

F_U = Peripheral force in N

M = Torque in Nm

P = Power in kW

z_1 = No. of teeth in small pulley

z_e = No. of teeth in mesh ($Z_e \text{ max} = 12$)

$$z_e = \frac{z_1}{180} \cdot \arccos \frac{(z_2 - z_1) \cdot t}{2 \pi a}$$

z_1 = No. of teeth in small pulley

z_2 = No. of teeth in large pulley

t = Pitch in mm

a = Centre distance in mm

Drive load capacity (with known belt width cm)

Peripheral force

$$F_U = F_{U\text{spez}} \cdot z_e \cdot b \quad \text{in N}$$

Torque

$$M = \frac{M_{\text{spez}} \cdot z_1 \cdot z_e \cdot b}{100} \quad \text{in Nm}$$

Power

$$P = \frac{P_{\text{spez}} \cdot z_1 \cdot z_e \cdot b}{1000} \quad \text{in kW}$$

F_{spez} Specific peripheral force in $\frac{\text{N}}{\text{cm}}$

M_{spez} Specific torque in $\frac{\text{Ncm}}{\text{cm}}$

P_{spez} Specific power in $\frac{\text{W}}{\text{cm}}$

Speed-up drives

The following safety factors should be employed with speed-up drives:

Ratio		Safety factor	S
i = over 1 to 1.5			1.1
i = over 1.5 to 2.5			1.2
i = over 2.5			1.3

The size of a Synchroflex Timing Belt is correctly determined when the permissible tooth shear strength, tensile loads and flexibility limits are not exceeded under the worst conditions. Safety factors are only necessary in speed-up drives. It is important that the peak loads acting on a drive are known, i.e. that they are correctly assessed by the designer. In a positive drive transient shock loads will have an effect on the whole drive. Some helpful hints on this subject are:-

Normal operating conditions : The timing belt should be designed to cope with rated working loads and conditions. Rated working loads are defined as the operating conditions under which the drive is expected to transmit torque or power based on the rated speed and normal running conditions.

Start-up conditions : (a) Driver: the max. start-up torque of the motor must be taken into account. The start-up torque on a three phase motor, for example, can be 2 - 2.5 times the running torque. (b) Driven: it is also important to consider possible break-away torque acting on the timing belt under start-up conditions. Check belt loading conditions (a) or (b) at $n = 0$ rpm.

Braking : It is necessary to determine whether loads induced by braking will affect the timing belt. It is quite possible that these loads may exceed those already present due to start-up and normal running conditions. Under braking conditions torque reversal should be taken into consideration and that if a torque reversal occurs under braking then a speed reduction would change to a speed-up drive.

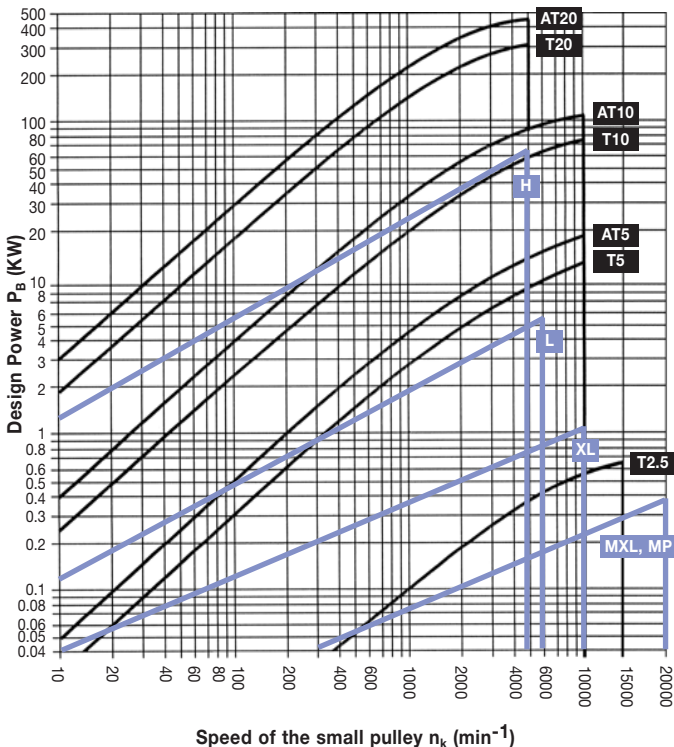
Shock Loads : If shock loads are present it would be necessary to increase the belt width factor by 1.3.

Inertial Masses : Inertial masses generally help in the smooth running of drives. However it is very important to check that extra loads these inertial masses are exerting on the timing belt under acceleration and braking conditions.



POWER RATING GRAPH FOR SECTION SELECTION AND MAX. BELT SPEEDS

Graph 3.2



TOOTH SHEAR STRENGTH

T2.5 TIMING BELT/PULLEY

2.5mm PITCH

TOOTH SHEAR STRENGTH

Technical Section

MAX. BELT CAPACITY

Max. power	0.5kw
Max. speed	40000 RPM
Max. recommended belt speed	80m/s



Rpm n min ⁻¹	T2.5			Rpm n min ⁻¹	T2.5		
	F_U spez $\frac{N}{cm}$	M spez $\frac{Ncm}{cm}$	P spez $\frac{W}{cm}$		F_U spez $\frac{N}{cm}$	M spez $\frac{Ncm}{cm}$	P spez $\frac{W}{cm}$
0	9.03	0.359	0.000	2200	4.80	0.191	0.440
20	8.72	0.347	0.007	2400	4.70	0.187	0.470
40	8.48	0.337	0.014	2500	4.65	0.185	0.484
60	8.28	0.329	0.021	2600	4.60	0.183	0.499
80	8.10	0.322	0.027	2800	4.51	0.180	0.527
100	7.95	0.316	0.033	2880	4.48	0.178	0.538
150	7.64	0.304	0.048	3000	4.43	0.176	0.554
200	7.39	0.294	0.062	3200	4.36	0.173	0.581
300	7.01	0.279	0.088	3400	4.28	0.170	0.607
400	6.71	0.267	0.112	3600	4.22	0.168	0.632
500	6.48	0.258	0.135	3800	4.15	0.165	0.567
600	6.28	0.250	0.157	4000	4.09	0.163	0.682
700	6.11	0.243	0.178	4500	3.95	0.157	0.740
730	6.07	0.241	0.185	5000	3.82	0.152	0.796
800	5.97	0.237	0.199	5500	3.71	0.148	0.850
900	5.83	0.232	0.219	6000	3.60	0.143	0.901
1000	5.71	0.227	0.238	6500	3.51	0.140	0.950
1100	5.61	0.223	0.257	7000	3.42	0.136	0.997
1200	5.51	0.219	0.275	7500	3.33	0.133	1.042
1300	5.41	0.215	0.293	8000	3.26	0.130	1.086
1400	5.33	0.212	0.311	8500	3.18	0.127	1.128
1460	5.28	0.210	0.321	9000	3.11	0.124	1.168
1500	5.25	0.209	0.328	9500	3.05	0.121	1.207
1600	5.17	0.206	0.345	10000	2.99	0.119	1.245
1700	5.10	0.203	0.361	12000	2.77	0.110	1.384
1800	5.04	0.200	0.378	15000	2.50	0.099	1.561
1900	4.97	0.198	0.394	18000	2.28	0.091	1.708
2000	4.91	0.195	0.409	20000	2.15	0.086	1.791

TENSION MEMBER TENSILE STRENGTH

T2.5 Belt Width in mm Newtons	4	6	10	16
	39	65	117	195

Allowable tensile load on belt cross section F_{zul} in N.

FLEXIBILITY

Type of Teeth		T2.5
without contraflexure 	Minimum No. of Teeth on pulley. Minimum DIA of flat tension pulley running on the belt teeth	10 15mm
with contraflexure 	Minimum No. of Teeth on timing pulleys for double sided belts T2.5 DL Minimum DIA of flat tension pulley running on belt back	18 15mm



TOOTH SHEAR STRENGTH

T5 TIMING BELT/PULLEY

5mm PITCH

TOOTH SHEAR STRENGTH

Technical Section

MAX. BELT CAPACITY

Max. power	5kw
Max. speed	40000 RPM
Max. recommended belt speed	80m/s



Rpm n min ⁻¹	T5			Rpm n min ⁻¹	T5		
	F _U spez N cm	M spez Ncm cm	P spez W cm		F _U spez N cm	M spez Ncm cm	P spez W cm
0	24.00	1.910	0.000	2200	13.38	1.065	2.453
20	23.38	1.861	0.039	2400	13.10	1.042	2.619
40	22.86	1.819	0.076	2500	12.96	1.032	2.701
60	22.41	1.783	0.112	2600	12.84	1.021	2.781
80	22.01	1.751	0.147	2800	12.59	1.002	2.938
100	21.65	1.723	0.180	2880	12.50	0.995	3.000
150	20.90	1.663	0.261	3000	12.37	0.984	3.092
200	20.28	1.614	0.338	3200	12.16	0.967	3.241
300	19.30	1.536	0.483	3400	11.96	0.951	3.388
400	18.55	1.476	0.618	3600	11.77	0.936	3.530
500	17.93	1.427	0.747	3800	11.59	0.922	3.670
600	17.41	1.385	0.870	4000	11.42	0.909	3.807
700	16.96	1.349	0.989	4500	11.03	0.878	4.136
730	16.83	1.339	1.024	5000	10.68	0.850	4.450
800	16.56	1.318	1.104	5500	10.36	0.825	4.750
900	16.20	1.289	1.215	6000	10.07	0.802	5.037
1000	15.88	1.263	1.323	6500	9.81	0.780	5.312
1100	15.58	1.240	1.428	7000	9.56	0.761	5.577
1200	15.31	1.218	1.531	7500	9.33	0.742	5.831
1300	15.06	1.198	1.632	8000	9.11	0.725	6.076
1400	14.83	1.180	1.730	8500	8.91	0.709	6.312
1460	14.69	1.169	1.788	9000	8.72	0.694	6.540
1500	14.61	1.162	1.826	9500	8.54	0.679	6.759
1600	14.40	1.146	1.920	10000	8.37	0.666	6.970
1700	14.21	1.131	2.013	12000	7.75	0.617	7.752
1800	14.03	1.116	2.104	15000	7.00	0.557	8.752
1900	13.85	1.102	2.193	18000	6.39	0.508	9.582
2000	13.69	1.089	2.281	20000	6.03	0.480	10.055

TENSION MEMBER TENSILE STRENGTH

T5 Belt Width in mm	6	10	16	25	32	50	75	100
Newtons	180	330	570	930	1200	1920	2940	3930

Allowable tensile load on belt cross section F_{zul} in N.

FLEXIBILITY

Type of Teeth	T5
without contraflexure 	Minimum No. of Teeth on pulley. Minimum DIA of flat tension pulley running on the belt teeth 10 30mm
with contraflexure 	Minimum No. of Teeth on timing pulleys for double sided belts T5 DL Minimum DIA of flat tension pulley running on belt back 15 30mm

27.22



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TOOTH SHEAR STRENGTH

AT5 TIMING BELT/PULLEY

5mm PITCH

TOOTH SHEAR STRENGTH

Technical Section

MAX. BELT CAPACITY

Max. power	15kw
Max. speed	40000 RPM
Flank Play	0.2mm
Max. recommended belt speed	80m/s



Rpm n min ⁻¹	AT5			Rpm n min ⁻¹	AT5		
	F _U spez $\frac{N}{cm}$	M _{spez} $\frac{Ncm}{cm}$	P _{spez} $\frac{W}{cm}$		F _U spez $\frac{N}{cm}$	M _{spez} $\frac{Ncm}{cm}$	P _{spez} $\frac{W}{cm}$
0	35.3	2.807	0.000	2200	21.3	1.695	3.906
20	34.9	2.775	0.057	2400	20.8	1.654	4.156
40	34.5	2.745	0.115	2500	20.5	1.634	4.278
60	34.1	2.717	0.171	2600	20.3	1.615	4.397
80	33.8	2.689	0.225	2800	19.8	1.579	4.630
100	33.5	2.663	0.279	2880	19.7	1.565	4.720
150	32.7	2.603	0.409	3000	19.4	1.545	4.854
200	32.0	2.549	0.534	3200	19.0	1.513	5.070
300	30.9	2.455	0.771	3400	18.6	1.483	5.280
400	29.8	2.375	0.995	3600	18.3	1.454	5.486
500	29.0	2.305	1.207	3800	17.9	1.427	5.679
600	28.2	2.242	1.409	4000	17.6	1.401	5.870
700	27.5	2.187	1.603	4500	16.9	1.342	6.322
730	27.3	2.171	1.660	5000	16.2	1.288	6.742
800	26.8	2.136	1.789	5500	15.6	1.239	7.134
900	26.3	2.090	1.969	6000	15.0	1.194	7.499
1000	25.7	2.047	2.144	6500	14.5	1.152	7.841
1100	25.2	2.007	2.312	7000	14.0	1.113	8.161
1200	24.8	1.970	2.476	7500	13.5	1.077	8.460
1300	24.3	1.936	2.635	8000	13.1	1.043	8.740
1400	23.9	1.903	2.790	8500	12.7	1.011	9.002
1460	23.7	1.885	2.881	9000	12.3	0.981	9.248
1500	23.5	1.872	2.941	9500	12.0	0.953	9.477
1600	23.2	1.843	3.089	10000	11.6	0.925	9.690
1700	22.8	1.816	3.232				
1800	22.5	1.789	3.373				
1900	22.2	1.764	3.510				
2000	21.9	1.740	3.645				

TENSION MEMBER TENSILE STRENGTH

AT5 Belt Width in mm Newtons	6	10	16	25	32	50	75	100
		350	700	1260	2030	2660	4200	6370

FLEXIBILITY

Allowable tensile load on belt cross section F_{zul} in N.

Type of Teeth	AT5
without contraflexure 	Minimum No. of Teeth on pulley. Minimum DIA. of flat tension pulley running on the belt teeth 15 25mm
with contraflexure 	Minimum No. of Teeth on pulley. Minimum DIA. of flat tension pulley running on belt back 20 60mm



TOOTH SHEAR STRENGTH

T10 TIMING BELT/PULLEY

10mm PITCH

TOOTH SHEAR STRENGTH

Technical Section

MAX. BELT CAPACITY	
Max. power	30kw
Max. speed	15000 RPM
Max. recommended belt speed	60m/s



Rpm n min ⁻¹	T10			Rpm n min ⁻¹	T10		
	F _U spez N cm	M spez Ncm cm	P spez W cm		F _U spez N cm	M spez Ncm cm	P spez W cm
0	50.50	8.04	0.000	2200	24.60	3.92	9.03
20	49.00	7.80	0.163	2400	23.90	3.81	9.58
40	47.70	7.60	0.318	2500	23.60	3.76	9.84
60	46.60	7.42	0.466	2600	23.30	3.71	10.10
80	45.60	7.27	0.609	2800	22.70	3.62	10.60
100	44.80	7.13	0.746	2880	22.50	3.58	10.80
150	42.90	6.83	1.073	3000	22.20	3.53	11.08
200	41.40	6.59	1.381	3200	21.60	3.45	11.55
300	39.10	6.22	1.953	3400	21.20	3.37	11.99
400	37.20	5.92	2.481	3600	20.70	3.30	12.42
500	35.70	5.68	2.976	3800	20.30	3.23	12.84
600	34.40	5.48	3.444	4000	19.90	3.16	13.24
700	33.30	5.31	3.890	4500	18.90	3.01	14.18
730	33.00	5.26	4.020	5000	18.10	2.87	15.05
800	32.40	5.15	4.316	5500	17.30	2.75	15.84
900	31.50	5.01	4.725	6000	16.60	2.64	16.58
1000	30.70	4.89	5.119	6500	15.90	2.54	17.26
1100	30.00	4.77	5.499	7000	15.30	2.44	17.88
1200	29.30	4.67	5.867	7500	14.80	2.35	18.46
1300	28.70	4.57	6.223	8000	14.20	2.27	18.99
1400	28.20	4.48	6.569	8500	13.70	2.19	19.47
1460	27.80	4.43	6.772	9000	13.30	2.11	19.92
1500	27.60	4.40	6.905	9500	12.80	2.04	20.33
1600	27.10	4.32	7.232	10000	12.40	1.98	20.70
1700	26.60	4.24	7.551				
1800	26.20	4.17	7.861				
1900	25.80	4.10	8.164				
2000	25.40	4.04	8.459				

TENSION MEMBER TENSILE STRENGTH

T10 Belt Width in mm	16	25	32	50	75	100
Newtons	1100	1800	2300	3800	5800	7800

FLEXIBILITY

Allowable tensile load on belt cross section F_{zul} in N.

Type of Teeth	T10
without contraflexure 	Minimum No. of Teeth on pulley. Minimum DIA of flat tension pulley running on the belt teeth 12 60mm
with contraflexure 	Minimum No. of Teeth on timing pulleys for double sided belts t20 DL Minimum DIA of flat tension pulley running on belt back 20 60mm

27.24



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TOOTH SHEAR STRENGTH

AT10 TIMING BELT/PULLEY

10mm PITCH

TOOTH SHEAR STRENGTH

Technical Section

MAX. BELT CAPACITY

Max. power	70kw
Max. speed	15000 RPM
Flank Play	0.4mm
Max. recommended belt speed	60m/s



Rpm n min ⁻¹	AT10			Rpm n min ⁻¹	AT10		
	F _U spez N cm	M spez Ncm cm	P spez W cm		F _U spez N cm	M spez Ncm cm	P spez W cm
0	73.5	11.70	0.000	2200	39.0	6.20	14.30
20	72.4	11.53	0.241	2400	37.8	6.01	15.10
40	71.4	11.37	0.476	2500	37.2	5.92	15.49
60	70.5	11.21	0.705	2600	36.6	5.83	15.86
80	69.6	11.07	0.928	2800	35.5	5.66	16.58
100	68.7	10.94	1.145	2880	35.1	5.59	16.86
150	66.8	10.63	1.669	3000	34.5	5.50	17.27
200	65.0	10.35	2.168	3200	33.6	5.35	17.92
300	62.1	9.88	3.103	3400	32.7	5.20	18.53
400	59.5	9.48	3.969	3600	31.9	5.07	19.11
500	57.4	9.13	4.780	3800	31.1	4.94	19.67
600	55.5	8.83	5.545	4000	30.3	4.82	20.20
700	53.7	8.55	6.270	4500	28.5	4.54	21.40
730	53.3	8.48	6.481	5000	26.9	4.29	22.46
800	52.2	8.31	6.961	5500	25.5	4.06	23.38
900	50.8	8.08	7.620	6000	24.2	3.85	24.18
1000	49.5	7.88	8.251	6500	23.0	3.65	24.87
1100	48.3	7.69	8.857	7000	21.8	3.47	25.46
1200	47.2	7.51	9.440	7500	20.8	3.30	25.96
1300	46.2	7.35	10.001	8000	19.8	3.15	26.36
1400	45.2	7.19	10.543	8500	18.8	3.0	26.69
1460	44.6	7.10	10.859	9000	18.0	2.86	26.93
1500	44.3	7.04	11.066	9500	17.0	2.72	27.10
1600	43.4	6.91	11.572	10000	16.3	2.60	27.20
1700	42.6	6.78	12.062				
1800	41.8	6.65	12.536				
1900	41.0	6.53	12.996				
2000	40.3	6.42	13.442				

TENSION MEMBER TENSILE STRENGTH

AT10 Belt Width in mm	25	32	50	75	100	150
Newton	3500	4750	7750	12000	16000	24500

FLEXIBILITY

Allowable tensile load on belt cross section F_{zul} in N.

Type of Teeth		AT10
without contraflexure 	Minimum No. of Teeth on pulley. Minimum DIA of flat tension pulley running on the belt teeth	15 50mm
with contraflexure 	Minimum No. of Teeth on pulley. Minimum DIA of flat tension pulley running on belt back	25 120mm



TOOTH SHEAR STRENGTH

T20 TIMING BELT/PULLEY

20mm PITCH

TOOTH SHEAR STRENGTH

Technical Section

MAX. BELT CAPACITY	
Max. power	100kw
Max. speed	6000 RPM
Max. recommended belt speed	40m/s



Rpm n min ⁻¹	T20			Rpm n min ⁻¹	T20		
	F _U spez N cm	M spez Ncm cm	P spez W cm		F _U spez N cm	M spez Ncm cm	P spez W cm
0	101.5	32.2	0.000	2200	43.6	13.9	31.99
20	98.1	31.2	0.654	2400	42.1	13.4	33.67
40	95.3	30.3	1.271	2500	41.4	13.2	34.47
60	92.8	29.5	1.856	2600	40.7	12.9	35.24
80	90.7	28.9	2.417	2800	39.3	12.5	36.72
100	88.7	28.2	2.957	2880	38.8	12.4	37.29
150	84.6	26.9	4.229	3000	38.1	12.1	38.11
200	81.2	25.9	5.415	3200	37.0	11.8	39.42
300	75.9	24.2	7.591	3400	35.9	11.4	40.66
400	71.8	22.9	9.573	3600	34.9	11.1	41.82
500	68.4	21.8	11.405	3800	33.9	10.8	42.91
600	65.6	20.9	13.117	4000	33.0	10.5	43.94
700	63.1	20.1	14.728	4500	30.8	9.8	46.24
730	62.4	19.9	15.194	5000	28.9	9.2	48.21
800	60.9	19.4	16.252	5500	27.2	8.6	49.90
900	59.0	18.8	17.700	6000	25.6	8.1	51.20
1000	57.2	18.2	19.080	6500	24.2	7.7	52.40
1100	55.6	17.7	20.399				
1200	54.2	17.2	21.663				
1300	52.8	16.8	22.875				
1400	51.5	16.4	24.041				
1460	50.8	16.2	24.719				
1500	50.3	16.0	25.162				
1600	49.2	15.7	26.243				
1700	48.2	15.3	27.286				
1800	47.2	15.0	28.292				
1900	46.2	14.7	29.264				
2000	45.3	14.4	30.204				

TENSION MEMBER TENSILE STRENGTH

T20 Belt Width in mm	32	50	75	100	150	
Newtons	4750	7750	12000	16000	24500	

FLEXIBILITY

Allowable tensile load on belt cross section F_{zul} in N.

Type of Teeth		T20
without contraflexure 	Minimum No. of Teeth on pulley. Minimum DIA of flat tension pulley running on the belt teeth	15 120mm
with contraflexure 	Minimum No. of Teeth on timing pulleys for double sided belts T20 DL Minimum DIA of flat tension pulley running on belt back	25 120mm

27.26



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TOOTH SHEAR STRENGTH

AT20 TIMING BELT/PULLEY

20mm PITCH

TOOTH SHEAR STRENGTH

Technical Section

MAX. BELT CAPACITY	
Max. power	250kw
Max. speed	6000 RPM
Flank Play	0.8mm
Max. recommended belt speed	40m/s



Rpm n min ⁻¹	AT20			Rpm n min ⁻¹	AT20		
	F _U spez N cm	M spez Ncm cm	P spez W cm		F _U spez N cm	M spez Ncm cm	P spez W cm
0	147.0	46.8	0.000	2200	63.6	20.2	46.60
20	144.2	45.9	0.962	2400	60.7	19.3	48.52
40	141.7	45.1	1.889	2500	59.3	18.9	49.40
60	139.3	44.3	2.786	2600	58.0	18.4	50.23
80	137.0	43.6	3.654	2800	55.5	17.7	51.75
100	134.9	42.9	4.497	2880	54.5	17.3	52.31
150	130.1	41.4	6.504	3000	53.1	16.9	53.10
200	125.8	40.0	8.388	3200	50.9	16.2	54.28
300	118.5	37.7	11.851	3400	48.8	15.5	55.31
400	112.4	35.8	14.988	3600	46.8	14.9	56.19
500	107.2	34.1	17.862	3800	45.0	14.3	56.93
600	102.6	32.7	20.516	4000	43.2	13.7	57.55
700	98.5	31.4	22.982	4500	39.0	12.4	58.56
730	97.4	31.0	23.689	5000	35.3	11.2	58.89
800	94.8	30.2	25.284	5500	32.0	10.1	60.60
900	91.5	29.1	27.441	6000	28.9	9.2	61.70
1000	88.4	28.1	29.466	6500	26.0	8.2	62.40
1100	85.6	27.2	31.373				
1200	82.9	26.4	33.171				
1300	80.5	25.6	34.869				
1400	78.2	24.9	36.475				
1460	76.8	24.5	37.397				
1500	76.0	24.2	37.994				
1600	73.9	23.5	39.433				
1700	72.0	22.9	40.796				
1800	70.1	22.3	42.087				
1900	68.4	21.8	43.310				
2000	66.7	21.2	44.469				

TENSION MEMBER TENSILE STRENGTH

AT20 Belt Width in mm	32	50	75	100	150
Newtons	6750	11250	17550	23850	36450

FLEXIBILITY

Allowable tensile load on belt cross section F_{zul} in N.

Type of Teeth		AT20
without contraflexure 	Minimum No. of Teeth on pulley. Minimum DIA of flat tension pulley running on the belt teeth	18 120mm
with contraflexure 	Minimum No. of Teeth on pulley. Minimum DIA of flat tension pulley running on belt back	25 180mm



TOOTH SHEAR STRENGTH

MP, MXL TIMING BELT/PULLEY

0.08" PITCH

Technical Section

TOOTH SHEAR STRENGTH

MAX. BELT CAPACITY	
Max. power	0.5kw
Max. speed	40,000 RPM
Max. recommended belt speed	80m/s



Rpm n min ⁻¹	MP, MXL			Rpm n min ⁻¹	MP, MXL		
	F _U spez $\frac{N}{cm}$	M spez $\frac{Ncm}{cm}$	P spez $\frac{W}{cm}$		F _U spez $\frac{N}{cm}$	M spez $\frac{Ncm}{cm}$	P spez $\frac{W}{cm}$
0	6.58	0.213	0.000	2200	3.50	0.113	0.261
20	6.36	0.206	0.004	2400	3.42	0.111	0.278
40	6.18	0.200	0.008	2500	3.39	0.110	0.287
60	6.03	0.195	0.012	2600	3.35	0.108	0.295
80	5.90	0.191	0.016	2800	3.29	0.106	0.312
100	5.79	0.187	0.020	2880	3.26	0.106	0.318
150	5.56	0.180	0.028	3000	3.23	0.104	0.328
200	5.38	0.174	0.036	3200	3.17	0.103	0.344
300	5.10	0.165	0.052	3400	3.12	0.101	0.359
400	4.89	0.158	0.066	3600	3.07	0.099	0.374
500	4.72	0.153	0.080	3800	3.02	0.098	0.389
600	4.58	0.148	0.093	4000	2.98	0.096	0.404
700	4.45	0.144	0.106	4500	2.88	0.093	0.438
730	4.42	0.143	0.109	5000	2.78	0.090	0.472
800	4.35	0.141	0.118	5500	2.70	0.087	0.503
900	4.25	0.137	0.130	6000	2.63	0.085	0.533
1000	4.16	0.135	0.141	6500	2.56	0.083	0.562
1100	4.08	0.132	0.152	7000	2.49	0.081	0.590
1200	4.01	0.130	0.163	7500	2.43	0.079	0.617
1300	3.94	0.128	0.174	8000	2.37	0.077	0.643
1400	3.88	0.126	0.184	8500	2.32	0.075	0.668
1460	3.85	0.124	0.190	9000	2.27	0.073	0.692
1500	3.82	0.124	0.194	9500	2.22	0.072	0.715
1600	3.77	0.122	0.204	10000	2.18	0.070	0.737
1700	3.72	0.120	0.214	12000	2.02	0.065	0.819
1800	3.67	0.119	0.224	15000	1.82	0.059	0.924
1900	3.62	0.117	0.233	18000	1.66	0.054	1.011
2000	3.58	0.116	0.242	20000	1.57	0.051	1.061

TENSION MEMBER TENSILE STRENGTH

MP, MXL Belt Width in mm Newtons	4	6	10	16
		39	65	117

Allowable tensile load on belt cross section F_{zul} in N.

FLEXIBILITY

Type of Teeth		MP MXL
without contraflexure 	Minimum No. of Teeth on pulley, Minimum DIA of flat tension pulley running on the belt teeth	10 15mm
with contraflexure 	Minimum No. of Teeth on pulley, Minimum DIA of flat tension pulley running on belt back	18 15mm

27.28



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TOOTH SHEAR STRENGTH

XL TIMING BELT/PULLEY

0.200" PITCH

TOOTH SHEAR STRENGTH

Technical Section

MAX. BELT CAPACITY

Max. power	5kw
Max. speed	40,000 RPM
Max. recommended belt speed	80m/s



Rpm n min ⁻¹	XL			Rpm n min ⁻¹	XL		
	F _U spez N cm	M spez Ncm cm	P spez W cm		F _U spez N cm	M spez Ncm cm	P spez W cm
0	24.40	1.973	0.000	2200	13.60	1.100	2.530
20	23.80	1.922	0.040	2400	13.31	1.706	2.710
40	23.20	1.879	0.079	2600	13.08	1.055	2.870
60	22.80	1.842	0.116	2800	12.80	1.035	3.060
80	22.40	1.809	0.152	3000	12.57	1.017	3.190
100	22.00	1.780	0.186	3200	12.36	0.999	3.350
200	20.60	1.667	0.349	3400	12.16	0.983	3.500
300	19.63	1.587	0.498	3600	11.96	0.967	3.650
400	18.86	1.525	0.639	3800	11.78	0.953	3.790
500	18.23	1.474	0.772	4000	11.61	0.939	3.930
600	17.70	1.431	0.899	4500	11.21	0.907	4.270
700	17.24	1.394	1.022	5000	10.86	0.878	4.600
800	16.83	1.361	1.140	5500	10.54	0.852	4.910
900	16.47	1.332	1.255	6000	10.24	0.828	5.200
1000	16.14	1.305	1.367	6500	9.97	0.806	5.490
1100	15.84	1.281	1.475	7000	9.72	0.786	5.760
1200	15.57	1.259	1.582	7500	9.49	0.767	6.020
1300	15.31	1.238	1.685	8000	9.27	0.749	6.280
1400	15.07	1.219	1.787	9000	8.86	0.717	6.760
1500	14.85	1.201	1.886	10000	8.51	0.688	7.200
1600	14.64	1.184	1.984				
1700	14.45	1.168	2.080				
1800	14.26	1.153	2.170				
1900	14.08	1.139	2.270				
2000	13.91	1.125	2.360				

TENSION MEMBER TENSILE STRENGTH

XL Belt Width in mm Newtons	6.35	9.52	12.7	19.05
	210	330	390	630

Allowable tensile load on belt cross section F_{Zul} in N.

FLEXIBILITY

Type of Teeth		XL
without contraflexure 	Minimum No. of Teeth on pulley. Minimum DIA of flat tension pulley running on the belt teeth	10 30mm
with contraflexure 	Minimum No. of Teeth on pulley. Minimum DIA of flat tension pulley running on belt back	15 30mm



TOOTH SHEAR STRENGTH

L TIMING BELT/PULLEY

3/8" PITCH

TOOTH SHEAR STRENGTH

Technical Section

MAX. BELT CAPACITY	
Max. power	12kw
Max. speed	15000 RPM
Max. recommended belt speed	60m/s



Rpm n min ⁻¹	L			Rpm n min ⁻¹	L		
	F _U spez N cm	M spez Ncm cm	P spez W cm		F _U spez N cm	M spez Ncm cm	P spez W cm
0	37.40	5.670	0.000	2200	18.22	2.760	6.370
20	36.30	5.500	0.115	2400	17.71	2.690	8.750
40	35.30	5.350	0.224	2600	17.25	2.610	7.120
60	34.50	5.230	0.329	2800	16.81	2.550	7.470
80	33.80	5.120	0.429	3000	16.40	2.490	7.810
100	33.10	5.020	0.526	3200	16.02	2.430	8.140
200	30.70	4.650	0.974	3400	15.66	2.370	8.450
300	28.90	4.380	1.377	3600	15.32	2.320	8.760
400	27.50	4.180	1.749	3800	15.00	2.270	9.050
500	26.40	4.010	2.100	4000	14.69	2.230	9.330
600	25.50	3.860	2.430	4500	13.99	2.120	9.990
700	24.70	3.740	2.740	5000	13.36	2.030	10.610
800	24.00	3.630	3.040	5500	12.79	1.939	11.170
900	23.30	3.530	3.330	6000	12.27	1.860	11.690
1000	22.70	3.450	3.610	6500	11.79	1.787	12.160
1100	22.20	3.370	3.880	7000	11.34	1.719	12.600
1200	21.70	3.290	4.140	7500	10.36	1.656	13.010
1300	21.30	3.220	4.390	8000	10.54	1.597	13.380
1400	20.80	3.160	4.630	9000	9.83	1.490	14.040
1500	20.40	3.100	4.870	10000	9.19	1.393	14.590
1600	20.10	3.040	5.100				
1700	19.72	2.990	5.320				
1800	19.39	2.940	5.540				
1900	19.08	2.890	5.750				
2000	18.78	2.850	5.960				

TENSION MEMBER TENSILE STRENGTH

L Belt Width in mm	13	19	25	38
Newton	840	1260	1680	2520

Allowable tensile load on belt cross section F_{zul} in N.

FLEXIBILITY

Type of Teeth		L
without contraflexure 	Minimum No. of Teeth on pulley. Minimum DIA of flat tension pulley running on the belt teeth	15 60mm
with contraflexure 	Minimum No. of Teeth on pulley. Minimum DIA of flat tension pulley running on belt back	20 60mm

27.30



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TOOTH SHEAR STRENGTH

H TIMING BELT/PULLEY

1/2" PITCH

Technical Section

MAX. BELT CAPACITY

Max. power	30kw
Max. speed	15000 RPM
Max. recommended belt speed	60m/s

TOOTH SHEAR STRENGTH



Rpm n min^{-1}	H			Rpm n min^{-1}	H		
	FU spez $\frac{N}{\text{cm}}$	M spez $\frac{N\text{cm}}{\text{cm}}$	P spez $\frac{W}{\text{cm}}$		FU spez $\frac{N}{\text{cm}}$	M spez $\frac{N\text{cm}}{\text{cm}}$	P spez $\frac{W}{\text{cm}}$
0	44.00	8.900	0.000	2200	21.50	4.340	10.000
20	42.70	8.640	0.181	2400	20.90	4.220	10.600
40	41.60	8.410	0.352	2600	20.30	4.110	11.180
60	40.70	8.220	0.516	2800	19.81	4.000	11.740
80	39.80	8.050	0.674	3000	19.39	3.910	12.270
100	39.10	7.890	0.827	3200	18.88	3.820	12.790
200	36.10	7.300	1.530	3400	18.45	3.730	13.280
300	34.10	6.890	2.160	3600	18.05	3.650	13.760
400	32.50	6.560	2.750	3800	17.68	3.570	14.220
500	31.50	6.300	3.300	4000	17.32	3.500	14.660
600	30.00	6.070	3.810	4500	16.49	3.330	15.700
700	29.10	5.880	4.310	5000	15.74	3.180	16.660
800	28.20	5.710	4.780	5500	15.07	3.050	17.550
900	27.50	5.550	5.230	6000	14.46	2.920	18.360
1000	26.80	5.410	5.670	6500	13.89	2.810	19.110
1100	26.20	5.290	6.090	7000	13.36	2.700	19.800
1200	25.60	5.170	6.500	7500	12.87	2.600	20.400
1300	25.10	5.060	6.890	8000	12.42	2.510	21.000
1400	24.60	4.960	7.280	9000	11.58	2.340	22.100
1500	24.10	4.870	7.650	10000	10.83	2.190	22.900
1600	23.70	4.780	8.010				
1700	23.20	4.700	8.360				
1800	22.90	4.620	8.710				
1900	22.50	4.540	9.040				
2000	22.10	4.470	9.370				

TENSION MEMBER TENSILE STRENGTH

H Belt Width in mm Newtons	19	25	38	51
		1600	2000	3200

Allowable tensile load on belt cross section F_{zul} in N.

FLEXIBILITY

Type of Teeth	H
without contraflexure 	14 60mm
with contraflexure 	20 80mm



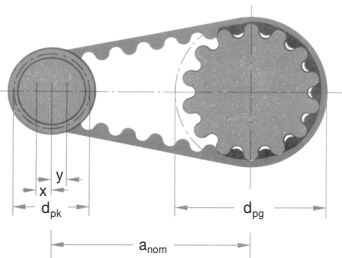
HTD TIMING BELTS

SYMBOL DESCRIPTIONS

Technical Section

a	= Drive centre distance	(mm)
a_{nom}	= Drive centre distance with standard belt length	(mm)
b_{st}	= Standard belt width	
C₀	= Basic service factor	
C₁	= Tooth in mesh factor	
C₂	= Overall service factor	
C₃	= Speed ratio correction factor	
C₆	= Fatigue correction factor	
C₇	= Length factor	
d_a	= Outside diameter of pulley	(mm)
d_p	= Pitch diameter of pulley	(mm)
d_{pg}	= Pitch diameter of large pulley	(mm)
d_{pk}	= Pitch diameter of small pulley	(mm)
d_{p1}	= Pitch diameter of driving pulley	(mm)
d_{p2}	= Pitch diameter of driven pulley	(mm)
E_a	= Belt deflection for given span length(mm)	
f	= Test force	(N)
i	= Speed ratio	
L	= Drive span length	(mm)
L_{psst}	= Standard pitch length of timing belt (mm)	
L_{pth}	= Calculated pitch length of timing belt(mm)	
n_k	= Speed of small pulley	(min ⁻¹)
n₁	= Speed of driving pulley	(min ⁻¹)
n₂	= 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_U	= Transmissible power for standard belt width (P _N x C ₁ x C ₂)	(kW)

S_a	= Minimum static shaft loading when stationary	(N)
S_{nperm}	= Maximum permissible peripheral force(N)	
S_{n3}	= Peripheral force to be effectively transmitted	(N)
S_n	= Peripheral force to be effectively transmitted including actual centrifugal force	(N)
S_Z	= Peripheral force referred to 25mm belt width	(N)
S_{ZB}	= Actual peripheral force	(N)
t	= Tooth pitch	(mm)
v	= Belt speed	(m/s)
x	= Minimum adjustment of drive centre distance e _{nom} for tensioning timing belt	(mm)
y	= Minimum adjustment of drive centre distance e _{nom} for installation	(mm)
Z_a	= 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	
Z₁	= Number of teeth on driving pulley	
Z₂	= Number of teeth on driven pulley	



HTD TIMING BELTS

DESIGN CALCULATIONS

The basic service factor C_0 takes account of the daily operating time and the types of prime mover and driven unit. As it is practically impossible to summarise every conceivable combination of prime mover/driver unit/ambient conditions, the service factors represent **guide values**. In special cases, such as increased starting torque values, drive systems with high stop/start frequencies, or with fast accelerations or decelerations, the service factor should be increased. **The overall service factor C_2 is determined by addition of the values found in tables 1, 2 and 5.** NOTE:- WHERE 6 TEETH OR MORE ARE IN MESH WITH THE SMALL PULLEY THEIR SHEAR STRENGTH EXCEEDS THE TENSION STRENGTH OF THE TENSION CORD.

Table 1

<div style="font-size: 4em; text-align: center; margin-bottom: 10px;">C_0</div> Service factor C_0 at number of operating hours per day	Service conditions and examples of prime movers			
	Steady operation		Intermittent operation	
Type of service and examples of machine applications	up to 16 h	over 16 h	up to 16 h	over 16 h
Lightweight drives, shock-free and steady running <i>Measuring equipment, film cameras, office machinery, belt conveyor systems (lightweight goods).</i>	1.3	1.4	1.4	1.5
Medium drives, intermittent operation with low to medium shock loading <i>Mixing machines, kitchen machines, printing machines, textile machines, packaging machines, belt conveyor systems (heavy goods).</i>	1.6	1.7	1.8	1.9
Heavy duty drives, intermittent operation with medium to high shock loading <i>Machine tools, woodworking machines, eccentric drives, conveyor systems (heavy goods).</i>	1.8	1.9	2.0	2.1
Very heavy duty drives, continuous operation with high stock loading <i>Grinding mills, calendars, extruders, piston pumps and compressors, lifting gear.</i>	2.0	2.1	2.2	2.3

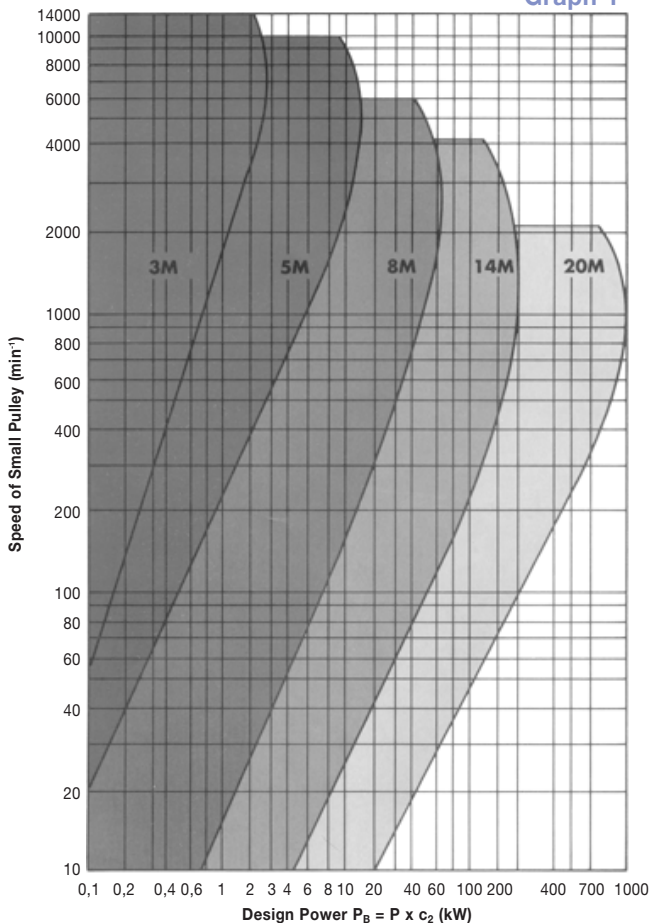


HTD TIMING BELTS

BELT SELECTION GRAPH

Technical Section

Graph 1



DRIVE DESIGN - ADDITIONAL FACTORS

Table 2
Length Factor C_7

TYPE 3M		
Pitch Length (mm)	C_7	
≤ 190	0.8	
> 190 ≤ 260	0.9	
> 260 ≤ 400	1.0	
> 400 ≤ 600	1.1	
> 600	1.2	

TYPE 5M		
Pitch Length (mm)	C_7	
≤ 440	0.8	
> 440 ≤ 555	0.9	
> 555 ≤ 800	1.0	
> 800 ≤ 1100	1.1	
> 1100	1.2	

TYPE 8M		
Pitch Length (mm)	C_7	
≤ 600	0.8	
> 600 ≤ 880	0.9	
> 880 ≤ 1200	1.0	
> 1200 ≤ 1760	1.1	
> 1760	1.2	

TYPE 14M		
Pitch Length (mm)	C_7	
≤ 1190	0.80	
> 1190 ≤ 1610	0.90	
> 1610 ≤ 1890	0.95	
> 1890 ≤ 2450	1.00	
> 2450 ≤ 3150	1.05	
> 3150	1.10	

TYPE 20M		
Pitch Length (mm)	C_7	
≤ 3000	0.90	
> 3000 ≤ 3400	0.95	
> 3400 ≤ 4600	1.00	
> 4600 ≤ 5400	1.05	
> 5400 ≤	1.10	

Table 3 : Teeth in Mesh Factor c_1

Number of Teeth in Mesh Z_0	Teeth in Mesh Factor C_1
6 and more	1.00
5	0.80
4	0.60
3	0.40
2	0.20

The factors and corrections in Tables, 3, 4 and 5 apply to all HTD types.

Table 4 : Fatigue Correction Factor C_6

Operating Conditions	Correction Factor C_6
Continuous 24-hour operation and/or use of a tensioning idler	0.20 per idler

For unusual operating conditions, the following should be added to the basic service factor C_0

Table 5 : Speed Ratio Correction Factor C_3

Speed Ratio i	Speed Ratio Correction Factor C_3
1.00 - 0.80	0.00
0.79 - 0.57	0.10
0.56 - 0.40	0.20
0.39 - 0.28	0.30
0.27 and smaller	0.40

For speed increasing drives, the factor corresponding to the speed ratio should be added to the basic service factor C_0

Further corrections to the overall service factor may become necessary in the case of reversing drives, brake motors, electric brakes, etc.



CALCULATION FORMULAE

Overall service factor

$$c_2 = c_0 + c_3 + c_6$$

c_0 from Table 1
 c_3 from Table 5
 c_6 from Table 4

Design Power

$$P_B = P \times c_2$$

Selection of Timing Belt Type

See graph 1

Speed Ratio

$$i = \frac{n_1}{n_2} = \frac{z_2}{z_1} = \frac{d_{p2}}{d_{p1}}$$

Number of Teeth on Pulleys

$$z_1$$

$$z_2 = z_1 \times i$$

Selected from standard HTD pulley range.

Checking the Speed on the Driven Unit

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

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

Teeth in Mesh Factor

c_1 from Table 3

Belt Width as a function of rated power

Requirement: $P_B \leq P_U$

$$P_U = P_N \times C_1 \times C_7$$

Required P_N value

See relevant belt pages.

Recommended Drive Centre Distance

$$0.5 (d_{pg} + d_{pk}) + 15 < a < 2 \times (d_{pg} + d_{pk})$$

Theoretical and standard pitch length L_{pth} , L_{pSt}

$$L_{pth} = 2a + \frac{\pi}{2} \times (d_{pg} + d_{pk}) + \frac{(d_{pg} - d_{pk})^2}{4a}$$

L_{pSt} Standard belt length, see pages for HTD Belts.

Nominal Drive Centre Distance a_{nom}

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

$$K = \frac{L_{pst}}{4} - \frac{\pi}{8} (d_{pg} + d_{pk})$$

Drive centre distance a_{nom} to be provided with adjustments for installation y_1 and tensioning x_1

$$x_1 \geq x + 0.002 \times a_{nom} \quad x \text{ from Table 6}$$

y_1 depending on flange arrangement, minimum adjustment y

$$y_1 \geq y \quad y \text{ from Table 6}$$

Calculation and setting of tension, see relevant page.

Length Factor

c_7 from Table 2

Number of Teeth in Mesh on a Small Pulley

$$z_e = \frac{zk}{6} \left(3 - \frac{d_{pg} - d_{pk}}{a_{nom}} \right)$$



CALCULATION

TENSIONING/MIN ADJUSTMENT x/y

Correct belt tension is of enormous importance for the satisfactory transmission of power and achievement of normal belt service life. Frequently, insufficient or excessive tensioning will lead to the premature failure of timing belts. Over tensioning frequently results in bearing failure on the prime mover or the driven unit. It has been found that unscientific tensioning methods, for example the 'thumb pressure method' are not suitable for applying the optimum tension to drive systems for maximum efficiency. It is recommended therefore that the necessary static tension should be calculated for each drive system, using the following formulae. By virtue of their extremely low stretch properties, it is not necessary with our HTD timing belts to carry out any retensioning after installation.

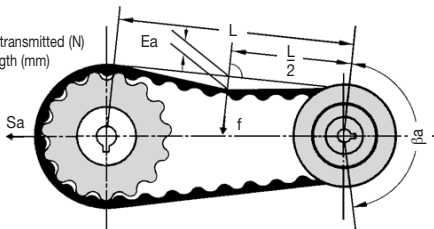
Formula symbols:

- f = test force (N)
- S_{n3} = peripheral force to be effectively transmitted (N)
- E_a = belt deflection for given span length (mm)
- L = drive span length (mm)

1. Calculation of test force f

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

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



2. Calculation of belt deflection E_a for existing span length L

$$E_a = \frac{L}{50}$$

$$L = \sqrt{a^2_{nom} - \left(\frac{d_{pg} - d_{pk}}{2}\right)^2}$$

Belt Speed

$$v = \frac{d_{p1} \times n_1}{19100}$$

v m/s

3. Calculation of minimum static shaft loading

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

Minimum adjustment x/y of drive centre distance for correction of length tolerance.

When establishing the drive centre distance, provision should be made for adjustment in accordance with Table 6, where L_{pSt} is Standard Pitch Length of timing belt.

Table 6

For each additional 254mm length, 0.03mm should be added.

L_{pSt} (mm)	≥ 91.44 ≥ 254	≥ 255 ≥ 381	≥ 382 ≥ 508	≥ 509 ≥ 762	≥ 763 ≥ 1016	≥ 1017 ≥ 1270	≥ 1270 ≥ 1524	≥ 1525 ≥ 1778
Min. drive centre distance adjustment x/y (mm)	± 0.20	± 0.23	± 0.25	± 0.30	± 0.33	± 0.38	± 0.41	± 0.43



RATED POWER PN 3mm PITCH, 6mm Wide Belt

RATED POWER (WATTS)

Pitch Ø (mm)	Number of Teeth in Pulley															
	10	12	14	16	18	20	24	28	32	40	48	56	64	72	80	
	9.55	11.46	13.37	15.28	17.19	19.10	22.92	26.74	30.56	38.20	45.84	53.48	61.12	68.76	76.39	
Speed of SmallPulley RPM	20	1	1	1	1	2	2	2	3	3	4	6	7	8	9	
	40	2	2	2	3	3	3	4	5	6	9	11	13	15	19	
	60	2	3	3	4	5	5	7	8	10	13	17	20	23	28	
	100	4	5	6	7	8	9	11	13	16	21	28	33	38	47	
	200	8	10	11	13	15	17	22	27	32	43	55	66	75	94	
	300	11	13	16	18	21	24	30	36	43	58	74	87	100	112	128
	400	13	16	19	23	26	30	37	45	53	71	90	107	122	138	153
	500	16	19	23	27	31	35	44	53	62	83	106	125	143	161	179
	600	18	22	27	31	35	40	50	60	71	95	120	142	163	183	203
	700	20	25	30	35	40	45	56	68	80	106	134	159	181	204	227
	800	23	28	33	39	44	50	62	75	88	117	148	174	199	224	249
	900	25	30	36	42	48	55	68	82	96	127	160	189	216	243	270
	950	26	32	38	44	50	57	71	85	100	132	167	197	225	253	281
	1000	27	33	39	46	52	59	73	88	104	137	173	204	233	262	291
	1200	31	38	45	52	60	68	84	101	119	156	197	232	265	298	330
	1400	35	43	51	59	68	76	94	113	133	175	219	258	295	331	367
	1450	36	44	52	61	69	78	97	116	137	179	225	264	302	339	377
	1600	39	47	56	65	75	84	104	125	147	192	241	283	323	363	403
	1800	42	52	62	72	82	92	114	136	160	209	261	307	351	394	437
	2000	46	56	67	77	89	100	123	148	173	226	281	331	377	423	469
2400	53	65	77	89	102	115	141	169	197	257	319	375	427	479	530	
2850	60	73	86	100	114	129	158	189	221	287	355	416	474	530	586	
3200	66	81	96	111	126	142	175	209	243	315	389	455	517	578	638	
3600	73	88	105	121	138	155	191	227	265	342	421	492	558	622	685	
4000	79	96	113	131	150	168	206	246	285	368	451	526	596	663	727	
5000	94	114	134	155	177	198	243	288	334	427	521	603	678	749	814	
6000	108	131	154	178	202	227	277	327	378	481	581	667	743	812	871	
7000	121	147	173	200	227	254	309	364	419	528	631	718	790	850	896	
8000	134	163	191	221	250	279	339	398	456	569	673	754	816	861	885	
10000	159	192	226	259	293	326	393	457	519	631	724	781	804	792	739	
12000	182	220	257	295	332	368	438	505	566	666	729	739	691			
14000	204	245	286	327	366	404	476	541	596	670	683	616				

When using these pulleys/speeds reduced service life must be expected



RATED POWER PN 3mm PITCH, 9mm Wide Belt

RATED POWER (WATTS)																
Pitch Ø (mm)	Number of Teeth in Pulley															
	10	12	14	16	18	20	24	28	32	40	48	56	64	72	80	
	9.55	11.46	13.37	15.28	17.19	19.10	22.92	26.74	30.56	38.20	45.84	53.48	61.12	68.76	76.39	
Speed of SmallPulley RPM	20	1	1	1	1	3	3	3	4	4	6	9	11	13	13	14
	40	3	3	3	4	4	4	6	8	9	14	18	21	24	27	31
	60	3	4	4	6	8	8	11	13	16	21	27	32	37	40	45
	100	6	8	9	11	13	14	18	21	26	34	45	54	62	68	77
	200	13	16	18	21	24	27	36	44	52	70	90	108	122	137	154
	300	18	21	26	29	34	39	49	59	70	95	121	142	163	183	204
	400	21	26	31	37	42	49	60	73	86	116	147	175	200	226	250
	500	26	31	37	44	50	57	72	86	101	136	173	204	234	264	293
	600	29	36	44	50	57	65	81	98	116	155	196	232	267	300	332
	700	32	40	49	57	65	73	91	111	131	173	219	260	296	334	372
	800	37	45	54	63	72	81	101	122	144	191	242	285	326	367	408
	900	40	49	59	68	78	90	111	134	157	208	262	309	354	398	442
	950	42	52	62	72	81	93	116	139	163	216	273	323	368	414	460
	1000	44	54	63	75	85	96	119	144	170	224	283	334	382	429	477
	1200	50	62	73	85	98	111	137	165	195	255	323	380	434	488	541
	1400	57	70	83	96	111	124	154	185	218	286	359	423	483	542	603
	1450	59	72	85	100	113	127	159	190	224	293	367	432	495	555	618
	1600	63	77	91	106	122	137	170	204	241	314	395	464	529	595	660
	1800	68	85	101	118	134	150	186	223	262	342	428	503	575	646	716
	2000	75	91	109	126	145	163	201	243	283	370	460	542	618	693	769
2400	86	106	126	145	167	188	231	277	323	421	523	614	700	785	869	
2850	98	119	141	163	186	211	259	309	362	470	582	682	777	869	961	
3200	108	132	157	182	206	232	286	342	398	516	637	746	847	947	1046	
3600	119	144	172	198	226	254	313	372	434	560	690	806	915	1020	1123	
4000	129	157	185	214	245	275	337	401	467	603	739	862	977	1087	1192	
5000	154	186	219	254	290	324	398	472	547	700	854	988	1111	1228	1334	
6000	177	214	252	291	331	372	454	536	619	788	952	1093	1218	1331	1428	
7000	198	241	283	327	372	416	506	596	687	865	1034	1177	1295	1393	1469	
8000	219	267	313	362	406	457	555	652	747	933	1103	1236	1338	1411	1451	
10000	260	314	370	424	480	534	644	749	851	1034	1187	1280	1318	1298	1211	
12000	298	360	421	482	544	603	718	828	928	1092	1195	1211	1133			
14000	334	401	469	536	600	662	780	887	977	1098	1120	1010				

When using these pulleys/speeds reduced service life must be expected



RATED POWER (WATTS)

Pitch Ø (mm)	Number of Teeth in Pulley															
	14	16	18	20	24	28	32	36	40	44	48	56	64	72	80	
	22.28	25.46	28.65	31.83	38.20	44.56	50.93	57.30	63.66	70.06	76.39	89.13	101.86	114.59	127.32	
Speed of SmallPulley RPM	20	4	5	6	7	9	11	13	15	17	20	23	27	31	34	38
	40	9	11	12	14	18	21	26	30	35	40	45	54	61	69	77
	60	13	16	18	21	26	32	38	45	52	60	68	80	92	103	115
	100	22	26	30	35	44	54	64	75	87	100	113	134	153	172	192
	200	45	53	61	69	88	107	128	150	174	199	226	268	306	345	383
	300	61	72	83	94	119	145	172	202	233	266	300	356	407	458	509
	400	76	90	103	117	147	179	213	249	286	326	368	436	498	561	623
	500	91	106	122	139	174	211	251	292	336	382	430	510	586	656	728
	600	104	122	140	159	199	241	286	334	383	435	489	580	662	745	827
	700	117	137	158	179	223	271	321	373	428	485	545	646	739	829	921
	800	130	152	174	198	247	299	353	411	471	533	598	709	809	910	1010
	900	142	166	191	216	269	326	385	447	512	580	650	769	879	987	1096
	950	148	173	199	225	280	339	401	465	532	603	675	799	912	1025	1137
	1000	154	180	206	234	291	352	416	483	552	625	699	828	945	1062	1178
	1200	177	207	237	268	334	403	475	551	629	710	794	939	1072	1204	1334
	1400	199	232	266	301	375	451	532	615	702	791	884	1044	1191	1336	1480
	1450	205	239	274	309	384	463	545	631	720	811	905	1070	1220	1368	1515
	1600	221	257	295	333	414	498	586	677	771	869	969	1144	1303	1461	1617
	1800	242	281	322	364	451	543	638	736	838	943	1050	1239	1410	1578	1745
	2000	262	305	349	394	488	586	688	794	902	1014	1128	1329	1511	1689	1864
2400	301	350	400	451	558	669	784	902	1024	1148	1274	1497	1697	1891	2079	
2850	338	393	449	506	625	748	874	1004	1137	1272	1408	1649	1863	2067	2262	
3200	374	434	496	559	688	822	960	1100	1242	1386	1531	1786	2008	2217	2411	
3600	409	474	541	609	749	893	1040	1190	1340	1492	1644	1908	2134	2340	2526	
4000	443	513	585	658	808	961	1116	1274	1431	1589	1745	2015	2238	2436	2604	
5000	523	605	688	772	943	1115	1288	1459	1628	1792	1951	2212	2402	2541	2623	
6000	598	690	783	877	1064	1250	1433	1610	1778	1937	2084	2301	2411	2434	2358	
7000	669	769	870	971	1171	1365	1550	1722	1880	2019	2137	2268	2245			
8000	735	843	950	1057	1264	1459	1637	1794	1927	2031	2101	2100				
10000	854	972	1088	1199	1403	1577	1714	1804	1842	1819	1729					
12000	956	1078	1193	1299	1476	1594	1643	1609								
14000	1039	1158	1264	1354	1473	1495	1403									

When using these pulleys/speeds reduced service life must be expected



RATED POWER (WATTS)																
Pitch Ø (mm)	Number of Teeth in Pulley															
	14	16	18	20	24	28	32	36	40	44	48	56	64	72	80	
	22.28	25.46	28.65	31.83	38.20	44.56	50.93	57.30	63.66	70.06	76.39	89.13	101.86	114.59	127.32	
Speed of SmallPulley RPM	20	7	9	11	13	16	20	24	27	31	37	42	50	57	63	70
	40	16	20	22	26	33	39	48	55	65	74	83	100	113	128	143
	60	24	29	33	39	48	59	70	83	96	111	126	148	171	192	214
	100	41	48	55	65	82	100	119	139	162	186	210	249	285	320	358
	200	83	68	113	128	164	199	238	279	324	371	421	499	570	643	714
	300	113	134	154	175	221	270	320	376	434	496	559	663	759	854	949
	400	141	167	192	218	274	333	397	464	533	607	686	813	928	1046	1161
	500	169	197	227	259	324	393	468	544	626	712	801	951	1087	1223	1357
	600	199	227	261	296	371	449	533	622	714	811	911	1081	1234	1389	1542
	700	218	255	294	333	415	505	598	695	798	904	1016	1204	1376	1546	1717
	800	242	283	324	369	460	557	658	766	878	993	1115	1322	1508	1697	1883
	900	264	309	356	402	501	607	717	833	954	1081	1212	1434	1639	1840	2043
	950	276	322	371	419	522	632	747	867	992	1124	1258	1490	1700	1911	2120
	1000	287	335	384	436	542	656	775	900	1029	1165	1303	1544	1762	1980	2196
	1200	330	386	441	499	622	751	885	1027	1173	1324	1480	1751	1999	2245	2487
	1400	371	432	496	561	699	841	992	1146	1309	1475	1648	1946	2221	2491	2760
	1450	382	445	510	576	716	863	1016	1176	1342	1512	1687	1995	2275	2551	2825
	1600	412	479	550	621	772	928	1092	1262	1437	1620	1807	2133	2429	2724	3015
	1800	451	524	600	678	841	1012	1189	1372	1562	1758	1958	2310	2629	2942	3254
	2000	488	568	650	734	910	1092	1283	1480	1682	1891	2103	2478	2817	3149	3476
2400	561	652	745	841	1040	1247	1462	1682	1909	2140	2375	2791	3164	3526	3877	
2850	630	732	837	943	1165	1394	1629	1872	2120	2372	2625	3075	3474	3854	4218	
3200	697	809	924	1042	1283	1532	1790	2051	2316	2584	2855	3330	3744	4134	4496	
3600	762	883	1008	1135	1396	1665	1939	2219	2498	2782	3065	3558	3979	4363	4710	
4000	826	956	1090	1227	1506	1792	2081	2375	2668	2963	3254	3757	4173	4542	4856	
5000	975	1128	1283	1439	1758	2079	2401	2720	3036	3341	3638	4125	4479	4738	4891	
6000	1115	1286	1460	1635	1974	2331	2672	3002	3315	3612	3886	4291	4496	4539	4397	
7000	1247	1434	1622	1810	2183	2545	2890	3211	3506	3765	3985	4229	4186			
8000	1370	1572	1771	1971	2357	2720	3052	3345	3593	3787	3918	3916				
10000	1592	1812	2029	2236	2616	2940	3196	3364	3435	3392	3221					
12000	1782	2010	2224	2422	2752	2972	3064	3000								
14000	1937	2159	2357	2525	2746	2788	2616									

When using these pulleys/speeds reduced service life must be expected



RATED POWER (kW)

Pitch Ø (mm)	Number of Teeth in Pulley																	
	22	24	26	28	30	32	34	36	38	40	44	48	52	56	64	72	80	
	56.02	61.12	66.21	71.30	76.39	81.49	86.58	91.67	96.77	101.86	112.05	122.23	132.42	142.60	162.97	183.35	203.72	
Speed of SmallPulley RPM	10	0.02	0.02	0.02	0.03	0.03	0.04	0.04	0.05	0.05	0.06	0.06	0.07	0.07	0.08	0.09	0.10	0.11
	20	0.03	0.04	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.17	0.19	0.21
	50	0.08	0.09	0.11	0.13	0.16	0.18	0.21	0.23	0.26	0.28	0.31	0.33	0.36	0.38	0.43	0.48	0.53
	100	0.16	0.18	0.22	0.27	0.31	0.36	0.41	0.47	0.52	0.56	0.62	0.67	0.72	0.77	0.87	0.96	1.06
	200	0.33	0.37	0.45	0.53	0.62	0.72	0.82	0.93	1.05	1.13	1.24	1.34	1.44	1.54	1.73	1.93	2.12
	300	0.49	0.53	0.65	0.77	0.90	1.04	1.19	1.34	1.51	1.64	1.78	1.93	2.07	2.22	2.50	2.77	3.05
	400	0.65	0.71	0.84	0.99	1.16	1.34	1.54	1.74	1.96	2.12	2.31	2.50	2.68	2.87	3.23	3.59	3.94
	500	0.81	0.89	1.02	1.22	1.42	1.64	1.88	2.13	2.39	2.59	2.82	3.05	3.27	3.50	3.94	4.37	4.80
	600	0.98	1.07	1.21	1.43	1.67	1.93	2.21	2.51	2.82	3.05	3.32	3.59	3.85	4.11	4.63	5.13	5.63
	700	1.14	1.24	1.38	1.64	1.92	2.22	2.54	2.88	3.23	3.50	3.81	4.11	4.41	4.71	5.30	5.87	6.44
	800	1.30	1.42	1.56	1.85	2.17	2.50	2.86	3.24	3.64	3.94	4.28	4.63	4.97	5.30	5.96	6.60	7.23
	950	1.55	1.69	1.83	2.16	2.52	2.91	3.33	3.77	4.24	4.58	4.99	5.38	5.77	6.16	6.91	7.65	8.37
	1000	1.63	1.77	1.93	2.26	2.64	3.05	3.48	3.95	4.44	4.80	5.22	5.63	6.04	6.44	7.23	7.99	8.74
	1200	1.95	2.13	2.31	2.65	3.10	3.58	4.09	4.63	5.21	5.63	6.12	6.60	7.07	7.54	8.44	9.32	10.17
	1450	2.35	2.57	2.79	3.13	3.66	4.23	4.83	5.47	6.14	6.64	7.21	7.77	8.31	8.85	9.89	10.90	11.85
	1600	2.59	2.83	3.07	3.42	3.99	4.61	5.26	5.96	6.69	7.23	7.84	8.44	9.03	9.61	10.73	11.79	12.80
	1800	2.92	3.18	3.45	3.78	4.42	5.10	5.82	6.59	7.40	7.99	8.67	9.32	9.96	10.59	11.79	12.92	13.99
	2000	3.23	3.52	3.82	4.18	4.84	5.58	6.37	7.21	8.09	8.74	9.47	10.17	10.86	11.53	12.80	13.99	15.09
	2200	3.55	3.87	4.19	4.59	5.25	6.05	6.91	7.82	8.77	9.47	10.24	11.00	11.73	12.43	13.76	14.98	16.09
	2500	4.02	4.38	4.75	5.19	5.84	6.74	7.69	8.69	9.75	10.52	11.36	12.18	12.95	13.70	15.09	16.32	17.40
2850	4.57	4.97	5.38	5.88	6.51	7.51	8.56	9.67	10.85	11.69	12.60	13.47	14.29	15.06	16.46	17.65	18.62	
3000	4.80	5.22	5.65	6.17	6.79	7.82	8.92	10.08	11.30	12.18	13.11	13.99	14.82	15.60	16.99	18.14	19.04	
3500	5.57	6.05	6.54	7.13	7.72	8.84	10.07	11.37	12.73	13.70	14.68	15.60	16.44	17.20	18.47	19.38	19.89	
4000	6.32	6.85	7.39	8.05	8.71	9.78	11.13	12.55	14.04	15.09	16.09	16.99	17.79	18.47	19.48	19.96		
4500	7.04	7.62	8.22	8.93	9.64	10.64	12.09	13.62	15.23	16.32	17.30	18.14	18.84	19.38	19.96			
5000	7.75	8.37	9.00	9.76	10.52	11.41	12.96	14.58	16.27	17.40	18.31	19.04	19.57	19.89				
5500	8.43	9.09	9.75	10.55	11.34	12.12	13.72	15.41	17.17	18.31	19.10	19.64	19.95					
6000	9.09	9.77	10.46	11.28	12.09	12.89	14.36	16.10	17.91	19.04	19.65	19.96						

 When using these pulleys/speeds reduced service life must be expected



RATED POWER (kW)																		
Pitch Ø (mm)	Number of Teeth in Pulley																	
	22	24	26	28	30	32	34	36	38	40	44	48	52	56	64	72	80	
	56.02	61.12	66.21	71.30	76.39	81.49	86.58	91.67	96.77	101.86	112.05	122.23	132.42	142.60	162.97	183.35	203.72	
Speed of SmallPulley RPM	10	0.03	0.03	0.04	0.04	0.05	0.06	0.06	0.07	0.08	0.09	0.10	0.11	0.11	0.12	0.14	0.15	0.17
	20	0.05	0.06	0.07	0.08	0.10	0.11	0.13	0.15	0.17	0.18	0.19	0.21	0.23	0.24	0.27	0.30	0.33
	50	0.13	0.15	0.18	0.21	0.24	0.28	0.32	0.37	0.41	0.44	0.49	0.53	0.57	0.61	0.68	0.76	0.84
	100	0.26	0.29	0.35	0.42	0.49	0.57	0.65	0.73	0.83	0.89	0.97	1.05	1.13	1.21	1.37	1.52	1.67
	200	0.51	0.58	0.70	0.84	0.98	1.13	1.29	1.47	1.65	1.78	1.95	2.11	2.27	2.42	2.73	3.04	3.34
	300	0.77	0.84	1.02	1.21	1.41	1.63	1.87	2.12	2.38	2.58	2.81	3.04	3.27	3.49	3.94	4.38	4.81
	400	1.03	1.12	1.32	1.57	1.83	2.12	2.42	2.75	3.09	3.34	3.64	3.94	4.23	4.52	5.09	5.66	6.21
	500	1.28	1.40	1.61	1.92	2.24	2.59	2.96	3.36	3.77	4.08	4.45	4.81	5.16	5.52	6.21	6.89	7.57
	600	1.54	1.68	1.90	2.26	2.64	3.05	3.49	3.95	4.44	4.81	5.23	5.66	6.07	6.49	7.30	8.10	8.88
	700	1.80	1.96	2.18	2.59	3.03	3.50	4.00	4.54	5.10	5.52	6.00	6.49	6.96	7.43	8.36	9.27	10.16
	800	2.05	2.24	2.46	2.92	3.41	3.94	4.51	5.11	5.74	6.21	6.76	7.30	7.83	8.36	9.40	10.41	11.40
	950	2.44	2.66	2.89	3.40	3.98	4.60	5.25	5.95	6.69	7.73	8.86	9.11	9.71	10.91	12.07	13.21	
	1000	2.57	2.80	3.04	3.56	4.16	4.81	5.50	6.23	7.00	7.57	8.23	8.88	9.52	10.16	11.40	12.61	13.80
	1200	3.08	3.35	3.64	4.19	4.89	5.65	6.46	7.31	8.21	8.88	9.65	10.41	11.16	11.89	13.33	14.72	16.07
	1450	3.71	4.05	4.39	4.94	5.78	6.67	7.62	8.63	9.69	10.47	11.37	12.25	13.12	13.97	15.62	17.21	18.73
	1600	4.09	4.46	4.84	5.39	6.30	7.27	8.30	9.40	10.55	11.40	12.37	13.33	14.26	15.17	16.94	18.63	20.24
	1800	4.60	5.01	5.44	5.97	6.97	8.05	9.19	10.40	11.68	12.61	13.68	14.72	15.73	16.72	18.63	20.43	22.13
	2000	5.10	5.56	6.03	6.60	7.64	8.81	10.06	11.38	12.78	13.80	14.95	16.07	17.16	18.21	20.24	22.13	23.88
	2200	5.60	6.10	6.62	7.24	8.28	9.55	10.91	12.34	13.85	14.95	16.18	17.37	18.53	19.64	21.76	23.72	25.50
	2500	6.35	6.91	7.49	8.19	9.23	10.64	12.14	13.73	15.40	16.61	17.95	19.24	20.48	21.67	23.88	25.88	27.63
2850	7.21	7.85	8.50	9.28	10.29	11.86	13.52	15.28	17.14	18.47	19.92	21.29	22.60	23.84	26.10	28.04	29.64	
3000	7.58	8.24	8.93	9.75	10.73	12.36	14.09	15.93	17.86	19.24	20.72	22.13	23.46	24.71	26.96	28.84	30.34	
3500	8.79	9.55	10.33	11.26	12.21	13.97	15.92	17.97	20.13	21.67	23.24	24.71	26.06	27.30	29.39	30.93	31.88	
4000	9.98	10.82	11.68	12.72	13.77	15.47	17.61	19.86	22.23	23.88	25.50	26.96	28.26	29.39	31.10	32.03		
4500	11.13	12.05	12.99	14.12	15.26	16.85	19.15	21.58	24.13	25.88	27.46	28.84	30.00	30.93	32.03			
5000	12.25	13.24	14.25	15.46	16.67	18.09	20.55	23.12	25.82	27.63	29.12	30.34	31.26	31.88				
5500	13.34	14.39	15.45	16.72	17.99	19.24	21.78	24.47	27.28	29.12	30.44	31.41	32.00					
6000	14.39	15.48	16.58	17.90	19.20	20.49	22.84	25.62	28.51	30.34	31.41	32.03						

 When using these pulleys/speeds reduced service life must be expected



RATED POWER PN 14mm PITCH, 40mm Wide Belt

RATED POWER (kW)

Pitch Ø (mm)	Number of Teeth in Pulley																	
	28	29	30	32	34	36	38	40	42	44	46	48	52	56	64	72	80	
	124.78	129.23	133.69	142.60	151.52	160.43	169.34	178.25	187.17	196.08	204.99	213.90	231.73	249.56	285.21	320.86	356.51	
Speed of Small Pulley RPM	10	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.6	0.7	0.7
	20	0.4	0.4	0.4	0.5	0.6	0.6	0.7	0.7	0.8	0.8	0.8	0.9	1.0	1.0	1.2	1.3	1.5
	40	0.7	0.8	0.8	1.0	1.1	1.2	1.4	1.4	1.5	1.6	1.7	1.8	1.9	2.1	2.4	2.7	3.0
	60	1.1	1.2	1.3	1.5	1.7	1.9	2.0	2.2	2.3	2.4	2.5	2.7	2.9	3.1	3.6	4.0	4.5
	100	1.8	1.9	2.1	2.4	2.8	3.1	3.4	3.6	3.8	4.0	4.2	4.4	4.9	5.2	6.0	6.7	7.5
	200	3.6	3.9	4.2	4.8	5.5	6.2	6.8	7.2	7.6	8.0	8.4	8.9	9.7	10.5	12.0	13.5	15.0
	300	4.9	5.3	5.7	6.6	7.5	8.5	9.2	9.7	10.3	10.8	11.4	12.0	13.1	14.2	16.5	18.9	21.3
	400	6.1	6.6	7.1	8.2	9.3	10.5	11.4	12.0	12.7	13.3	14.0	14.7	16.1	17.4	20.1	22.9	25.8
	500	7.2	7.8	8.4	9.6	11.0	12.3	13.3	14.1	14.8	15.6	16.4	17.2	18.7	20.2	23.3	26.4	29.6
	600	8.2	8.9	9.5	11.0	12.5	14.0	15.1	15.9	16.8	17.7	18.5	19.4	21.1	22.7	26.1	29.5	32.9
	700	9.1	9.9	10.6	12.2	13.9	15.6	16.8	17.7	18.6	19.5	20.5	21.4	23.2	25.0	28.6	32.2	35.8
	800	10.0	10.8	11.6	13.4	15.1	17.0	18.3	19.3	20.3	21.3	22.3	23.2	25.2	27.0	30.8	34.5	38.2
	950	11.3	12.1	13.1	14.9	16.9	19.0	20.4	21.4	22.5	23.6	24.6	25.7	27.7	29.7	33.6	37.4	41.1
	1000	11.6	12.6	13.5	15.4	17.5	19.6	21.0	22.1	23.5	24.3	25.4	26.5	28.5	30.5	34.4	38.2	41.9
	1200	13.1	14.1	15.1	17.3	19.5	21.8	23.4	24.5	25.7	26.8	28.0	29.1	31.2	33.2	37.1	40.7	44.1
	1450	14.6	15.7	16.9	19.2	21.7	24.2	25.9	27.1	28.3	29.4	30.6	31.7	33.8	35.7	39.2	42.3	44.8
	1600	15.4	16.6	17.8	20.3	22.8	25.5	27.1	28.3	29.5	30.7	31.8	32.9	34.9	36.6	39.8	42.3	44.1
	1800	16.4	17.7	18.9	21.5	24.1	26.8	28.5	29.7	30.9	32.0	33.0	34.0	35.8	37.3	39.8	41.3	41.8
	2000	17.3	18.6	19.8	22.5	25.2	28.0	29.7	30.8	31.9	32.9	33.8	34.7	36.2	37.4	38.9	39.1	38.0
	2200	18.6	19.3	20.6	23.3	26.1	28.9	30.5	31.5	32.5	33.4	34.2	35.0	36.1	36.7	37.0	35.6	
2400	20.1	20.7	21.3	24.0	26.7	29.5	31.1	32.0	32.8	33.5	34.2	34.7	35.3	35.4	34.2			
2600	21.5	22.1	22.7	24.4	27.2	29.9	31.4	32.1	32.7	33.2	33.7	33.9	34.0	33.4	30.9			
2850	23.1	23.8	24.4	25.6	22.4	30.0	31.3	31.8	32.1	32.3	32.4	32.3	31.7	31.4				
3000	24.1	24.7	25.3	26.5	27.5	30.1	31.0	31.6	31.5	31.5	31.4	31.6	31.5	30.8				
3500	26.8	27.5	28.0	29.1	30.8	30.7	31.2	31.5	31.7	31.6	31.3	30.8						
4000	29.1	29.6	30.1	30.8	31.4	31.6	31.6	31.4	30.8									

 When using these pulleys/speeds reduced service life must be expected



RATED POWER (kW)																		
Pitch Ø (mm)	Number of Teeth in Pulley																	
	28	29	30	32	34	36	38	40	42	44	46	48	52	56	64	72	80	
	124.78	129.23	133.69	142.60	151.52	160.43	169.34	178.25	187.17	196.08	204.99	213.90	231.73	249.56	285.21	320.86	356.51	
Speed of Small Pulley RPM	10	0.3	0.3	0.3	0.4	0.4	0.5	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.8	0.9	1.0	1.1
	20	0.5	0.6	0.6	0.7	0.8	0.9	1.0	1.1	1.1	1.2	1.3	1.3	1.4	1.6	1.8	2.0	2.2
	40	1.1	1.2	1.3	1.4	1.6	1.9	2.0	2.1	2.3	2.4	2.5	2.6	2.9	3.1	3.6	4.0	4.5
	60	1.6	1.7	1.9	2.2	2.5	2.8	3.0	3.2	3.4	3.6	3.8	4.0	4.3	4.7	5.4	6.0	6.7
	100	2.7	2.9	3.1	3.6	4.1	4.7	5.0	5.3	5.7	6.0	6.3	6.6	7.2	7.8	8.9	10.1	11.2
	200	5.4	5.8	6.3	7.2	8.2	9.3	10.1	10.7	11.3	11.9	12.6	13.2	14.5	15.7	17.9	20.1	22.3
	300	7.3	7.9	8.6	9.9	11.2	12.7	13.7	14.5	15.3	16.2	17.0	17.9	19.5	21.2	24.6	28.1	31.8
	400	9.1	9.9	10.6	12.2	13.9	15.7	16.9	17.9	18.9	19.9	20.9	22.0	24.0	25.9	30.0	34.2	38.5
	500	10.7	11.6	12.5	14.4	16.4	18.4	19.9	21.0	22.1	23.3	24.5	25.6	27.9	30.2	34.8	39.4	44.2
	600	12.2	13.2	14.3	16.4	18.6	20.9	22.5	23.8	25.1	26.4	27.6	28.9	31.5	33.9	39.0	44.0	49.2
	700	13.7	14.7	15.9	18.2	20.7	23.2	25.0	26.4	27.8	29.2	30.6	32.0	34.7	37.3	42.7	48.1	53.5
	800	15.0	16.2	17.4	19.9	22.6	25.4	27.3	28.8	30.3	31.7	33.2	34.7	37.6	40.4	46.0	51.6	57.2
	950	16.8	18.1	19.5	22.3	25.3	28.4	30.4	32.0	33.6	35.2	36.8	38.4	41.5	44.4	50.3	56.0	61.6
	1000	17.4	18.7	20.1	23.1	26.1	29.3	31.4	33.0	34.7	36.3	37.9	39.5	42.6	45.6	51.5	57.3	62.8
	1200	19.5	21.0	22.6	25.8	29.2	32.6	35.0	36.7	38.4	40.1	41.8	43.5	46.7	49.8	55.6	61.2	66.3
	1450	21.9	23.5	25.2	28.8	32.4	36.2	38.7	40.5	42.3	44.0	45.8	47.5	50.6	53.5	58.9	63.7	67.7
	1600	23.1	24.9	26.6	30.3	34.1	38.1	40.6	42.4	44.2	45.9	47.6	49.3	52.3	55.1	60.0	64.0	67.0
	1800	24.6	26.4	28.3	32.2	36.1	40.2	42.8	44.6	46.3	48.0	49.6	51.2	53.9	56.3	60.2	62.9	64.1
	2000	25.9	27.8	29.7	33.7	37.8	42.0	44.5	46.2	47.9	49.4	50.9	52.3	54.7	56.6	59.2	60.0	59.0
	2200	27.9	29.0	30.9	35.0	39.1	43.4	45.9	47.4	48.9	50.3	51.6	52.8	54.6	55.9	56.8	55.5	
2400	30.1	31.0	32.0	36.0	40.2	44.4	46.8	48.2	49.5	50.7	51.7	52.6	53.8	54.2	53.1			
2600	32.3	33.2	34.1	36.8	40.9	45.1	47.1	48.5	49.6	50.5	51.2	51.7	52.1	51.5	48.8			
2850	34.8	35.8	36.7	38.6	41.4	45.4	47.2	48.3	48.9	49.4	49.6	49.6	49.1	49.1				
3000	36.2	37.2	38.2	40.0	41.7	45.6	47.3	47.8	48.1	48.3	48.4	48.9	49.2	48.6				
3500	40.6	41.6	42.5	44.2	45.7	46.9	47.9	48.6	49.1	49.2	49.1	48.6						
4000	44.2	45.1	45.8	47.2	48.2	48.9	49.2	49.1	48.6									

 When using these pulleys/speeds reduced service life must be expected



PULLEY DIAMETERS

The use of pulleys below the recommended minimums should, if possible, be avoided as otherwise reduced belt life must be expected.

Belt Types	Speed of Small Pulley (rpm)	Min. Pitch Diameter (mm)	Min. Number of Teeth	Min Diameter of Outside Idler (mm)
3M	3000	19.10	20	20.00
	1500	17.19	18	20.00
	1000	15.28	16	20.00
5M	3000	50.93	32	50.00
	1500	44.56	28	50.00
	1000	35.01	22	50.00
8M	3000	86.58	34	120.00
	1500	76.39	30	120.00
	1000	71.30	28	120.00
14M	3000	160.43	36	180.00
	1500	133.69	30	180.00
	1000	124.78	28	180.00

MINIMUM TIMING BELTS PULLEY DIAMETERS

Belt Types	Max Speed rpm	Minimum Number of Teeth		Minimum Roller Diameter	
		Normal use	Reverse Bending	Normal use	Reverse Bending
T2.5	40000	10	18	15 Ø	15 Ø
T5	40000	10	15	30 Ø	30 Ø
AT5	40000	15	20	25 Ø	60 Ø
T10	15000	12	20	60 Ø	60 Ø
AT10	15000	15	25	50 Ø	120 Ø
T20	6000	15	25	120 Ø	120 Ø
AT20	6000	18	25	120 Ø	180 Ø
MXL	40000	10	18	15 Ø	15 Ø
MP	40000	10	18	15 Ø	15 Ø
XL	40000	10	15	30 Ø	30 Ø
L	15000	15	20	60 Ø	60 Ø
H	15000	14	20	60 Ø	80 Ø



Conditions: z=20, i=1, measuring load as per table (not applicable for double-sided belts)

Belt length mm		Length tolerance measured over centre distance mm	Allowable longitudinal tolerance mm
from	to		
	320	± 0.15	0.10
320	630	± 0.18	0.12
630	1000	± 0.25	0.15
1000	1960	± 0.40	0.20
1960	3500	± 0.50	0.25
3500	4500	± 0.80	0.30

Belt length Tolerances on Center Distance MXL & Classic

Belt length (mm)	Length Tolerance (mm)	Center Distance (mm)	Allowance for Take up (mm)
250 Under	± 0.41	± 0.21	3
250 to 380 Under	± 0.46	± 0.23	5
380 to 500 Under	± 0.51	± 0.26	10
500 to 750 Under	± 0.60	± 0.30	10
750 to 1000 Under	± 0.66	± 0.33	15
1000 to 1250 Under	± 0.76	± 0.38	15
1250 to 1500 Under	± 0.82	± 0.41	25
1250 to 1750 Under	± 0.86	± 0.43	25
1750 to 2000 Under	± 0.92	± 0.46	30

Over 2000 add 0.05mm for each 250mm increase in belt length.

Tolerances

CONTI SYNCHROBELT® HTD synchronous drive belts are precision products. They are manufactured with maximum care and accuracy. The tolerances for length, width and thickness are extremely narrow.

Length Tolerances for Synchronous Drive Belts

Pitch length L _w mm	Tolerance of centre distance deviation mm
≤ 150	± 0.15
> 150- 255	± 0.20
> 255- 400	± 0.23
> 400- 560	± 0.25
> 560- 800	± 0.30
> 800-1000	± 0.33
> 1000-1270	± 0.38
> 1270-1500	± 0.40
> 1500-1800	± 0.43
> 1800-2000	± 0.45
> 2000-2250	± 0.48
> 2250	The tolerance value increases by a further 0.05 mm per 500 mm increase in length.

TOLERANCES ON BELT LENGTH RPP (HTD)

BELT LENGTH (mm)	TOLERANCE ON BELT LENGTH (mm)	TOLERANCE ON CENTRE DISTANCE (mm)
91 - 254	± 0.40	± 0.200
255 - 381	± 0.46	± 0.230
382 - 508	± 0.50	± 0.250
509 - 762	± 0.60	± 0.300
763 - 990	± 0.66	± 0.330
991 -1219	± 0.76	± 0.380
1220-1524	± 0.80	± 0.400
1525-1778	± 0.86	± 0.430
1779-2032	± 0.90	± 0.450
2033-2286	± 0.97	± 0.480
2287-2540	± 1.00	± 0.500
2541-2843	± 1.06	± 0.530
2884-3048	± 1.10	± 0.550
3049-3600	± 1.20	± 0.600
3601-4956	± 1.40	± 0.700

