

7 / Polymers

7.1 Qualities of standard polymers

Belt brand	Designation	Hardness (Sh A)	Temperatures	Colour	Material
Linear applications					
BRECO® Linear - BRECO® Welded	TPUST1	92	0 to 80°C	White	Thermoplastic polyurethane (TPUAU1 - Specially adapted to aggressive environments and conforms to FDA according to Regulation 21 CFR)
BRECO® Linear - BRECO® Welded	TPUAU1	92	0 to 80°C	Transparent	
BRECO ^{basic} ®	TPUBAS	92	0 to 80°C	Grey	
CONTI® Synchrodrive		92	0 to 80°C	Black	
Transmission applications					
BRECOFLEX® ≥ 720 mm	TPUST1	92	0 to 80°C	White	Thermoplastic polyurethane
BRECOFLEX® < 720 mm	TPUST3	92	0 to 80°C	Transparent	
BRECOFLEX® ATP	TPUSM1	92	0 to 80°C	Transparent	
SYNCHROFLEX®	DEDU 8600	88	-20 to 80°C	Grey	Duroplastic polyurethane
SYNCHROFLEX® GEN III	DNHU 9333	93	-20 to 100°C	Red	
CONTI® Synchrochain	DNSU 9590	95	-35 to 100°C	Black	Duroplastic polyurethane
CONTI® Synchrobelt			-20 to 100°C	Black	Synthetic rubber
CONTI® Synchrotwin			Synthetic rubber		

7.2 Design of special polyurethane belts

For BRECO® linear (M), BRECO® welded (V) and BRECOFLEX® belts .

Desired characteristics	Designation	Hardness (Sh A)	Temperatures	Colour	Comments
Improvement of friction coefficient	TPUST2	85	5 to 50°C	Transparent	Increased resistance to hydrolysis
Resistance to aggressive environments	TPUAU2	92	0 to + 50°C		For dry foods - Resistance to cleaning agents - Conforms to FDA according to Regulation 21 CFR - Very good resistance to hydrolysis and to microbes
	TPUAU3	86	0 to 50°C		Very good resistance to cleaning agents
Food applications	TPUFD1	92	0 to 80°C		For dry or wet foods - Conforms to FDA according Regulation 21 CFR - Moderate resistance to cleaning agents - Good resistance to oils and greases
	TPUFD2	85	5 to 50°C		
Resistance to temperature	TPUKF1	85	-25 to 5°C		Limited dynamic stress
	TPUKF2	82	-30 to -10°C		
	TPUWB1	94	20 to 110°C	White	Limited dynamic stress
			110 to 130°C		Limited dynamic stress - Maximum 50% of nominal values - $Z_0 \geq 6$ - No joined BRECO® belt - Unique connection with rapid attachment
Antistatic	TPUAS1	92	0 to 80°C	Translucent Grey	Surface resistance acc. to ISO 9563 = $10^8 \dots 10^9 \Omega$ (on new product)
	TPUAS2	83	5 to 50°C	Black	Surface resistance acc. to IEC93 = $10^4 \dots 10^6 \Omega$ (on new product) - Often supplied in BRECO® linear (M) or BRECO® welded (V) with a PAZ and a PAR (dark grey antistatic) with $10^4 \Omega$ approx.
	TPUAS3	85	5 to 50°C	Translucent grey	Surface resistance acc. to ISO 9563 = $10^8 \dots 10^9 \Omega$ (on new product)
Eco-friendly	TPUEC1	91	0 to 80°C	Green	Good mechanical resistance and resistance to oils

These polyurethanes cannot be used for all the belt types (contact us for further details).

For SYNCHROFLEX® belts

Desired characteristics	Designation	Hardness (Sh A)	Temperatures	Colour	Comments
Resistance to temperature	DNHU 8580	83	-35 to 80°C	Dark brown	High friction coefficient
	DNHU 9080	90	-35 to 80°C		
Antistatic	DNHU 9090EL	90	0° to 50°C	Black	Surface resistance acc. to DIN 53482/53596 on new product

7.3 Design of polypropylene belts

Desired characteristics	Designation	Hardness (Sh D)	Temperatures	Colour	Comments
Resistance to very aggressive environments	PP1	30	0° to 50°C	Milky white	Very good resistance to alkaline and acidic agents - Limited dynamic stress

7.4 BRECO^{green}®

This belt is partly made of eco-friendly polyurethane that comes from original renewable materials.

- Mechanical polyurethane characteristics identical to the standard
- Can be made in all the versions:
 - BRECOFLEX®
 - BRECO® linear (M)
 - BRECO® welded (V)
 - With profiles
 - With coatings
- Can be joined by glueing or welding

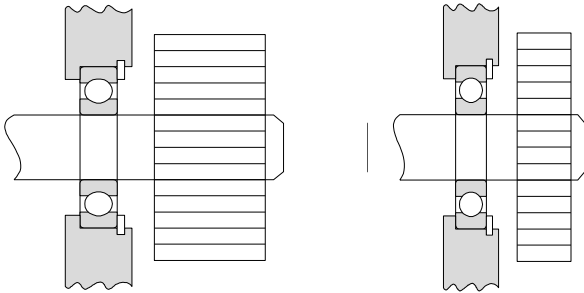


8 / Influence on pulleys

The choice of a high-performance belt from Aratron magnetic is the right solution for:

- reducing inertia
- reducing the space required, and hence the cost
- reducing the bending moment (better axial parallelism)
- improving efficiency.

Standard solution	High-performance solution
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9 / Tension members of belts

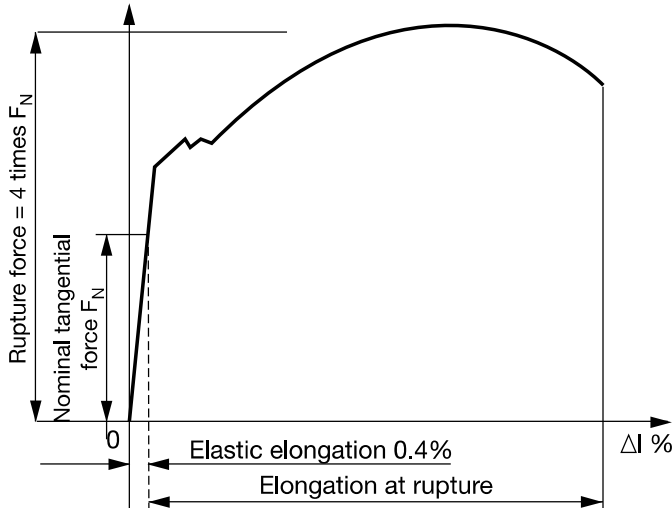
Each type of belt has tension members which give its well defined mechanical characteristics. Thanks to this the belts maintain an elasticity without elongation.

A tension member is comparable to a spring subjected to strain deformation. The tension member is deformed proportionally in the elasticity phase under stress in accordance with Hooke's Law.

9.1 Tension members of polyurethane (PU) belts

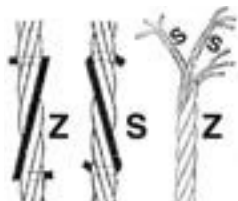
Standard PU belts are reinforced by galvanised steel tension members. These tension members enable the belts to maintain their longitudinal stability. However, like all metals, steel is deformed under load according to Hooke's Law. This law describes deformations under load in the elasticity phase. The value of the force F_N (maximum permissible nominal force) is specified for each pitch on the profile pages. Elongation of the belt is proportional to the force applied to the wire.

Hooke's Law



■ Bifilar design Z + S

This is achieved by an opposed-twist arrangement which enables it to limit the belt pressure on the flanges, resulting in improved efficiency and reduced wear on the faces.



■ Tension members of SYNCHROFLEX® and BRECOFLEX® belts

These belts, produced by extrusion or "endless" moulding, are fitted with continuous tension members. Two options:

- Monofilar (one tension member per belt): this is the case with standard SYNCHROFLEX® and BRECOFLEX® belts up to 710 mm.

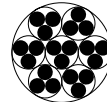
- Bifilar Z + S opposed twist (two tension members per belt): this improvement is already effective on the majority of BRECOFLEX® belts starting from 710 mm in length and on all SYNCHROFLEX® GEN III belts. It has been possible to increase the number of tension members on the latter belts. As a result the transmittable tangential force (F_t) is increased by 45% for SYNCHROFLEX® GEN III belts.

■ Tension members of BRECO® linear (M) and BRECO® welded (V) belts

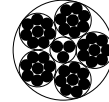
These belts, produced by linear extrusion, are fitted with parallel tension members.

9.2 Special tension members

- High-flexibility galvanised steel tension member (E).



Standard tension member (ST)



High-flexibility tension member (E)

For E high-flexibility tension members the section is distributed to a much higher number of finer wires, reducing the bending stresses accordingly. The advantage offered by the E tension member is better bending strength.

Timing belts with E tension members must preferably be used for multiple-pulley drives or where the contraflexures are more frequent.

- Reinforced steel tension member
- Stainless steel tension member: this tension member transmits a little less force than the normal steel tension member but has good resistance to chemical attacks.
- Aramide fibre tension member: this tension member has good resistance to certain chemical agents but this fibre has the drawback of creeping over time. It is not suited to dynamic stress.

The use of these last three special tension members lends belts different mechanical and elastic characteristics. We can advise you on choosing a specific variant.

9.3 Tension members of CONTI® SYNCHROBELT and CONTI® SYNCHROCHAIN belt

CONTI® SYNCHROFORCE belts and CXP belts are reinforced with twisted glass fibre tension members while CXA belts and CONTI® SYNCHROCHAIN belts are reinforced with an aramide fibre tension members. Carbon CONTI® SYNCHROCHAIN belts are reinforced with carbon tension members..

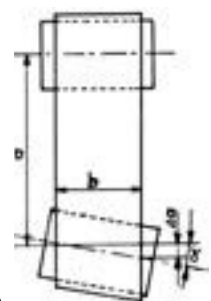
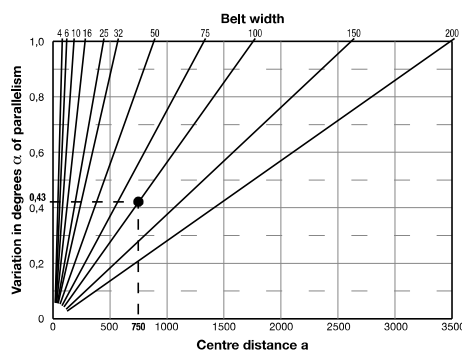
10 / Service conditions

Various service parameters must be observed in order to transmit a torque under good conditions with regard to service life, noise level, bearing load, and backlash:

- Clean surrounding area - Ambient temperature
- Good pulley quality - Observance of minimum diameters
- Good pre-tension

Fitting with a fixed centre distance necessitates belts with a more exacting length tolerance and with more precise machining (it is essential to consult our technical department).

11 / Axial parallelism



To avoid side forces on the guide flanges, the angular distance "a" between two shafts must be lower than the belt width "b" is large and the centre distance short (refer to the diagram above and do not exceed $\pm 1^\circ$).