Linear technology

(BRECO M = BRECO open length)
(SFX = SYNCHROFLEX® TIMING BELTS)

Construction and properties

The most common output movement of electro-mechanical drives is the rotational movement. For the technical designer is the timing belt an ideal link in the kinematics. The timing belt transmits reliable, fast and directly rotational movements into linear motions. Travel speeds up to 10 m/s and any centre distances are possible. Within linear motions low position deviations are often required, e.g. in the handling technology (high precision of repeatability). We recommend our product range of BRECO® TIMING BELTS with the profiles AT and ATL. These polyurethane timing belts are designed and optimised for linear drives. They stand out for dimensionally stable teeth and stiffness of the belt spans.
Under extreme load and after a short run-in time, the pre-tension of the belts might slightly reduce by the tension members settling, making a once-only re-tensioning of the timing belt unavoidable. No post-elongation of the tension members is to be expected in continuous operation.

The timing belts are temperature resistant with ambient temperatures from -30°C to +80°C. **Applications close to the limit temperatures (<-10°C and >50°C), however, might require adapted dimensioning. In this case please contact your Mulco partner.**

This catalog has been compiled to especially meet designers requirements. In this catalog you will find both the delivery range and all technical data required for the dimensioning linear drives.

Take into consideration corrections to the admissible load values, in case of deviations from the standard.

Construction

BRECO TIMING BELTS are constructed of wear resistant polyurethane and high tensile steel cord tension members. Both materials combined form the basis for dimensionally stable and reliable BRECO® TIMING BELTS. An additional nylon tooth facing results in a low-friction timing belt with high performance.
The BRECO® TIMING BELT is manufactured without length limitation. The steel cord tension members are arranged with parallel edges. The preferred delivery form is in rolls of 50 m or 100 m.

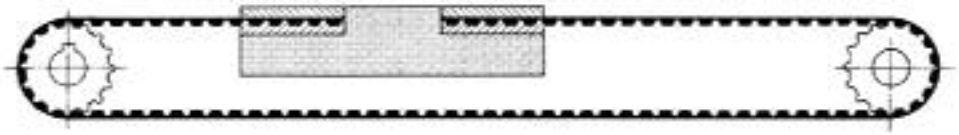
Properties

- Positive fit, synchronous run
- High loadability, length stable
- High degree of efficiency, max. 98 %
- Wear resistant in continous operation
- Precision of repeatability of positioning in the linear system
- Pitch accuracy in the rotational to linear translation of movement
- Low mass, suitable for stepper drives
- Hydrolysis resistant, resistant against ozone and sun light
- Temperature resistant from -30° to + 80°C, temporarily higher
- Resistant to petrol, simple fats and oils

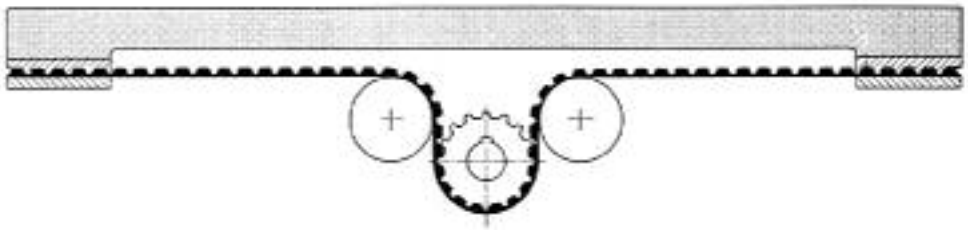
Surrounding structure

Low friction and low dead weight is to be aspired for all assembly modules assuming part of the movement. The surrounding structure is to design dimensionally stable. Generally, BRECO®-AT and ATL TIMING BELTS as open length are to be clamped on the moving linear technology using clamp plates (see clamp plates). BRECO®-AT and ATL TIMING BELTS permit a rotational to linear translation of movement with continous accuracy.
Due to the high pitch accuracy between belt and pulley meshing the load distribution is distributed equally to the tooth faces in mesh on the drive assembly pulley and that produces a high performance and accuracy. The choice of materials for the belt and pulley is especially suitable for bi-directional drives. The distance of travel per pulley revolution is defined with the selection of the pitch and the number of teeth of the drive assembly pulley. For the linear drives are three design versions available.

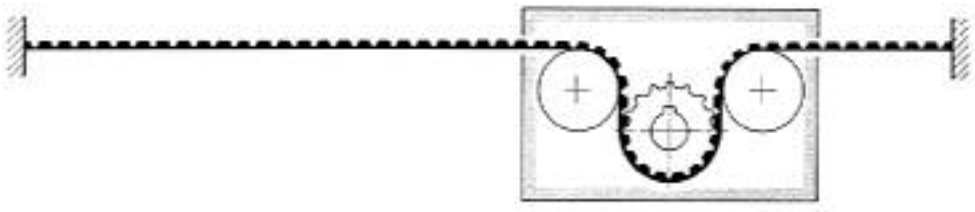
Linear slide



Linear table

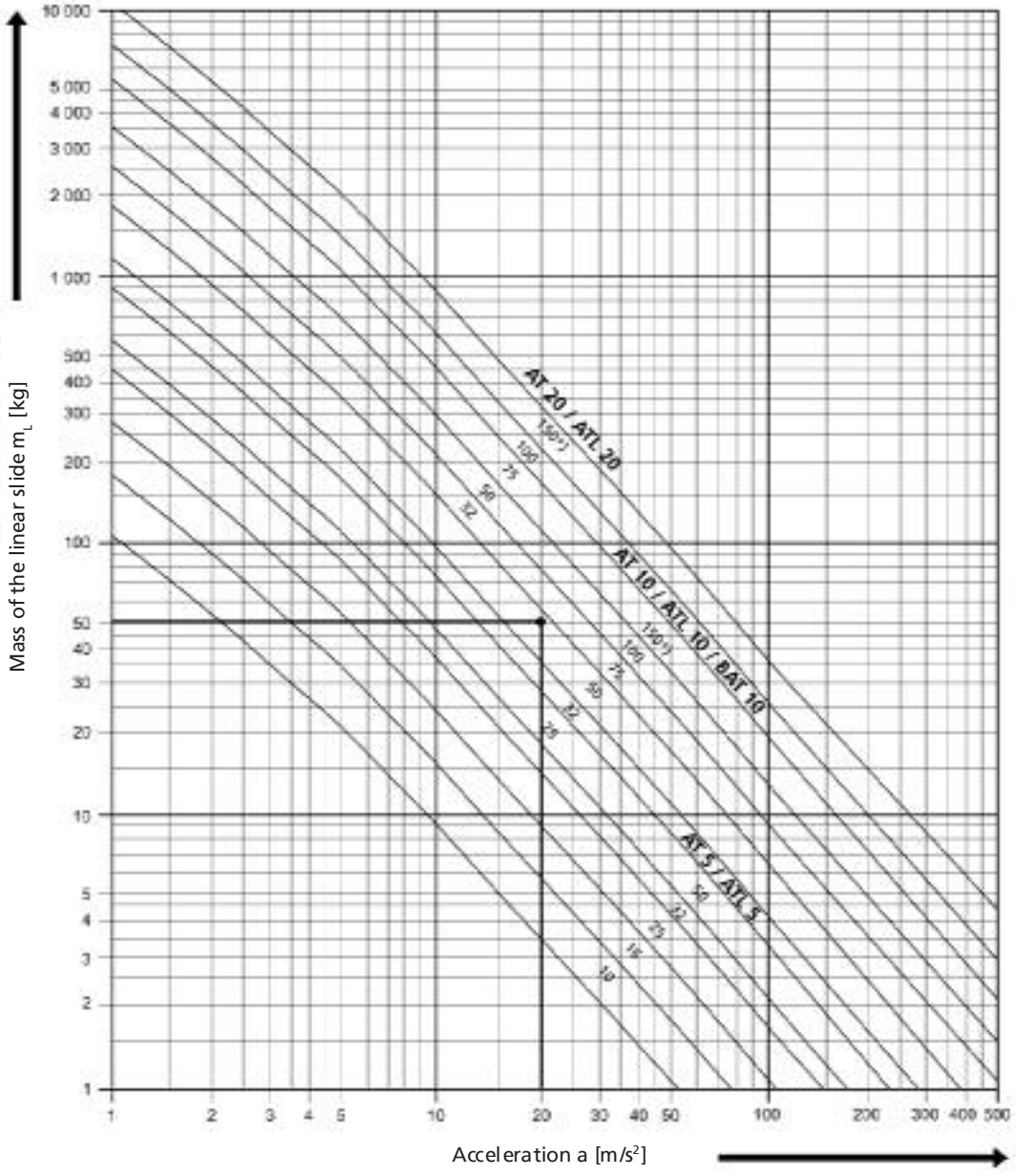


Linear trolley



A dimensionally stable surrounding structure is to consider.

Determination of belt type and belt width



Example for the coarse design:

Mass of linear slide m_L = 50 kg
max. acceleration (w/o delay) a = 20 m/s²

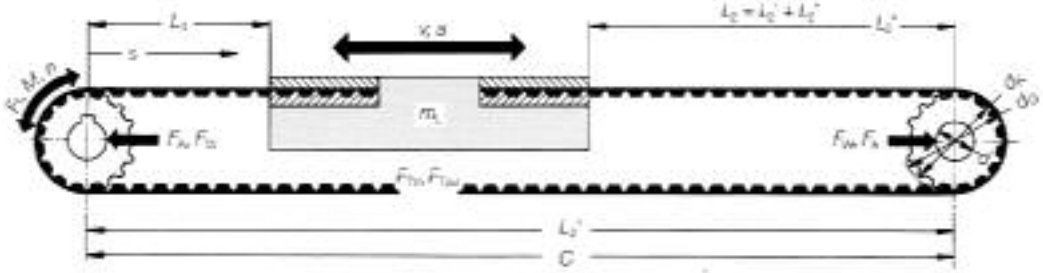
In the graph intersection point can be read:

BRECO® TIMING BELTS: AT 10/ ATL 10, 50 mm wide
alternatively: AT 20/ ATL 20, 32 mm wide

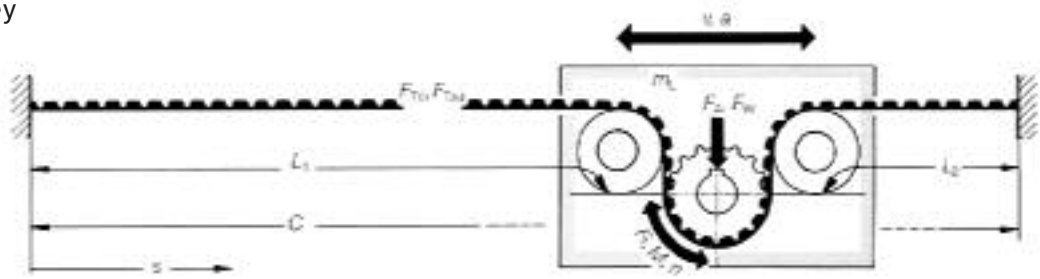
Recommendation:

The corresponding pulley of the drive pulley assembly should have 20 teeth (ATL =25) or more. With a pulley with less than 20 teeth (AT), select the next larger belt width.
Dimensioning see Calculation section in chapter Linear technology.

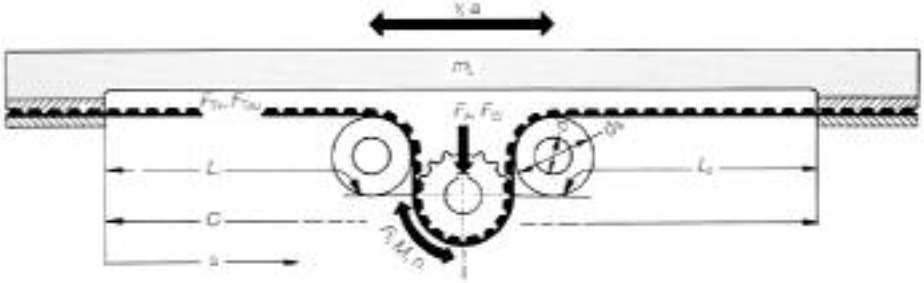
Linear slide



Linear trolley



Linear table



Designation

Circumferencial force	F_U	[N]	Tangential force	F_t	[N]	Belt width	b	[mm]
Torque	M	[Nm]	Specific tooth force	F_{tspec}	[N]	Pre-tension distance	Δl	[mm]
Power	P	[W]	Admissible tensile load	F_{Tadm}	[N]	Specific elasticity	c_{spec}	[N]
Mass to be moved	m	[kg]	Pre-tension force	F_{TV}	[N]	Elasticity	c	[N/mm]
Mass of linear slide	m_L	[kg]	max. span force	F_{Tmax}	[N]			
Mass of timing belt	m_B	[kg]	Centre load	F_A	[N]	Positioning deviation	Δs	[mm]
Mass of pulley	m_Z	[kg]	Shaft force	F_W	[N]	Positioning range	P_s	[mm]
Mass of tension roller	m_S	[kg]	Frictional force	F_R	[N]			
reduced mass	m_{red}	[kg]	Lifting force	F_H	[N]	Acceleration distance	s_B	[mm]
specific weight	ρ	[kg/dm³]	Belt length	L_B	[mm]	Braking distance	s'_B	[mm]
Acceleration	a	[m/s²]	Span length	L_1, L_2	[mm]	Inherent frequency	f_e	[s⁻¹]
Acceleration due to			Number of belt teeth	z_B		Excitation frequency	f_0	[s⁻¹]
gravity	g	[m/s²]	Number of pulley teeth	z		Travel time with		
Speed	v	[m/s]	Number of meshing			v = const. t_V	[s]	
Rotational speed	n	[min⁻¹]	teeth	z_e		Overall time	t_{ges}	[s]
Angular speed	ω	[s⁻¹]	Pitch circle diameter	d_o	[mm]	Overall distance	s_{ges}	
Centre distance	s_A	[mm]	Crown diameter	d_K	[mm]			
Useful linear distance	s_L	[mm]	Tension roller diameter	d_s	[mm]			
total distance of travel	s_{ges}	[mm]	Bore	d	[mm]			

Apply all equations with the dimensions mentioned here.

List of formulae, terms, definitions

Calculation | **Calculation value**

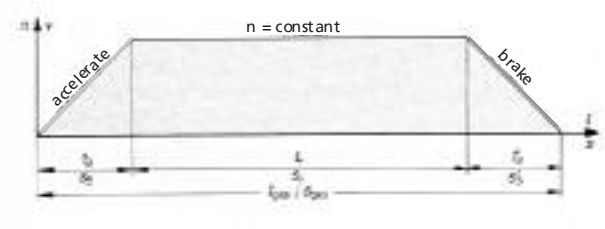
Circumferencial force $F_t = \frac{2 \cdot 10^3 \cdot M}{d_0}$

Torque $M = \frac{d_0 \cdot F_t}{2 \cdot 10^3}$

Power $P = \frac{M \cdot n}{9{,}55 \cdot 10^3}$

Tangential force F_t [N]
Torque M [Nm]
Power P [kW]
Diameter d_0 [mm]

(formula 2)



Angular speed $\omega = \frac{\pi \cdot n}{30}$ — linear and rotary motion

Rotational speed $n = \frac{19{,}1 \cdot 10^3 \cdot v}{d_0}$

Speed / peripheral speed $v = \frac{d_0 \cdot n}{19{,}1 \cdot 10^3} = \sqrt{\frac{2 \cdot s_B \cdot a}{1000}}$

Acceleration time (braking time) $t_B = \frac{v}{a} = \sqrt{\frac{2 \cdot s_B}{a \cdot 1000}}$

Acceleration distance (braking time) $s_B = \frac{a \cdot t_B^2 \cdot 10^3}{2} = \frac{v^2 \cdot 10^3}{2 \cdot a}$

Travel time when v = const. $t_v = \frac{s_v}{v \cdot 10^3}$

Travel distance when v = const. $s_v = v \cdot t_v \cdot 10^3$

Overall time $t_{ges} = t_B + t_v + t_B$

Overall distance $s_{ges} = s_B + s_v + s_B$

(formula 3)

F_t = Acceleration force (1st) + Lifting force (2nd) + Frictional force (3rd)
= $m \cdot a$ + $m \cdot g$ + $m \cdot \mu \cdot g$

required tangential force at the pulley F_t [N]

(1.) The acceleration force F_B is necessary to accelerate the linear drive with with mass m e.g. from the stand still to the limit speed v.
(2.) The lifting force F_H is necessary with a movement direction opposite to the acceleration due to gravity. With horizontal linear - movement is $F_H = 0$.
(3.) A friction force is required when opposite to the moving direction a force is taking effect, e.g. friction force. Can the frictional drags be neglected is $F_R = 0$.

(formula 4)

Calculation

Calculation value

m_L [kg] Mass of the linear slide to be moved
m_B [kg] Mass of the timing belt (belt weight, see Technical data)
m_{Zred} [kg] reduced mass of the pulley(s)
m_{Sred} [kg] reduced mass of the tension roller(s)

Mass to be moved m [kg]

$$m = m_L + m_B + m_{Zred} + m_{Sred}$$ (formula 5)

The mass of a pulley and/or tension roller is calculated in relation to:

Mass of the pulley m_Z [kg]

$$m_Z = \frac{(d_K^2 - d^2) \cdot \pi \cdot B \cdot \rho}{4 \cdot 10^6} \qquad m_S = \frac{(d_S^2 - d^2) \cdot \pi \cdot B \cdot \rho}{4 \cdot 10^6}$$

Mass of the tension roller m_S [kg]

The reduced mass m_{red} of a pulley and/or tension roller is an equivalent mass with equal load bearing to the effective line of the timing belt, the same as the rotational solid to the rotational axis.

reduced mass of the pulley m_{Zred} [kg]

$$m_{Zred} = \frac{m_Z}{2}\left[1+\frac{d^2}{d_K^2}\right] \qquad m_{Sred} = \frac{m_S}{2}\left[1+\frac{d^2}{d_S^2}\right]$$

reduced Mass of the tension roller m_{Sred} [kg]
(formula 6)

A linear drive is pre-tensioned correctly, when under maximum effective tangential force F_{tmax} (from acceleration and braking) the slack span side of the belt stays tight. A minimum pre-tension force is to be considered:

Pre-tension force F_{TV} [N]

$$F_{TV} \geq F_t$$ (formula 7)

The highest span forces F_{Tmax} are to be expected within the tight span side, when both pre-tension force F_{TV} (static) and tangential force F_t (dynamic) acting together.

maximum span force in the belt F_{Tmax} [N]

$$F_{Tmax} = F_{TV} + F_t$$ (formula 8)

The admissible tensile load F_{Tadm} has to show always safety factors to the max. occurring span force F_{Tmax} in the timing belt.
(F_{Tadm} see Technical Data).

admissible span force F_{Tadm} [N]

$$F_{Tadm} \geq F_{Tmax}$$ (formula 9)

The static centre/axis load F_{Asta} act within the stand still or under no-load conditions. F_{Adyn} is a value depending on the effective circumferencial force.

Centre force [N]

$$F_{Astat} = 2 \cdot F_{TV}$$ (formula 10)

List of formulae, terms, definitions

Calculation | **Calculation value**

$$\Delta l = \frac{F_{TV} \cdot L_B}{2 \cdot c_{spec}}$$ Linear slide

Pre-tension distance Δl [mm]

$$\Delta l = \frac{F_{TV} \cdot L_B}{c_{spec}}$$ Linear trolley

$$\Delta l = \frac{F_{TV} \cdot L_B}{c_{spec}}$$ Linear table

The tensioning station can be mounted at any position on the timing belt. Values for c_{spec} see Technical Data.

Elasticity c [N/mm]

$$c = \frac{L_B}{L_1 \cdot L_2} \cdot c_{spec} \qquad L_B = L_1 + L_2$$ (formula 11)

Linear systems show a variable elasticity. The elasticity behaviour of the linear slide and/or linear bed depends on the length proportion L_1 and L_2.
That means: Each individual position of the linear bed has its own elasticity.
The elasticity shows a minimum c_{min}, when L_1 and L_2 are equal in length. For this case the following relation is valid:

$$c_{min} = \frac{4 \cdot c_{spec}}{L_B}$$ with $L_1 = L_2$ (formula 12)

Is an external force acting on a linear slide a positioning deviation s results Δs from the relation:

Positioning deviation Δs [mm]

$$\Delta s = \frac{F}{c}$$ (formula 13)

Under the effect of a triggered force, a mass connected to the timing belt (elasticity/mass system) assumes a damped natural vibration.

Inherent frequency f_e [s^{-1}]

$$f_e = \frac{1}{2\pi} \sqrt{\frac{c \cdot 1000}{m_L}}$$ (formula 14)

If necessary, check linear drives with regard to the occurrence of excitation frequencies f_0 in the drive pulley assembly which are close to the natural frequency f_e.
For technical structures, avoid compatibility of $f_e = f_0$ (resonance).
Note: In linear drives, the natural frequency f_e is in general considerably higher than the excitation frequency f_0 of the drive, in which case no resonance is to be expected . We recommend a special examination, if necessary, where stepping motors are used. Measures in the event of resonance: Increase the stiffness of the timing belt by choosing a larger belt width.

Excitation frequency f_0 [s^{-1}]

How to proceed

The above mentioned equations can be used to comprehensively compute BRECO linear drives. The type of the individual examinations depends on the task. If necessary, request technical support from our sales outlets.

General kinematics

If the movement sequence of the linear drive has to be timed, we recommend to proceed in accordance with the linear movement values of the equations (3).

Coarse design according to mass and acceleration

Generally, the mass of the linear slide m_L and the acceleration a represent the decisive values for the design of linear drives. On page 136 the belt type and timing belt width can be determined, based on mass and acceleration after the selection diagram.
In conjunction with the coarse design, we recommend to adopt the pulley dimensions (as a provisional measure). Note the permissible minimum number of teeth or minimum diameters.

The drive station

The required tangential force F_t in the drive pulley assembly has to be determined according to equation (4). By provisionally assuming the pulley size, it is possible to calculate the attendant drive torque M according to equation (2) for the drive pulley assembly. In how far the calculated torque M can be harmonised with the torque sequence of the motor, depends on the type and selection of the drive motor. The selection of the motor also depends on the desired servo and positioning tasks. Once the drive motor has been decided upon, the actual torque sequence of the motor has to be taken into consideration for the further precise design of the timing belt.

List of formulae, terms, definitions

Belt width calculation
Precise design to tooth shear strength

For the calculation of the belt width the actual torque characteristic of the drive motor - from drive or brake - is to be used. At first the maximum motor torque according to formula (2) is to be converted to the respective circumferencial force F_U. From the calculated tangential force the minimum width of the timing belt, according to formula (1)

$$b = \frac{F_t}{F_{tspec}\ z_e}$$ can be calculated.

The result of the calculated belt width (b in cm) is the required belt width for transmit the tangential force F_t via the meshing teeth from the pulley to the belt (or reverse). The calculated belt width is to be rounded-up to the next larger standard belt width.

Check of tensile load

Check the tensile loads for the calculated belt width, which become effective due to the pre-tension force F_{TV} according to formula (7) and the overlapping tangential force F_t according to formula (8). The max. permitted tensile loads according to formula (9) must not be exceeded.
If necessary, select the next larger belt width.

Safety factors

Special additional safety factors are not necessary for the BRECO® TIMING BELT. When, however, in addition to the maximum tangential force F_{tmax} are to be expected unevennesses, variations or impact shocks, which are not yet cosidered in the design, any additional safety factors can be added to the belt width.

Accuracy
in the rotational to linear translation of movement

The BRECO® TIMING BELT transmits rotational movements into the corresponding linear motions via the pulley of the drive station. The procedure can be repeated as often as required and is a continous operation with BRECO® TIMING BELTS. Deviation from the linear line can occur due to different forces and tolerances. The following is a description of causes and measures to be taken.

1. Precision of repeatability

The term repeatability of a linear drive implies the capability of regaining a position once accessed under the same conditions. In linear systems, repeatabilities of notably less than +/- 0.1 mm per metre of path travelled can be achieved with BRECO®-AT TIMING BELTS. Prerequisite for a consistent repeatability is the retaining of the minimum pre-tension force according to the equation (7).

2. Positioning precision

The term positioning precision of a linear drive is the capability to convert the turning angle of the pulley into the attendant setpoint linear path via the timing belt. The achievable actual linear path depends on the active forces and of the tolerances of all assembly groups involved in the sequence of movement.
Measures: Individual measures according to the following points 3 - 8 are to be applied, depending on the dominating values.

3. Stiffness / force-extension behaviour

If varying forces act on the linear unit, a correspondingly different elongation becomes effective. The corresponding “specific elasticities” are indicated in the Technical Data for steel cord tension members.
Measures: Plan a wider timing belt to keep the elongation small. The positioning deviation resulting from the elongation behaviour can be calculated with the equations (12) and (13). A dimensionally stable surrounding structure is to consider.

4. Inverse fault

When a linear position is moved to from a different direction, an inverse fault could occur in relation to the desired position. In other words: If the forces acting on the linear unit inverse, an inverse fault could occur.
Measures: Design linear guides and the entire system such that low friction occurs. Design the pulley of the drive pulley assembly with a narrower tooth gap or with a „0" tooth gap. Normal requirements with regard to the positioning precision are reached with the standard tooth gap. For the use of special tooth gaps, please ask for our technical support.

5. Length tolerance
Pitch deviation

A length tolerance in the timing belt leads to a pitch deviation. In this case, all pitches remain identical in relation to each other. Once installed, amongst others, a length tolerance/pitch deviation depends on the pre-tension applied. The length tolerance/pitch deviation is available in pre-defined ranges, due to the production method.
Measures: Use BRECO TIMING BELTS in the minus tolerance range, and pre-tension to the setpoint dimension once installed. Ask for our specialist support.

6. Pitch faults

The term pitch faults defines irregularities of neighbouring pitches. Pitch faults have no cumulative effect within one belt section.
Measures: Design the pulley of the drive pulley assembly as large as possible. The larger the number of teeth meshing in the pulley, the more efficient pitch errors are suppressed.

7. Eccentricity fault
Centre offset

The eccentricity fault and/or centre offset of at least one pulley or tension roller involved can lead to an irregular movement in the linear system. This type of fault should be assumed when sinusoidal movements occur in the linear movement sequence.
Measures: Check the concentric precision and the centre offset.
Reduce the tolerance range, if necessary.

8. Ambient temperature
Elongation under heat

The linear elongation under heat of the BRECO TIMING BELT with steel cord tension members shows the same values as the linear elongation under heat of a surrounding steel structure. No change of the pre-tension force is then to be expected. In the case of a surrounding aluminium structure and a rise of the ambient temperature, a slight increase of the pre-tension can be expected. The attendant linear path changes with the linear elongation behaviour under heat of the surrounding structure.
Measures: The influence of elongation under heat in the belt and also in the surrounding structure are minor. Temperature influences only need to be taken into account in exceptional cases.

User information

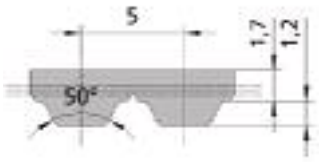
Part of the offered formulae contain simplified assumptions.
e.g. calculation of the positioning deviation according to equations (12) and (13):
The elongation behaviour of the tension member is also taken into account in the area of the pulley angle of wrap. However, the elasticity of the belt tooth has been neglected.
e.g. the vibration behaviour according to equation (14):
Only the vibrating mass m of the linear slide m_L is taken into account. The vibrating mass of the timing belt, the pulleys as well as the retroaction of the elasticity to the surrounding structure have not been taken into consideration.

For this reason, we point out that corresponding deviations have to be expected, depending on the drive geometry selected.

ATL high performance timing belt - open length

BRECO® TIMING BELTS

ATL 5



Preferred belt widths *)

b [mm]	16	25	32	50
Pulley width B [mm]	22	32	40	60

*) In-between belt widths are available
Preferred delivery in rolls of 50 or 100 m.
Please specify shorter dimensions (cut to length) separately.
Please specify lengths above 50 m separately.

Available versions for ATL 5

- **ATL 5:** Standard (with E tension member)
- **PAZ:** with nylon tooth facing

Order example:

BRECO®-TIMING BELT 25 ATL 5 / 1250 M PAZ

- 25 — Belt width in mm
- ATL 5 — Type / Pitch
- 1250 — Belt length in mm
- M — open length
- PAZ — Nylon facing on the tooth side

ATL high performance timing belt - open length

1. Tooth shear strength (specific tooth force)

Technical Data BRECO® TIMING BELT
ATL 5

The specific tooth force F_{tspec} is the maximum force N a belt tooth with a width of 1 cm can transmit. This value depends on the rotational speed of the drive pulley. The calculation takes into account each identical carrying values for each meshing tooth. With more than 12 meshing teeth z_e is limited to 12.

$$F_t = F_{tspez} \cdot z_e \cdot b$$

F_t Tangential force

F_{tspec} specific tooth force in N/cm

b Belt width in cm

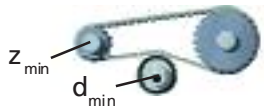
z_e Number of meshing teeth
$z_{emax} = 12$

R.p.m. n [min^{-1}]	F_{tspec} [N/cm]	R.p.m. n [min^{-1}]	F_{tspec} [N/cm]
0	35,30	2200	21,30
20	34,90	2400	20,80
40	34,50	2600	20,30
60	34,10	2800	19,84
80	33,80	3000	19,42
100	33,50	3200	19,01
200	32,00	3400	18,64
300	30,90	3600	18,28
400	29,80	3800	17,93
500	29,00	4000	17,61
600	28,20	4500	16,86
700	27,50	5000	16,18
800	26,80	5500	15,56
900	26,30	6000	15,00
1000	25,70	6500	14,48
1100	25,20	7000	13,99
1200	24,80	7500	13,54
1300	24,30	8000	13,11
1400	23,90	8500	12,71
1500	23,50	9000	12,33
1600	23,20	9500	11,97
1700	22,80	10000	11,63
1800	22,50		
1900	22,20		
2000	21,90		

2. Tension cord strength (admissible tensile force of the belt cross section F_{tadm}), **belt weight**

Belt width	b	[mm]	16	25	32	50
Tension cord strength (M)	F_{Tadm}	[N]	1300	2000	2800	4200
specific elasticity	c_{spec}	[N]	$0,33 \cdot 10^6$	$0,50 \cdot 10^6$	$0,65 \cdot 10^6$	$1,05 \cdot 10^6$
Belt weight	ATL5	kg/m]	0,059	0,090	0,119	0,187

3. Flexibility (Minimum numbers of teeth, minimum diameter)

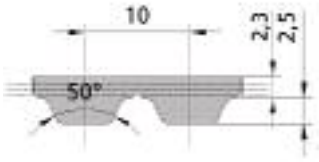
Drive type	BRECO ATL 5		
without contraflexure	Synchronising pulley	z_{min}	25
	Tension roller (smooth), running on teeth	d_{min} [mm]	40
with contraflexure	Synchronising pulley	z_{min}	25
	Tension roller (smooth), running on the back of the belt	d_{min} [mm]	60

Linear technology

ATL high performance timing belt - open length

BRECO® TIMING BELTS

ATL 10



Preferred belt widths *)				
b [mm]	32	50	75	100
Pulley width				
B [mm]	40	60	85	110

*) In-between belt widths are available
Preferred delivery in rolls of 50 or 100 m.
Please specify shorter dimensions (cut to length) separately.
Please specify lengths above 50 m separately.

Available versions for ATL 10

- **ATL 10**: Standard
- **PAZ**: with nylon tooth facing

Order example:

BRECO®-TIMING BELT 50 ATL 10 / 5000 M

Belt width in mm
Type / Pitch
Belt length in mm
Open length

ATL high performance timing belt - open length

Technical Data BRECO® TIMING BELT
ATL 10

1. Tooth shear strength (specific tooth force)

The specific tooth force F_{tspec} is the maximum force N a belt tooth with a width of 1 cm can transmit. This value depends on the rotational speed of the drive pulley. The calculation takes into account each identical carrying values for each meshing tooth. With more than 12 meshing teeth z_e is limited to 12.

$$F_t = F_{tspez} \cdot z_e \cdot b$$

F_t Tangential force

F_{tspec} specific tooth force in N/cm

b Belt width in cm

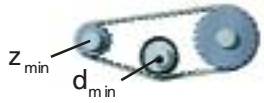
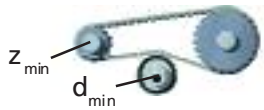
z_e Number of meshing teeth
$z_{emax} = 12$

R.p.m. n [min^{-1}]	F_{tspec} [N/cm]	R.p.m. n [min^{-1}]	F_{tspec} [N/cm]
0	73,50	2200	39,00
20	72,40	2400	37,80
40	71,40	2600	36,60
60	70,50	2800	35,50
80	69,60	3000	34,50
100	68,70	3200	33,60
200	65,00	3400	32,70
300	62,10	3600	31,90
400	59,50	3800	31,10
500	57,40	4000	30,30
600	55,50	4500	28,50
700	53,70	5000	26,90
800	52,20	5500	25,50
900	50,80	6000	24,20
1000	49,50	6500	23,00
1100	48,30	7000	21,80
1200	47,20	7500	20,80
1300	46,20	8000	19,77
1400	45,20	8500	18,84
1500	44,30	9000	17,95
1600	43,40	9500	17,12
1700	42,60	10000	16,32
1800	41,80		
1900	41,00		
2000	40,30		

2. Tension cord strength (admissible tensile force of the belt cross section F_{tadm}), belt weight

Belt width	b	[mm]	32	50	75	100
Tension cord strength (M)	F_{Tadm}	[N]	7200	11200	16800	22400
specific elasticity	c_{spec}	[N]	$1{,}8 \cdot 10^6$	$2{,}8 \cdot 10^6$	$4{,}2 \cdot 10^6$	$5{,}6 \cdot 10^6$
Belt weight	ATL 10	[kg/m]	0,220	0,340	0,510	0,680

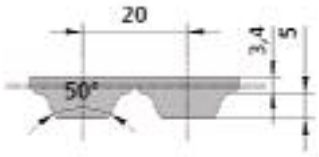
3. Flexibility (Minimum numbers of teeth, minimum diameter)

Drive type			BRECO ATL 10
without contraflexure	Synchronising pulley	z_{min}	25
	Tension roller (smooth), running on teeth	d_{min} [mm]	80
with contraflexure	Synchronising pulley	z_{min}	25
	Tension roller (smooth), running on the back of the belt	d_{min} [mm]	150

ATL high performance timing belt - open length

BRECO® TIMING BELTS

ATL 20



Preferred belt widths *)				
b [mm]	32	50	75	100
Pulley width				
B [mm]	40	60	85	110

*) In-between belt widths are available
Preferred delivery in rolls of 50 m length.
Please specify shorter dimensions (cut to length) separately.
Please specify lengths above 50 m separately.

Available versions for ATL 20

- **ATL 20:** Standard
- **PAZ:** with nylon tooth facing

Order example:

BRECO®-TIMING BELT 50 ATL 20 / 50000 M

Belt width in mm
Type / Pitch
Belt length in mm
Open length

ATL high performance timing belt - open length

Technical Data BRECO® TIMING BELT
ATL 20

1. Tooth shear strength (specific tooth force)

The specific tooth force F_{tspec} is the maximum force N a belt tooth with a width of 1 cm can transmit. This value depends on the rotational speed of the drive pulley. The calculation takes into account each identical carrying values for each meshing tooth. With more than 12 meshing teeth z_e is limited to 12.

$$F_t = F_{tspez} \cdot z_e \cdot b$$

F_t Tangential force

F_{tspec} specific tooth force in N/cm

b Belt width in cm

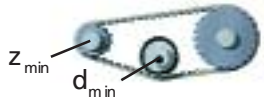
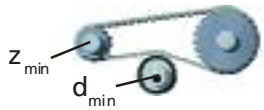
z_e Number of meshing teeth
$z_{emax} = 12$

R.p.m. n [min^{-1}]	F_{tspec} [N/cm]	R.p.m. n [min^{-1}]	F_{tspec} [N/cm]
0	147,00	2200	63,60
20	144,20	2400	60,70
40	141,70	2600	58,00
60	139,30	2800	55,50
80	137,00	3000	53,10
100	134,90	3200	50,90
200	125,80	3400	48,80
300	118,50	3600	46,80
400	112,40	3800	45,00
500	107,20	4000	43,20
600	102,60	4500	39,00
700	98,50	5000	35,30
800	94,80	5500	32,00
900	91,50	6000	28,90
1000	88,40	6500	26,00
1100	85,60		
1200	82,90		
1300	80,50		
1400	78,20		
1500	76,00		
1600	73,90		
1700	72,00		
1800	70,10		
1900	68,40		
2000	66,70		

2. Tension cord strength (admissible tensile force of the belt cross section F_{tadm}), belt weight

Belt width	b	[mm]	32	50	75	100
Tension cord strength (M)	F_{Tadm}	[N]	9800	15400	23800	31500
specific elasticity	c_{spec}	[N]	$2,45 \cdot 10^6$	$3,85 \cdot 10^6$	$5,95 \cdot 10^6$	$7,88 \cdot 10^6$
Belt weight	ATL20	[kg/m]	0,350	0,550	0,840	1,110

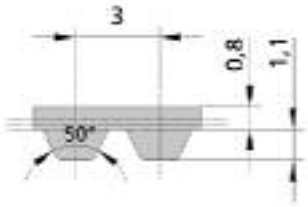
3. Flexibility (Minimum numbers of teeth, minimum diameter)

Drive type			BRECO ATL 20
without contraflexure 	Synchronising pulley	z_{min}	25
	Tension roller (smooth), running on teeth	d_{min} [mm]	160
with contraflexure 	Synchronising pulley	z_{min}	25
	Tension roller (smooth), running on the back of the belt	d_{min} [mm]	250

AT high performance timing belt - open length

BRECO® TIMING BELTS

AT 3



Preferred belt widths *)

b [mm]	8	10	20	25
Pulley width B [mm]	12	15	26	30

*) In-between belt widths are available
Preferred delivery in rolls of 100 m length.
Please specify shorter dimensions (cut to length) separately.
Please specify lengths above 100 m separately.

Available versions for AT 3

- **AT 3:** Standard (with E tension member)
- **PAZ:** Nylon tooth facing
- Endless joined BRECO® TIMING BELTS (V) see chapter Transport technology.

Order example:

BRECO®-TIMING BELT 10 AT 3 / 9000 M

Belt width in mm
Type / Pitch
Belt length in mm
Open length

1. Tooth shear strength (specific tooth force)

Technical Data BRECO® TIMING BELT
AT 3

The specific tooth force F_{tspec} is the maximum force N a belt tooth with a width of 1 cm can transmit. This value depends on the rotational speed of the drive pulley. The calculation takes into account each identical carrying values for each meshing tooth. With more than 12 meshing teeth z_e is limited to 12.

$$F_t = F_{tspez} \cdot z_e \cdot b$$

F_t Tangential force

F_{tspec} specific tooth force in N/cm

b Belt width in cm

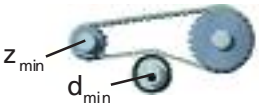
z_e Number of meshing teeth
$z_{emax} = 12$

R.p.m. n [min^{-1}]	F_{tspec} [N/cm]	R.p.m. n [min^{-1}]	F_{tspec} [N/cm]
0	32,34	2200	20,20
20	32,00	2400	19,73
40	31,68	2600	19,52
60	31,37	2800	19,31
80	31,08	3000	18,90
100	30,80	3200	18,17
200	29,58	3400	17,84
300	28,55	3600	17,52
400	27,68	3800	17,22
500	26,91	4000	16,93
600	26,23	4500	16,27
700	25,62	5000	15,67
800	25,07	5500	15,12
900	24,56	6000	14,62
1000	24,09	6500	14,15
1100	23,65	7000	13,72
1200	23,24	7500	13,32
1300	22,86	8000	12,94
1400	22,50	8500	12,59
1500	22,16	9000	12,25
1600	21,84	9500	11,93
1700	21,53	10000	11,63
1800	21,24		
1900	20,96		
2000	20,70		

2. Tension cord strength (admissible tensile force of the belt cross section F_{tadm}), **belt weight**

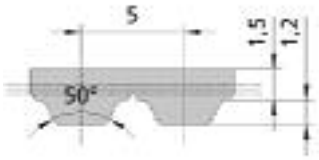
Belt width	b	[mm]	8	10	20	25
Tension cord strength (M)	F_{Tadm}	[N]	320	400	800	1000
specific elasticity	c_{spec}	[N]	$8,0 \cdot 10^4$	$10,0 \cdot 10^4$	$20,0 \cdot 10^4$	$25,0 \cdot 10^4$
Belt weight	AT3	[kg/m]	0,018	0,022	0,044	0,054

3. Flexibility (Minimum numbers of teeth, minimum diameter)

Drive type			BRECO AT 3
without contraflexure	Synchronising pulley	z_{min}	15
	Tension roller (smooth), running on teeth	d_{min} [mm]	30
with contraflexure	Synchronising pulley	z_{min}	25
	Tension roller (smooth), running on the back of the belt	d_{min} [mm]	30

BRECO® TIMING BELTS

AT 5-E



Preferred belt widths *)						
b [mm]	10	16	25	32	50	75
Pulley width						
B [mm]	16	22	32	40	60	85

*) In-between belt widths are available
Preferred delivery in rolls of 50 or 100 m.
Please specify shorter dimensions (cut to length) separately.
Please specify lengths above 100 m separately.

Available versions for AT 5-E

- **AT 5-E:** Standard (with E tension member)
- **PAZ:** Nylon facing on the tooth side (PAZ)
- Endless joined BRECO® TIMING BELTS (V) see chapter Transport technology.

Order example:

BRECO®-TIMING BELT 25 AT 5-E / 50000 M

Belt width in mm
Type / Pitch
Belt length in mm
Open length

1. Tooth shear strength (specific tooth force)

Technical Data BRECO® TIMING BELT
AT 5-E

The specific tooth force F_{tspec} is the maximum force N a belt tooth with a width of 1 cm can transmit. This value depends on the rotational speed of the drive pulley. The calculation takes into account each identical carrying values for each meshing tooth. With more than 12 meshing teeth z_e is limited to 12.

$$F_t = F_{tspez} \cdot z_e \cdot b$$

F_t Tangential force

F_{tspec} specific tooth force in N/cm

b Belt width in cm

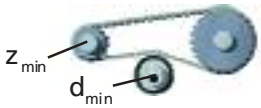
z_e Number of meshing teeth
$z_{emax} = 12$

R.p.m. n [min^{-1}]	F_{tspec} [N/cm]	R.p.m. n [min^{-1}]	F_{tspec} [N/cm]
0	35,30	2200	21,30
20	34,90	2400	20,80
40	34,50	2600	20,30
60	34,10	2800	19,84
80	33,80	3000	19,42
100	33,50	3200	19,01
200	32,00	3400	18,64
300	30,90	3600	18,28
400	29,80	3800	17,93
500	29,00	4000	17,61
600	28,30	4500	16,87
700	27,50	5000	16,18
800	26,80	5500	15,56
900	26,30	6000	15,00
1000	25,80	6500	14,49
1100	25,20	7000	13,99
1200	24,80	7500	13,54
1300	24,30	8000	13,11
1400	23,90	8500	12,71
1500	23,50	9000	12,33
1600	23,20	9500	11,97
1700	22,80	10000	11,63
1800	22,50		
1900	22,20		
2000	21,90		

2. Tension cord strength (admissible tensile force of the belt cross section F_{tadm}), **belt weight**

Belt width	b	[mm]	10	16	25	32	50	75
Tension cord strength (M)	F_{Tadm}	[N]	700	1120	1750	2240	3500	5250
specific elasticity	c_{spec}	[N]	$0,175 \cdot 10^6$	$0,280 \cdot 10^6$	$0,440 \cdot 10^6$	$0,560 \cdot 10^6$	$0,875 \cdot 10^6$	$1,310 \cdot 10^6$
Belt weight	AT5-E	[kg/m]	0,033	0,052	0,082	0,105	0,164	0,245

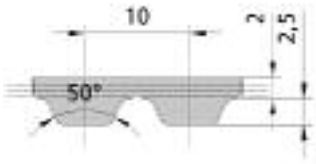
3. Flexibility (Minimum numbers of teeth, minimum diameter)

Drive type			BRECO AT 5-E
without contraflexure	Synchronising pulley	z_{min}	15
	Tension roller (smooth), running on teeth	d_{min} [mm]	25
with contraflexure	Synchronising pulley	z_{min}	20
	Tension roller (smooth), running on the back of the belt	d_{min} [mm]	60

AT high performance timing belt - open length

BRECO® TIMING BELTS

AT 10



Preferred belt widths *)						
b [mm]	25	32	50	75	100	150
Pulley width						
B [mm]	32	40	60	85	110	160

*) In-between belt widths are available
Preferred delivery in rolls of 50 or 100 m.
Please specify shorter dimensions (cut to length) separately.
Please specify lengths above 100 m separately.

Available versions for AT 10

- **AT 10:** Standard
- **E:** with E tension member
- **PAZ:** Nylon facing on the tooth side (PAZ)
- **PAZ-E:** With nylon tooth facing and E tension member
- Endless joined BRECO® TIMING BELTS (V) see chapter Transport technology.

Order example:

BRECO®-TIMING BELT 50 AT10 / 50000 M

Belt width in mm
Type / Pitch
Belt length in mm
Open length

AT high performance timing belt - open length

Technical Data BRECO® TIMING BELT
AT 10

1. Tooth shear strength (specific tooth force)

The specific tooth force F_{tspec} is the maximum force N a belt tooth with a width of 1 cm can transmit. This value depends on the rotational speed of the drive pulley. The calculation takes into account each identical carrying values for each meshing tooth. With more than 12 meshing teeth z_e is limited to 12.

$$F_t = F_{tspez} \cdot z_e \cdot b$$

F_t Tangential force

F_{tspec} specific tooth force in N/cm

b Belt width in cm

z_e Number of meshing teeth
$z_{emax} = 12$

R.p.m. n [min^{-1}]	F_{tspec} [N/cm]	R.p.m. n [min^{-1}]	F_{tspec} [N/cm]
0	73,50	2200	39,00
20	72,40	2400	37,80
40	71,40	2600	36,60
60	70,50	2800	35,50
80	69,60	3000	34,50
100	68,70	3200	33,60
200	65,00	3400	32,70
300	62,10	3600	31,90
400	59,50	3800	31,10
500	57,40	4000	30,30
600	55,50	4500	28,50
700	53,70	5000	26,90
800	52,20	5500	25,50
900	50,80	6000	24,20
1000	49,50	6500	23,00
1100	48,30	7000	21,80
1200	47,20	7500	20,80
1300	46,20	8000	19,77
1400	45,20	8500	18,84
1500	44,30	9000	17,95
1600	43,40	9500	17,12
1700	42,60	10000	16,32
1800	41,80		
1900	41,00		
2000	40,30		

2. Tension cord strength (admissible tensile force of the belt cross section F_{tadm}), belt weight

Belt width	b	[mm]	25	32	50	75	100	150
Tension cord strength (M)	F_{Tadm}	[N]	4250	5500	8500	12750	17000	22000
specific elasticity	c_{spec}	[N]	$1,06 \cdot 10^6$	$1,37 \cdot 10^6$	$2,12 \cdot 10^6$	$3,18 \cdot 10^6$	$4,25 \cdot 10^6$	$5,5 \cdot 10^6$
Belt weight	AT10	[kg/m]	0,158	0,186	0,290	0,436	0,581	0,839

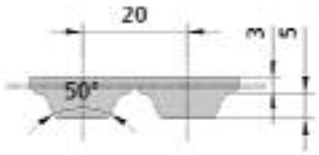
3. Flexibility (Minimum numbers of teeth, minimum diameter)

Drive type			BRECO AT 10	BRECO AT 10-E
without contraflexure	Synchronising pulley	z_{min}	15	12
	Tension roller (smooth), running on teeth	d_{min} [mm]	50	50
with contraflexure	Synchronising pulley	z_{min}	25	20
	Tension roller (smooth), running on the back of the belt	d_{min} [mm]	120	80

AT high performance timing belt - open length

BRECO® TIMING BELTS

AT 20



Preferred belt widths *)					
b [mm]	32	50	75	100	150
Pulley width					
B [mm]	40	60	85	110	160

*) In-between belt widths are available
Preferred delivery in rolls of 50 m length.
Please specify shorter dimensions (cut to length) separately.
Please specify lengths above 50 m separately.

Available versions for AT 20

- **AT 20:** Standard
- **PAZ:** with nylon tooth facing
- Endless joined BRECO® TIMING BELTS (V) see chapter Transport technology.

Order example:

BRECO®-TIMING BELT 75 AT 20 / 50000 M

Belt width in mm
Type / Pitch
Belt length in mm
Open length

1. Tooth shear strength (specific tooth force)

Technical Data BRECO® TIMING BELT
AT 20

The specific tooth force F_{tspec} is the maximum force N a belt tooth with a width of 1 cm can transmit. This value depends on the rotational speed of the drive pulley. The calculation takes into account each identical carrying values for each meshing tooth. With more than 12 meshing teeth z_e is limited to 12.

$$F_t = F_{tspez} \cdot z_e \cdot b$$

F_t Tangential force

F_{tspec} specific tooth force in N/cm

b Belt width in cm

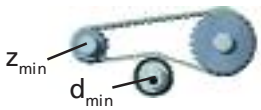
z_e Number of meshing teeth
$z_{emax} = 12$

R.p.m. n [min^{-1}]	F_{tspec} [N/cm]	R.p.m. n [min^{-1}]	F_{tspec} [N/cm]
0	147,00	2200	63,60
20	144,20	2400	60,70
40	141,70	2600	58,00
60	139,30	2800	55,50
80	137,00	3000	53,10
100	134,90	3200	50,90
200	125,80	3400	48,80
300	118,50	3600	46,80
400	112,40	3800	45,00
500	107,20	4000	43,20
600	102,60	4500	39,00
700	98,50	5000	35,30
800	94,80	5500	32,00
900	91,50	6000	28,90
1000	88,40	6500	26,00
1100	85,60		
1200	82,90		
1300	80,50		
1400	78,20		
1500	76,00		
1600	73,90		
1700	72,00		
1800	70,10		
1900	68,40		
2000	66,70		

2. Tension cord strength (admissible tensile force of the belt cross section F_{tadm}), **belt weight**

Belt width	b	[mm]	32	50	75	100	150
Tension cord strength (M)	F_{Tadm}	[N]	7200	11200	16800	22400	32000
specific elasticity	c_{spec}	[N]	$1,80 \cdot 10^6$	$2,80 \cdot 10^6$	$4,20 \cdot 10^6$	$5,60 \cdot 10^6$	$8,00 \cdot 10^6$
Belt weight	AT20	[kg/m]	0,307	0,480	0,720	0,960	1,423

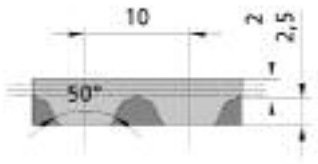
3. Flexibility (Minimum numbers of teeth, minimum diameter)

Drive type	BRECO AT 20		
without contraflexure	Synchronising pulley	z_{min}	18
	Tension roller (smooth), running on teeth	d_{min} [mm]	120
with contraflexure	Synchronising pulley	z_{min}	25
	Tension roller (smooth), running on the back of the belt	d_{min} [mm]	180

Self-guiding timing belts - open length

self-guiding BRECO® TIMING BELTS

BATK 10



Belt width b [mm]	32	50	75	100
Pulley width B [mm]	37	55	80	105

Preferred delivery in rolls of 50 m length.
Please specify shorter dimensions (cut to length) separately.
Please specify lengths above 50 m separately.

Available versions for BATK 10

- **BATK10:** Standard
- **PAZ:** with nylon tooth facing
- Endless joined BRECO® TIMING BELTS (V) see chapter Transport technology.

Order example:

BRECO®-TIMING BELT 50 BATK 10 / 50000 M

Belt width in mm
Type / Pitch
Belt length in mm
Open length

1. Tooth shear strength (specific tooth force)

Technical Data BRECO® TIMING BELT
BATK 10

The specific tooth force F_{tspec} is the maximum force N a belt tooth with a width of 1 cm can transmit. This value depends on the rotational speed of the drive pulley. The calculation takes into account each identical carrying values for each meshing tooth. With more than 12 meshing teeth z_e is limited to 12.

$$F_t = F_{tspez} \cdot z_e \cdot b$$

F_t Tangential force

F_{tspec} specific tooth force in N/cm

b Belt width in cm

z_e Number of meshing teeth
$z_{emax} = 12$

R.p.m. n [min^{-1}]	F_{tspec} [N/cm]	R.p.m. n [min^{-1}]	F_{tspec} [N/cm]
0	77,91	2200	41,34
20	76,74	2400	40,07
40	75,68	2600	38,80
60	74,73	2800	37,63
80	73,78	3000	36,57
100	72,82	3200	35,62
200	68,90	3400	34,66
300	65,83	3600	33,81
400	63,07	3800	32,97
500	60,84	4000	32,12
600	58,83	4500	30,53
700	56,92	5000	28,51
800	55,33	5500	27,03
900	53,85	6000	25,65
1000	52,47	6500	24,38
1100	51,20		
1200	50,03		
1300	48,97		
1400	47,91		
1500	46,96		
1600	46,00		
1700	45,16		
1800	44,31		
1900	43,46		
2000	42,72		

2. Tension cord strength (admissible tensile force of the belt cross section F_{tadm}), **belt weight**

Belt width	b	[mm]	32	50	75	100
Tension cord strength (M)	F_{Tadm}	[N]	5000	7500	12000	17000
specific elasticity	c_{spec}	[N]	$1,37 \cdot 10^6$	$2,12 \cdot 10^6$	$3,18 \cdot 10^6$	$4,25 \cdot 10^6$
Belt weight	BATK10	[kg/m]	0,192	0,300	0,450	0,600

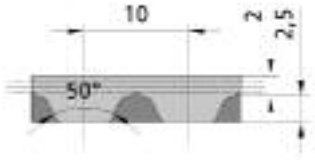
3. Flexibility (Minimum numbers of teeth, minimum diameter)

Drive type			BRECO BATK10
without contraflexure	Synchronising pulley	z_{min}	20
	Tension roller (smooth), running on teeth	d_{min} [mm]	60
with contraflexure	Synchronising pulley	z_{min}	25
	Tension roller (smooth), running on the back of the belt	d_{min} [mm]	120

Self-guiding timing belts - open length

self-guiding BRECO® TIMING BELTS

SFAT 10



Preferred belt widths *)

b [mm]	50	75	100
Pulley width			
B [mm]	65	90	115

*) In-between belt widths are available
Preferred delivery in rolls of 50 or 100 m.
Please specify shorter dimensions (cut to length) separately.
Please specify lengths above 100 m separately.

Available versions for SFAT 10

- **SFAT 10:** Standard
- **PAZ:** with nylon tooth facing
- Endless joined BRECO® TIMING BELTS (V) see chapter Transport technology.

Order Example:

BRECO®-TIMING BELT 50 SFAT10 / 50000 M

Belt width in mm
Type / Pitch
Belt length in mm
Open length

1. Tooth shear strength (specific tooth force)

Technical Data BRECO® TIMING BELT
SFAT 10

The specific tooth force F_{tspec} is the maximum force N a belt tooth with a width of 1 cm can transmit. This value depends on the rotational speed of the drive pulley. The calculation takes into account each identical carrying values for each meshing tooth. With more than 12 meshing teeth z_e is limited to 12.

$$F_t = F_{tspez} \cdot z_e \cdot b$$

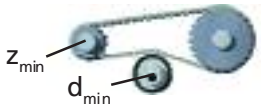
F_t	Tangential force
F_{tspec}	specific tooth force in N/cm
b	Belt width in cm
z_e	Number of meshing teeth $z_{emax} = 12$

R.p.m. n [min^{-1}]	F_{tspec} [N/cm]	R.p.m. n [min^{-1}]	F_{tspec} [N/cm]
0	73,50	2200	39,00
20	72,40	2400	37,80
40	71,40	2600	36,60
60	70,50	2800	35,50
80	69,60	3000	34,50
100	68,70	3200	33,60
200	65,00	3400	32,70
300	62,10	3600	31,90
400	59,50	3800	31,10
500	57,40	4000	30,30
600	55,50	4500	28,50
700	53,70	5000	26,90
800	52,20	5500	25,50
900	50,80	6000	24,20
1000	49,50	6500	23,00
1100	48,30	7000	21,80
1200	47,20	7500	20,80
1300	46,20	8000	19,77
1400	45,20	8500	18,84
1500	44,30	9000	17,95
1600	43,40	9500	17,12
1700	42,60	10000	16,32
1800	41,80		
1900	41,00		
2000	40,30		

2. Tension cord strength (admissible tensile force of the belt cross section F_{tadm}), **belt weight**

Belt width	b	[mm]	50	75	100
Tension cord strength (M)	F_{Tadm}	[N]	7500	10500	16000
specific elasticity	c_{spec}	[N]	$1,87 \cdot 10^6$	$2,62 \cdot 10^6$	$4,00 \cdot 10^6$
Belt weight	SFAT10	[kg/m]	0,290	0,436	0,581

3. Flexibility (Minimum numbers of teeth, minimum diameter)

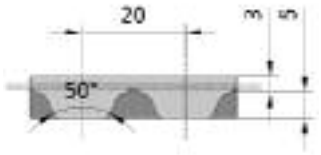
Drive type			BRECO SFAT 10
without contraflexure	Synchronising pulley	z_{min}	15
	Tension roller (smooth), running on teeth	d_{min} [mm]	50
with contraflexure	Synchronising pulley	z_{min}	25
	Tension roller (smooth), running on the back of the belt	d_{min} [mm]	120

Linear technology

Self-guiding timing belts - open length

self-guiding BRECO® TIMING BELTS

SFAT 20



Preferred belt widths *)			
b [mm]	50	75	100
Pulley width			
B [mm]	55	80	105

*) In-between belt widths are available
Preferred delivery in rolls of 50 m length.
Please specify shorter dimensions (cut to length) separately.
Please specify lengths above 50 m separately.

Available versions for SFAT 20

- **SFAT 20:** Standard
- **PAZ:** with nylon tooth facing
- Endless joined BRECO® TIMING BELTS (V) see chapter Transport technology.

Order example:

BRECO®-TIMING BELT 50 SFAT 20 / 50000 M

Belt width in mm
Type / Pitch
Belt length in mm
Open length

1. Tooth shear strength (specific tooth force)

Technical Data BRECO® TIMING BELT
SFAT 20

The specific tooth force F_{tspec} is the maximum force N a belt tooth with a width of 1 cm can transmit. This value depends on the rotational speed of the drive pulley. The calculation takes into account each identical carrying values for each meshing tooth. With more than 12 meshing teeth z_e is limited to 12.

$$F_t = F_{tspez} \cdot z_e \cdot b$$

F_t Tangential force

F_{tspec} specific tooth force in N/cm

b Belt width in cm

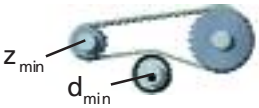
z_e Number of meshing teeth
$z_{emax} = 12$

R.p.m. n [min^{-1}]	F_{tspec} [N/cm]	R.p.m. n [min^{-1}]	F_{tspec} [N/cm]
0	147,00	2200	63,60
20	144,20	2400	60,70
40	141,70	2600	58,00
60	139,30	2800	55,50
80	137,00	3000	53,10
100	134,90	3200	50,90
200	125,80	3400	48,80
300	118,50	3600	46,80
400	112,40	3800	45,00
500	107,20	4000	43,20
600	102,60	4500	39,00
700	98,50	5000	35,30
800	94,80	5500	32,00
900	91,50	6000	28,90
1000	88,40	6500	26,00
1100	85,60		
1200	82,90		
1300	80,50		
1400	78,20		
1500	76,00		
1600	73,90		
1700	72,00		
1800	70,10		
1900	68,40		
2000	66,70		

2. Tension cord strength (admissible tensile force of the belt cross section F_{tadm}), **belt weight**

Belt width	b	[mm]	50	75	100
Tension cord strength (M)	F_{Tadm}	[N]	11200	16800	22400
specific elasticity	c_{spec}	[N]	$2{,}8 \cdot 10^6$	$4{,}20 \cdot 10^6$	$5{,}60 \cdot 10^6$
Belt weight	SFAT 20	[kg/m]	0,480	0,720	0,960

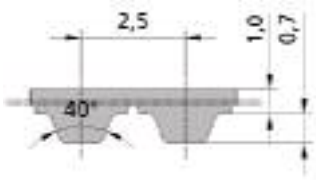
3. Flexibility (Minimum numbers of teeth, minimum diameter)

Drive type	BRECO SFAT 20		
without contraflexure	Synchronising pulley	z_{min}	18
	Tension roller (smooth), running on teeth	d_{min} [mm]	120
with contraflexure	Synchronising pulley	z_{min}	25
	Tension roller (smooth), running on the back of the belt	d_{min} [mm]	180

Linear technology

BRECO® TIMING BELTS

T 2,5



Preferred belt widths *)			
b [mm]	8	10	20
Pulley width			
B [mm]	12	15	26

*) In-between belt widths are available
Preferred delivery in rolls of 100 m length.
Please specify shorter dimensions (cut to length) separately.
Please specify lengths above 100 m separately.

Available versions for T 2.5

- **T 2,5:** Standard
- Endless joined BRECO® TIMING BELTS (V) see chapter Transport technology.

Order example:

BRECO®-TIMING BELT 10 T 2,5 / 1250 M

Belt width in mm
Type / Pitch
Belt length in mm
Open length

1. Tooth shear strength (specific tooth force)

Technical Data BRECO® TIMING BELT
T 2.5

The specific tooth force F_{tspec} is the maximum force N a belt tooth with a width of 1 cm can transmit. This value depends on the rotational speed of the drive pulley. The calculation takes into account each identical carrying values for each meshing tooth. With more than 12 meshing teeth z_e is limited to 12.

$$F_t = F_{tspez} \cdot z_e \cdot b$$

F_t Tangential force

F_{tspec} specific tooth force in N/cm

b Belt width in cm

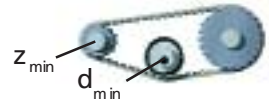
z_e Number of meshing teeth
$z_{emax} = 12$

R.p.m. n [min^{-1}]	F_{tspec} [N/cm]	R.p.m. n [min^{-1}]	F_{tspec} [N/cm]
0	9,03	2200	4,80
20	8,72	2400	4,70
40	8,48	2600	4,65
60	8,28	2800	4,60
80	8,10	3000	4,51
100	7,95	3200	4,48
200	7,39	3400	4,43
300	7,01	3600	4,36
400	6,71	3800	4,28
500	6,48	4000	4,22
600	6,28	4500	4,15
700	6,11	5000	4,09
800	5,97	5500	3,95
900	5,83	6000	3,82
1000	5,71	6500	3,71
1100	5,61	7000	3,60
1200	5,51	7500	3,51
1300	5,41	8000	3,42
1400	5,33	8500	3,33
1500	5,25	9000	3,26
1600	5,17	9500	3,18
1700	5,10	10000	3,05
1800	5,04		
1900	4,97		
2000	4,91		

2. Tension cord strength (admissible tensile force of the belt cross section F_{tadm}), belt weight

Belt width	b	[mm]	8	10	20
Tension cord strength (M)	F_{Tadm}	[N]	77	98	196
specific elasticity	c_{spec}	[N]	$1{,}93 \cdot 10^4$	$2{,}45 \cdot 10^4$	$4{,}9 \cdot 10^4$
Belt weight	T 2.5	[kg/m]	0,010	0,015	0,030

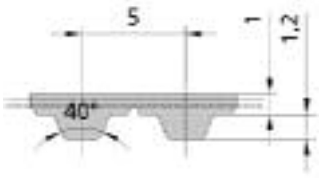
3. Flexibility (Minimum numbers of teeth, minimum diameter)

Drive type			BRECO T 2,5
without contraflexure	Synchronising pulley	z_{min}	15
	Tension roller (smooth), running on teeth	d_{min} [mm]	15
with contraflexure	Synchronising pulley	z_{min}	18
	Tension roller (smooth), running on the back of the belt	d_{min} [mm]	18

T standard timing belts - open length

BRECO® TIMING BELTS

T 5



Preferred belt widths *)

b [mm]	6	10	16	25	32	50	75
Pulley width B [mm]	12	16	22	32	40	60	85

*) In-between belt widths are available
Preferred delivery in rolls of 50 or 100 m.
Please specify shorter dimensions (cut to length) separately.
Please specify lengths above 100 m separately.

Available versions for T 5

- **T 5:** Standard

  E: with E tension member

- **PAZ:** with nylon tooth facing

  PAZ-E: With nylon tooth facing and E tension member

- Endless joined BRECO® TIMING BELTS (V) see chapter Transport technology.

Order example:

BRECO®-TIMING BELT 25 T 5 / 50000 M

Belt width in mm
Type / Pitch
Belt length in mm
Open length

1. Tooth shear strength (specific tooth force)

Technical Data BRECO® TIMING BELT
T 5

The specific tooth force F_{tspec} is the maximum force N a belt tooth with a width of 1 cm can transmit. This value depends on the rotational speed of the drive pulley. The calculation takes into account each identical carrying values for each meshing tooth. With more than 12 meshing teeth z_e is limited to 12.

$$F_t = F_{tspez} \cdot z_e \cdot b$$

F_t Tangential force

F_{tspec} specific tooth force in N/cm

b Belt width in cm

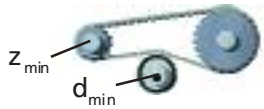
z_e Number of meshing teeth
$z_{emax} = 12$

R.p.m. n [min^{-1}]	F_{tspec} [N/cm]	R.p.m. n [min^{-1}]	F_{tspec} [N/cm]
0	24,00	2200	13,38
20	23,40	2400	13,10
40	22,90	2600	12,84
60	22,40	2800	12,59
80	22,00	3000	12,37
100	21,70	3200	12,16
200	20,30	3400	11,96
300	19,30	3600	11,77
400	18,55	3800	11,59
500	17,93	4000	11,42
600	17,41	4500	11,03
700	16,96	5000	10,68
800	16,56	5500	10,36
900	16,20	6000	10,07
1000	15,88	6500	9,81
1100	15,58	7000	9,56
1200	15,31	7500	9,33
1300	15,06	8000	9,11
1400	14,83	8500	8,91
1500	14,61	9000	8,72
1600	14,40	9500	8,54
1700	14,21	10000	8,37
1800	14,03		
1900	13,85		
2000	13,69		

2. Tension cord strength (admissible tensile force of the belt cross section F_{tadm}), **belt weight**

Belt width	b	[mm]	6	10	16	25	32	50	75
Tension cord strength (M)	F_{Tadm}	[N]	180	300	540	840	1080	1680	2520
specific elasticity	c_{spec}	[N]	$4{,}5 \cdot 10^4$	$7{,}5 \cdot 10^4$	$13{,}5 \cdot 10^4$	$21{,}0 \cdot 10^4$	$27{,}0 \cdot 10^4$	$42{,}0 \cdot 10^4$	$63{,}0 \cdot 10^4$
Belt weight	T 5	[kg/m]	0,013	0,021	0,034	0,053	0,068	0,106	0,160

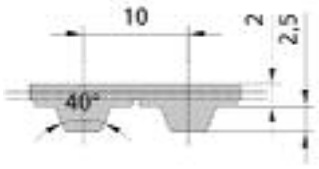
3. Flexibility (Minimum numbers of teeth, minimum diameter)

Drive type			BRECO T 5	BRECO T 5-E
without contraflexure	Synchronising pulley	z_{min}	10	10
	Tension roller (smooth), running on teeth	d_{min} [mm]	30	18
with contraflexure	Synchronising pulley	z_{min}	15	12
	Tension roller (smooth), running on the back of the belt	d_{min} [mm]	30	18

T standard timing belts - open length

BRECO® TIMING BELTS

T 10



Preferred belt widths *)							
b [mm]	16	25	32	50	75	100	150
Pulley width							
B [mm]	22	32	40	60	85	110	160

*) In-between belt widths are available
Preferred delivery in rolls of 50 or 100 m.
Please specify shorter dimensions (cut to length) separately.
Please specify lengths above 100 m separately.

Available versions for T 10

- **T10:** Standard
- **E:** with E tension member
- **PAZ:** with nylon tooth facing
- **PAZ-E:** With nylon tooth facing and E tension member
- Endless joined BRECO® TIMING BELTS (V) see chapter Transport technology.

Order example:

BRECO®-TIMING BELT 25 T10 / 50000 M

Belt width in mm
Type / Pitch
Belt length in mm
Open length

1. Tooth shear strength (specific tooth force)

Technical Data BRECO® TIMING BELT
T 10

The specific tooth force F_{tspec} is the maximum force N a belt tooth with a width of 1 cm can transmit. This value depends on the rotational speed of the drive pulley. The calculation takes into account each identical carrying values for each meshing tooth. With more than 12 meshing teeth z_e is limited to 12.

$$F_t = F_{tspez} \cdot z_e \cdot b$$

F_t Tangential force

F_{tspec} specific tooth force in N/cm

b Belt width in cm

z_e Number of meshing teeth
$z_{emax} = 12$

R.p.m. n [min^{-1}]	F_{tspec} [N/cm]	R.p.m. n [min^{-1}]	F_{tspec} [N/cm]
0	50,50	2200	24,60
20	49,00	2400	23,90
40	47,70	2600	23,30
60	46,60	2800	22,70
80	45,70	3000	22,20
100	44,80	3200	21,70
200	41,40	3400	21,20
300	39,10	3600	20,70
400	37,20	3800	20,30
500	35,70	4000	19,86
600	34,40	4500	18,91
700	33,30	5000	18,06
800	32,40	5500	17,28
900	31,50	6000	16,58
1000	30,70	6500	15,93
1100	30,00	7000	15,33
1200	29,30	7500	14,76
1300	28,70	8000	14,24
1400	28,20	8500	13,74
1500	27,60	9000	13,28
1600	27,10	9500	12,84
1700	26,70	10000	12,42
1800	26,20		
1900	25,80		
2000	25,40		

2. Tension cord strength (admissible tensile force of the belt cross section F_{tadm}), **belt weight**

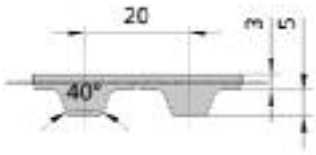
Belt width	b	[mm]	16	25	32	50	75	100	150
Tension cord strength (M)	F_{Tadm}	[N]	1400	2200	2800	4400	6600	8800	13200
specific elasticity	c_{spec}	[N]	$3,5 \cdot 10^5$	$5,5 \cdot 10^5$	$7,0 \cdot 10^5$	$11,0 \cdot 10^5$	$16,5 \cdot 10^5$	$22,0 \cdot 10^5$	$33,0 \cdot 10^5$
Belt weight	T 10	[kg/m]	0,073	0,114	0,145	0,227	0,341	0,454	0,681

3. Flexibility (Minimum numbers of teeth, minimum diameter)

Drive type			BRECO T 10	BRECO T 10-E
without contraflexure	Synchronising pulley	z_{min}	12	10
	Tension roller (smooth), running on teeth	d_{min} [mm]	60	50
with contraflexure	Synchronising pulley	z_{min}	20	15
	Tension roller (smooth), running on the back of the belt	d_{min} [mm]	60	50

T standard timing belts - open length

BRECO® TIMING BELTS
T 20



Preferred belt widths *)						
b [mm]	25	32	50	75	100	150
Pulley width						
B [mm]	32	40	60	85	110	160

*) In-between belt widths are available
Preferred delivery in rolls of 50 m length.
Please specify shorter dimensions (cut to length) separately.
Please specify lengths above 50 m separately.

Available versions for T 20

- **T 20:** Standard
- **PAZ:** with nylon tooth facing
- Endless joined BRECO® TIMING BELTS (V) see chapter Transport technology.

Order example:

BRECO®-TIMING BELT 75 T 20 / 50000 M

Belt width in mm
Type / Pitch
Belt length in mm
Open length

1. Tooth shear strength (specific tooth force)

Technical Data BRECO® TIMING BELT
T 20

The specific tooth force F_{tspec} is the maximum force N a belt tooth with a width of 1 cm can transmit. This value depends on the rotational speed of the drive pulley. The calculation takes into account each identical carrying values for each meshing tooth. With more than 12 meshing teeth z_e is limited to 12.

$$F_t = F_{tspez} \cdot z_e \cdot b$$

F_t Tangential force

F_{tspec} specific tooth force in N/cm

b Belt width in cm

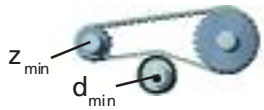
z_e Number of meshing teeth
$z_{emax} = 12$

R.p.m. n [min^{-1}]	F_{tspec} [N/cm]	R.p.m. n [min^{-1}]	F_{tspec} [N/cm]
0	101,50	2200	43,60
20	98,10	2400	42,10
40	95,30	2600	40,70
60	92,80	2800	39,40
80	90,70	3000	38,10
100	88,70	3200	37,00
200	81,20	3400	35,90
300	75,90	3600	34,90
400	71,80	3800	33,90
500	68,40	4000	33,00
600	65,60	4500	30,80
700	63,10	5000	28,90
800	60,90	5500	27,20
900	59,00	6000	25,60
1000	57,20	6500	24,20
1100	55,60		
1200	54,20		
1300	52,80		
1400	51,50		
1500	50,30		
1600	49,20		
1700	48,20		
1800	47,20		
1900	46,20		
2000	45,30		

2. Tension cord strength (admissible tensile force of the belt cross section F_{tadm}), **belt weight**

Belt width	b	[mm]	25	32	50	75	100	150
Tension cord strength (M)	F_{Tadm}	[N]	3500	4500	7000	10500	14000	20000
specific elasticity	c_{spec}	[N]	$0,87 \cdot 10^6$	$1,13 \cdot 10^6$	$1,75 \cdot 10^6$	$2,63 \cdot 10^6$	$3,5 \cdot 10^6$	$5,0 \cdot 10^6$
Belt weight	T 20	[kg/m]	0,184	0,236	0,368	0,552	0,736	1,095

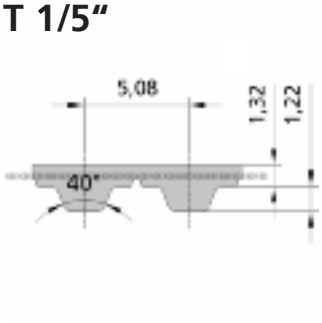
3. Flexibility (Minimum numbers of teeth, minimum diameter)

Drive type			BRECO T 20
without contraflexure	Synchronising pulley	z_{min}	15
	Tension roller (smooth), running on teeth	d_{min} [mm]	120
with contraflexure	Synchronising pulley	z_{min}	25
	Tension roller (smooth), running on the back of the belt	d_{min} [mm]	120

Imperial timing belts - open length

BRECO® TIMING BELTS

T 1/5“



Preferred belt widths *)

b [mm]	6,35	7,94	9,53	12,7	19,1	25,4
Imperial code	025	031	037	050	075	100

*) In-between belt widths are available
Preferred delivery in rolls of 50 or 100 m.
Please specify shorter dimensions (cut to length) separately.
Please specify lengths above 100 m separately.

Available versions for T 1/5"

- **T1/5“:** Standard
- **PAZ:** with nylon tooth facing
- Endless joined BRECO® TIMING BELTS (V) see chapter Transport technology.

Order example:

BRECO®-TIMING BELT 25,4 T1/5“ / 50000 M

Belt width in mm
Type / Pitch
Belt length in mm
Open length

1. Tooth shear strength (specific tooth force)

Technical Data BRECO® TIMING BELT
T 1/5“

The specific tooth force F_{tspec} is the maximum force N a belt tooth with a width of 1 cm can transmit. This value depends on the rotational speed of the drive pulley. The calculation takes into account each identical carrying values for each meshing tooth. With more than 12 meshing teeth z_e is limited to 12.

$$F_t = F_{tspez} \cdot z_e \cdot b$$

F_t Tangential force

F_{tspec} specific tooth force in N/cm

b Belt width in cm

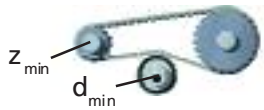
z_e Number of meshing teeth
$z_{emax} = 12$

R.p.m. n [min^{-1}]	F_{tspec} [N/cm]	R.p.m. n [min^{-1}]	F_{tspec} [N/cm]
0	24,40	2200	13,60
20	23,80	2400	13,31
40	23,20	2600	13,05
60	22,80	2800	12,80
80	22,40	3000	12,57
100	22,00	3200	12,36
200	20,60	3400	12,16
300	19,63	3600	11,96
400	18,86	3800	11,78
500	18,23	4000	11,61
600	17,70	4500	11,21
700	17,24	5000	10,86
800	16,83	5500	10,54
900	16,47	6000	10,24
1000	16,14	6500	9,97
1100	15,84	7000	9,72
1200	15,57	7500	9,49
1300	15,31	8000	9,27
1400	15,07	8500	9,06
1500	14,85	9000	8,86
1600	14,64	9500	8,68
1700	14,45	10000	8,51
1800	14,26		
1900	14,08		
2000	13,91		

2. Tension cord strength (admissible tensile force of the belt cross section F_{tadm}), belt weight

Belt width	b	[mm]	6,35	7,94	9,53	12,7	19,1	25,4
Tension cord strength (M)	F_{Tadm}	[N]	210	240	330	390	660	840
specific elasticity	c_{spec}	[N]	$5,25 \cdot 10^4$	$6,0 \cdot 10^4$	$8,25 \cdot 10^4$	$9,75 \cdot 10^4$	$1,65 \cdot 10^4$	$2,1 \cdot 10^4$
Belt weight	T1/5“	[kg/m]	0,015	0,019	0,023	0,03	0,046	0,061

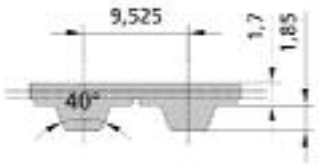
3. Flexibility (Minimum numbers of teeth, minimum diameter)

Drive type			BRECO T 1/5“
without contraflexure	Synchronising pulley	z_{min}	10
	Tension roller (smooth), running on teeth	d_{min} [mm]	30
with contraflexure	Synchronising pulley	z_{min}	15
	Tension roller (smooth), running on the back of the belt	d_{min} [mm]	30

Imperial timing belts - open length

BRECO® TIMING BELTS

T 3/8“



Preferred belt widths *)						
b [mm]	9,53	12,7	19,1	25,4	38,1	50,8
Imperial code	037	050	075	100	150	200

*) In-between belt widths are available
Preferred delivery in rolls of 50 or 100 m.
Please specify shorter dimensions (cut to length) separately.
Please specify lengths above 100 m separately.

Available versions for T 3/8"

- **T3/8“:** Standard
- **PAZ:** with nylon tooth facing
- Endless joined BRECO® TIMING BELTS (V) see chapter Transport technology.

Order example:

BRECO®-TIMING BELT 19,1 T3/8“ / 50000 M

Belt width in mm
Type / Pitch
Belt length in mm
Open length

1. Tooth shear strength (specific tooth force)

Technical Data BRECO® TIMING BELT
T 3/8“

The specific tooth force F_{tspec} is the maximum force N a belt tooth with a width of 1 cm can transmit. This value depends on the rotational speed of the drive pulley. The calculation takes into account each identical carrying values for each meshing tooth. With more than 12 meshing teeth z_e is limited to 12.

$$F_t = F_{tspez} \cdot z_e \cdot b$$

F_t Tangential force

F_{tspec} specific tooth force in N/cm

b Belt width in cm

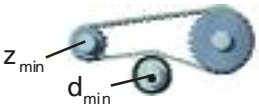
z_e Number of meshing teeth
$z_{emax} = 12$

R.p.m. n [min^{-1}]	F_{tspec} [N/cm]	R.p.m. n [min^{-1}]	F_{tspec} [N/cm]
0	37,40	2200	18,22
20	36,30	2400	17,71
40	35,50	2600	17,25
60	34,50	2800	16,81
80	33,80	3000	16,40
100	33,10	3200	16,02
200	30,70	3400	15,66
300	28,90	3600	15,32
400	27,50	3800	15,00
500	26,40	4000	14,69
600	25,50	4500	13,99
700	24,70	5000	13,36
800	24,00	5500	12,79
900	23,30	6000	12,27
1000	22,70	6500	11,79
1100	22,20	7000	11,34
1200	21,70	7500	10,93
1300	21,30	8000	10,54
1400	20,80	8500	10,17
1500	20,40	9000	9,83
1600	20,10	9500	9,50
1700	19,72	10000	9,19
1800	19,39		
1900	19,08		
2000	18,78		

2. Tension cord strength (admissible tensile force of the belt cross section F_{tadm}), **belt weight**

Belt width	b	[mm]	9,53	12,7	19,1	25,4	38,1	50,8
Tension cord strength (M)	F_{Tadm}	[N]	630	840	1260	1680	2520	3500
specific elasticity	c_{spec}	[N]	$15,8 \cdot 10^4$	$21,0 \cdot 10^4$	$31,5 \cdot 10^4$	$42,0 \cdot 10^4$	$63,0 \cdot 10^4$	$87,0 \cdot 10^4$
Belt weight	T3/8"	[kg/m]	0,033	0,044	0,066	0,088	0,133	0,178

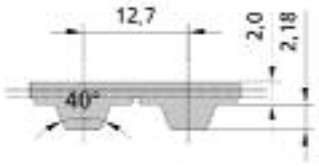
3. Flexibility (Minimum numbers of teeth, minimum diameter)

Drive type			BRECO T 3/8“
without contraflexure	Synchronising pulley	z_{min}	15
	Tension roller (smooth), running on teeth	d_{min} [mm]	60
with contraflexure	Synchronising pulley	z_{min}	20
	Tension roller (smooth), running on the back of the belt	d_{min} [mm]	60

Imperial timing belts - open length

BRECO® TIMING BELTS

T 1/2“



Preferred belt widths *)

b [mm]	12,7	19,1	25,4	38,1	50,8	76,2	101,6	152,4
Imperial code	050	075	100	150	200	300	400	600

*) In-between belt widths are available
Preferred delivery in rolls of 50 or 100 m.
Please specify shorter dimensions (cut to length) separately.
Please specify lengths above 100 m separately.

Available versions for T1/2“

- **T1/2“:** Standard
- **PAZ:** with nylon tooth facing
- Endless joined BRECO® TIMING BELTS (V) see chapter Transport technology.

Order example:

BRECO®-TIMING BELT 25,4 T1/2“ / 50000 M

Belt width in mm
Type / Pitch
Belt length in mm
Open length

1. Tooth shear strength (specific tooth force)

Technical Data BRECO® TIMING BELT
T 1/2“

The specific tooth force F_{tspec} is the maximum force N a belt tooth with a width of 1 cm can transmit. This value depends on the rotational speed of the drive pulley. The calculation takes into account each identical carrying values for each meshing tooth. With more than 12 meshing teeth z_e is limited to 12.

$$F_t = F_{tspez} \cdot z_e \cdot b$$

F_t Tangential force

F_{tspec} specific tooth force in N/cm

b Belt width in cm

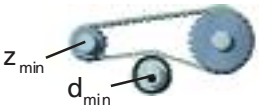
z_e Number of meshing teeth
$z_{emax} = 12$

R.p.m. n [min^{-1}]	F_{tspec} [N/cm]	R.p.m. n [min^{-1}]	F_{tspec} [N/cm]
0	44,00	2200	21,50
20	42,70	2400	20,90
40	41,60	2600	20,30
60	40,70	2800	19,81
80	39,80	3000	19,33
100	39,10	3200	18,88
200	36,10	3400	18,45
300	34,10	3600	18,05
400	32,50	3800	17,68
500	31,10	4000	17,32
600	30,00	4500	16,49
700	29,10	5000	15,74
800	28,20	5500	15,07
900	27,50	6000	14,46
1000	26,80	6500	13,89
1100	26,20	7000	13,36
1200	25,60	7500	12,87
1300	25,10	8000	12,42
1400	24,60	8500	11,99
1500	24,10	9000	11,58
1600	23,70	9500	11,19
1700	23,20	10000	10,83
1800	22,90		
1900	22,50		
2000	22,10		

2. Tension cord strength (admissible tensile force of the belt cross section F_{tadm}), **belt weight**

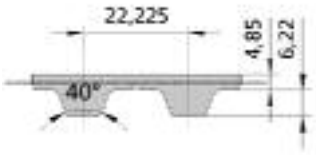
Belt width	b	[mm]	12,7	19,1	25,4	38,1	50,8	76,2	101,6	152,4
Tension cord strength (M)	F_{Tadm}	[N]	1000	1600	2200	3200	4400	6600	8800	13200
specific elasticity	c_{spec}	[N]	$0,25 \cdot 10^6$	$0,4 \cdot 10^6$	$0,55 \cdot 10^6$	$0,80 \cdot 10^6$	$1,10 \cdot 10^6$	$1,65 \cdot 10^6$	$2,20 \cdot 10^6$	$3,30 \cdot 10^6$
Belt weight	T1/2“	[kg/m]	0,053	0,081	0,108	0,161	0,216	0,324	0,432	0,648

3. Flexibility (Minimum numbers of teeth, minimum diameter)

Drive type			BRECO T 1/2“
without contraflexure	Synchronising pulley	z_{min}	14
	Tension roller (smooth), running on teeth	d_{min} [mm]	60
with contraflexure	Synchronising pulley	z_{min}	20
	Tension roller (smooth), running on the back of the belt	d_{min} [mm]	80

BRECO® TIMING BELTS

T 7/8“



Preferred belt widths *)			
b [mm]	50,8	76,2	101,6
Imperial code	200	300	400

*) In-between belt widths are available
Preferred delivery in rolls of 50 m length.
Please specify shorter dimensions (cut to length) separately.
Please specify lengths above 50 m separately.

Available versions for T7/8“

- **T7/8“:** Standard
- **PAZ:** with nylon tooth facing
- Endless joined BRECO® TIMING BELTS (V) see chapter Transport technology.

Order example:

BRECO®-TIMING BELT 50,8 T7/8“ / 50000 M

Belt width in mm
Type / Pitch
Belt length in mm
Open length

1. Tooth shear strength (specific tooth force)

Technical Data BRECO® TIMING BELT
T 7/8“

The specific tooth force F_{tspec} is the maximum force N a belt tooth with a width of 1 cm can transmit. This value depends on the rotational speed of the drive pulley. The calculation takes into account each identical carrying values for each meshing tooth. With more than 12 meshing teeth z_e is limited to 12.

$$F_t = F_{tspez} \cdot z_e \cdot b$$

F_t Tangential force

F_{tspec} specific tooth force in N/cm

b Belt width in cm

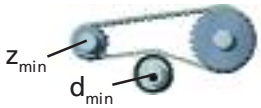
z_e Number of meshing teeth
$z_{emax} = 12$

R.p.m. n [min^{-1}]	F_{tspec} [N/cm]	R.p.m. n [min^{-1}]	F_{tspec} [N/cm]
0	91,35	2200	39,24
20	88,29	2400	37,89
40	85,77	2600	36,63
60	83,52	2800	35,46
80	81,63	3000	34,29
100	79,83	3200	33,30
200	73,08	3400	32,31
300	68,31	3600	31,41
400	64,62	3800	30,51
500	61,56	4000	29,70
600	59,04	4500	27,72
700	56,79	5000	26,01
800	54,81	5500	24,48
900	53,10	6000	23,04
1000	51,48	6500	21,78
1100	50,04		
1200	48,78		
1300	47,52		
1400	46,35		
1500	45,27		
1600	44,28		
1700	43,38		
1800	42,48		
1900	41,58		
2000	40,77		

2. Tension cord strength (admissible tensile force of the belt cross section F_{tadm}), **belt weight**

Belt width	b	[mm]	38,1	50,8	76,2	101,6
Tension cord strength (M)	F_{Tadm}	[N]	5250	7000	10500	14000
specific elasticity	c_{spec}	[N]	$1,31 \cdot 10^6$	$1,75 \cdot 10^6$	$2,63 \cdot 10^6$	$3,5 \cdot 10^6$
Belt weight	T7/8"	[kg/m]	0,397	0,530	0,795	1,059

3. Flexibility (Minimum numbers of teeth, minimum diameter)

Drive type			BRECO T 7/8“
without contraflexure	Synchronising pulley	z_{min}	18
	Tension roller (smooth), running on teeth	d_{min} [mm]	150
with contraflexure	Synchronising pulley	z_{min}	20
	Tension roller (smooth), running on the back of the belt	d_{min} [mm]	180

F flat belts - open length

BRECO® FLAT BELT

F 1.0

(previous designation: F 1)

Preferred belt widths *)

b [mm]	8	10	12	20

*) In-between belt widths are available
Preferred delivery in rolls of 100 m length.
Please specify shorter dimensions (cut to length) separately.
Please specify lengths above 100 m separately.

Available versions for F 1.0

- **F1.0:** Standard
- only available in open lengths

Order example:

BRECO®-FLATBELT 20 F 1.0 / 50000 M

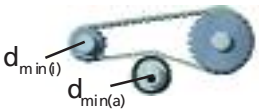
Belt width in mm
Type
Belt length in mm
Open length

Technical Data BRECO® FLAT BELT F 1.0

1. Tension cord strength (admissible tensile force of the belt cross section F_{tadm}), **belt weight**

Belt width	b	[mm]	8	10	12	20
Tension cord strength (M)	F_{Tadm}	[N]	300	360	420	720
specific elasticity	c_{spec}	[N]	$7{,}5 \cdot 10^4$	$9{,}0 \cdot 10^4$	$1.05 \cdot 10^5$	$1{,}8 \cdot 10^5$
Belt weight	F1.0	[kg/m]	0,012	0,015	0,018	0,030

2. Flexibility (Minimum diameter)

Drive type			BRECO F 1.0
without contraflexure	Minimum diameter	d_{min} [mm]	16
			
with contraflexure	internal minimum diameter	$d_{min(i)}$ [mm]	30
	Tension roller (smooth), running on the back of the belt	$d_{min(a)}$ [mm]	30

BRECO® FLAT BELT
F 2.0
(previous designation: F 2)

Preferred belt widths *)

b [mm]	25	32	50	75	100

*) In-between belt widths are available
Preferred delivery in rolls of 50 and 100 meters.
Please specify shorter dimensions (cut to length) separately.
Please specify lengths above 100 m separately.

Order example:

BRECO®-FLATBELT 25 F 2.0 / 50000 M

Belt width in mm
Type
Belt length in mm
Open length

Available versions for F 2.0

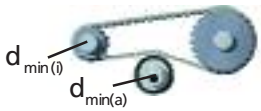
- **F 2.0:** Standard
- **PAZ:** Nylon facing on the groove side
- Endless joined BRECO® FLAT BELTS (V) available.

Technical Data BRECO® FLAT BELT F 2.0

1. Tension cord strength (admissible tensile force of the belt cross section F_{tadm}), **belt weight**

Belt width	b	[mm]	25	32	50	75	100
Tension cord strength (M)	F_{Tadm}	[N]	2000	2600	4200	4800	6600
specific elasticity	c_{spec}	[N]	$5{,}0 \cdot 10^5$	$6{,}5 \cdot 10^5$	$1{,}05 \cdot 10^6$	$1{,}2 \cdot 10^6$	$1{,}65 \cdot 10^6$
Belt weight	F2.0	[kg/m]	0,079	0,101	0,159	0,255	0,301

2. Flexibility (Minimum diameter)

Drive type	BRECO F 2.0		
without contraflexure	Minimum diameter	d_{min} [mm]	30
			
with contraflexure	internal minimum diameter	$d_{min(i)}$ [mm]	40
	Tension roller (smooth), running on the back of the belt	$d_{min(a)}$ [mm]	60

BRECO® FLAT BELT

F 3.0

(previous designation: F 3)

Preferred belt widths *)

b [mm]	30	50	100

*) In-between belt widths are available
Preferred delivery in rolls of 100 m length.
Please specify shorter dimensions (cut to length) separately.
Please specify lengths above 100 m separately.

Available versions for F 3.0

- **F 3.0:** Standard
- Endless joined BRECO® FLAT BELTS (V) available.

Order example:

BRECO®-FLAT BELT 30 F 3.0 / 50000 M

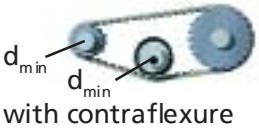
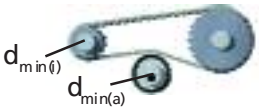
Belt width in mm
Type
Belt length in mm
Open length

Technical Data BRECO® FLAT BELT F 3.0

1. Tension cord strength (admissible tensile force of the belt cross section F_{tadm}), **belt weight**

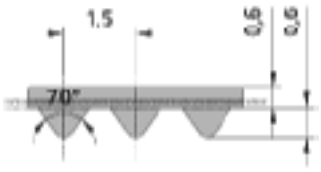
Belt width	b	[mm]	30	50	100
Tension cord strength (M)	F_{Tadm}	[N]	8400	14700	30800
specific elasticity	c_{spec}	[N]	$2,1 \cdot 10^6$	$3,68 \cdot 10^6$	$7,7 \cdot 10^6$
Belt weight	F3.0	[kg/m]	0,197	0,343	0,686

2. Flexibility (Minimum diameter)

Drive type			BRECO F 3.0
without contraflexure	Minimum diameter	d_{min} [mm]	120
			
with contraflexure	internal minimum diameter	$d_{min(i)}$ [mm]	150
	Tension roller (smooth), running on the back of the belt	$d_{min(a)}$ [mm]	150
			

Open length SYNCHROFLEX® TIMING BELTS
made of polyurethane with Aramid tension member

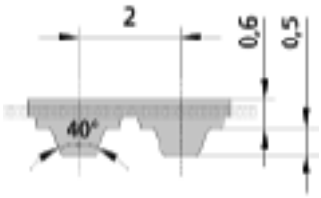
K 1,5



Applications (examples):

- Fine mechanical technology
- EDP equipment
- Office machinery
- Drawing machines
- Handling technology
- Linear transmissions

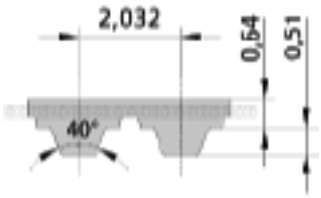
T 2



Properties:

- precision of repeatability
- twist angle precision
- positive fit
- highly flexible
- wear resistant
- mostly oil resistant
- low noise
- low pretension
- low space requirement
- maintenance-free

M

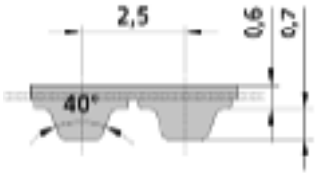


Order example:

T 2,5

SYNCHROFLEX®-TIMING BELT 10 T2,5 / 5000 M

Belt width in mm
Type / Pitch
Belt length in mm
Open length



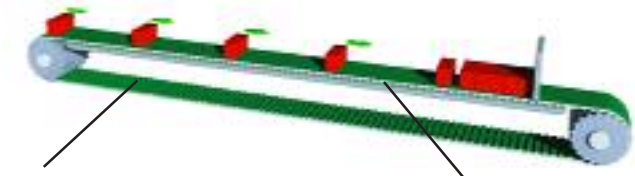
Product range: K 1.5; T 2; M; T 2.5

Belt width b [mm] Width tolerance ±0.3mm In-between widths upon request	4*	6*	8	10*	12	14	16
Pulley width B [mm]	8	10	12	14	16	18	20
Max. adm. pulling force F_{adm} [N] referred to a 0.4 % elastic stretch	24	40	64	80	104	120	144
max. lengths available [mm]	15000	12000	10000	8000	7000	6000	5000

*held in stock

Application example in transport technology

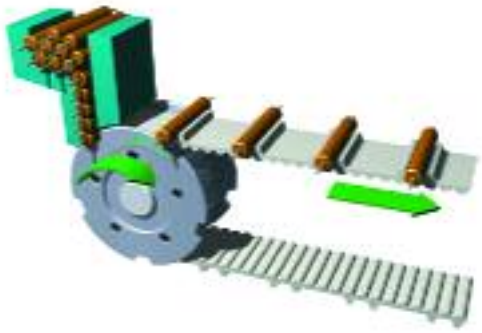
Accumulation conveyors



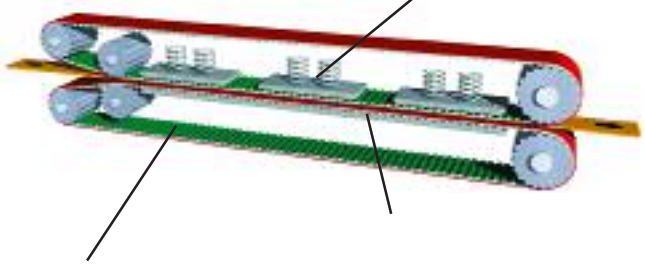
Tooth side and back of the belt with nylon facing = low friction

Guide rail

Product separation



Haul-off system



Pressure plate

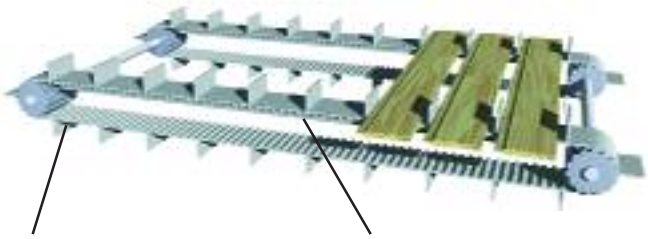
Tooth side with nylon facing = low friction

Back of the belt with transport backing = high friction

Rotary indexing magazine for test tubes

welded-on profiles

Synchronous conveyors



welded-on profiles

Guide rail

Supply belt for cosmetics

welded-on profiles

Guide rail