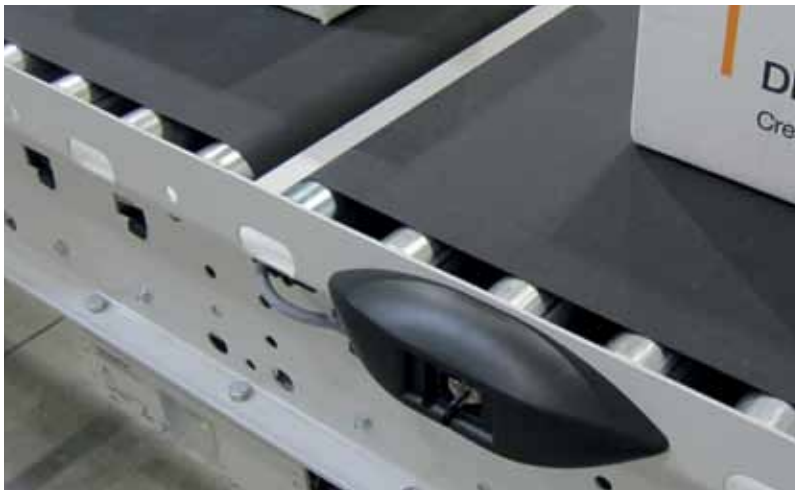


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conveyor and processing belts

# **ELASTIC BELTS**

## RECOMMENDATIONS FOR MACHINE DESIGN



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# RECOMMENDATIONS FOR MACHINE DESIGN

## Calculating the shaft load

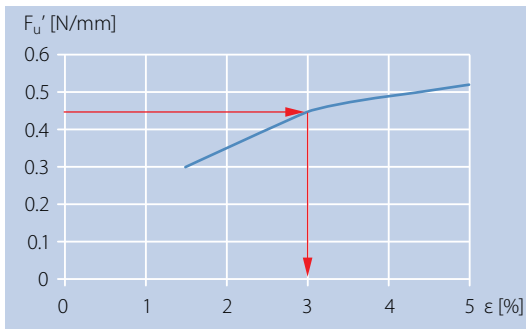


Diagram 1 – Specific effective pull  $F_u'$  [N/mm]

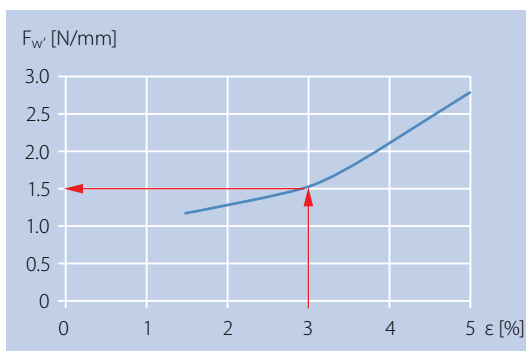


Diagram 2 – Specific shaft load  $F_w'$  [N/mm]

The ideal elongation range is between 1.5 and 5.0%. We recommend our B\_Rex calculation program for sizing belts. A rough calculation for drums with a 180° arc of contact can be made based on the following example:

Unit weight m	[kg]	35
Band width b	[mm]	400
Conveying speed	[m/s]	2
Acceleration a	[m/s <sup>2</sup> ]	2
Friction coefficient $\mu_{\text{steel}}$		0.2 (for new belts)
Friction coefficient $\mu_{\text{steel}}$		0.3 (on older friction surfaces)
Friction coefficient $\mu_{\text{Roll}}$		0.03 (with rolling support)
Friction coefficient $\mu_{\text{galvanized steel}}$		0.4 (with galvanized support)

$$F_u = m \cdot g \cdot \mu + m \cdot a + \text{number of returns} \times 20 \text{ N}$$

$$= 35 \text{ kg} \cdot 9.81 \text{ kg} \cdot \text{m/s}^2 \times 0.2 + 35 \text{ kg} \cdot 2 \text{ m/s}^2 + 2 \cdot 20 \text{ N} = 179 \text{ N}$$

$$F_u' = F_u / b = 179 \text{ N} / 400 \text{ mm} = 0.45 \text{ N/mm}$$

- > Refer to diagram 1 for the elongation required (in this example  $\epsilon = 3\%$ )
- > Refer to diagram 2 for the resulting shaft load (in this example  $F_w' = 1.5 \text{ N/mm}$ )

$$F_w = F_w' \times b = 1.5 \text{ N/mm} \times 400 \text{ mm} = \mathbf{600 \text{ N}}$$

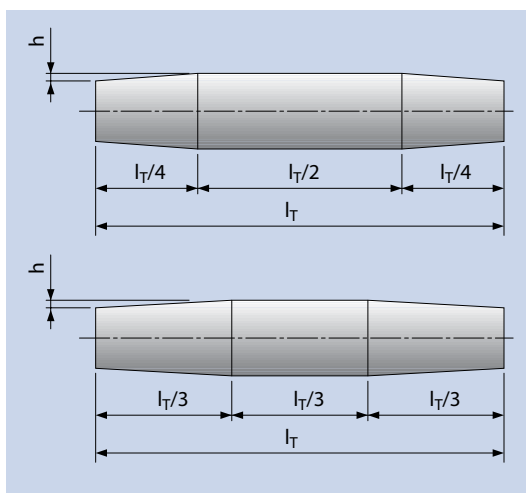
## Length tolerances

Belts without tracking profile: +0/-1.0 [% belt length]

Belts with tracking profile: +0/-1.5 [% belt length]

Take this information into account when placing an order. An appropriate take-up range must be provided for when designing the conveyor.

## Design information for belts without tracking profile



### Drum design

At least one drum must be conical-cylindrical in order to control the belt.

Conicity height h depends on the drum length  $l_T$ :

$l_T$ [mm]	< 200	400–600	600–1000	> 1000
h [mm]	0.4	0.6	1.0	1.2

### Reversing operation

For reversing operation, at least 10 mm play should be allowed for between the edge of the belt and edge of the slider bed.

Recommended design of conical-cylindrical drums

## Drive types

The following types of drums should be used depending on the drive:



### Head drive

Drive drum:

conical-cylindrical

End drum:

cylindrical



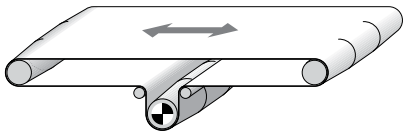
### Tail drive

Drive drum:

conical-cylindrical

End drum:

cylindrical (optionally: conical-cylindrical)



### Center drive and reversing operation

Drive drum:

conical-cylindrical

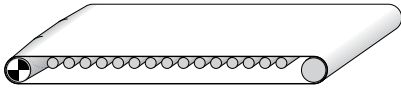
End drum:

conical-cylindrical

Snub roller:

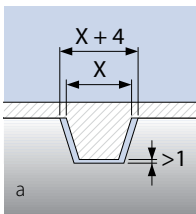
cylindrical

## Rolling support



Rolling support instead of a sliderbed could also be provided and also reduces the effective pull.

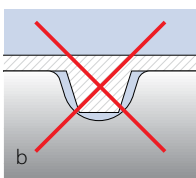
## Design information for belts with tracking profile



Despite the fact that the EL types are very easy to fit, tracking profiles must be applied when using cylindrical rollers.

The following points need to be observed in the process:

- All drums must be cylindrical
- At least one drum has to be adjustable in order to fit the belt
- The drum groove should be a wedge shape as in “a” (parallel to the profile form) and not rounded as in “b”
- The slider bed groove should be designed to comply with “a” and be at least as wide as the drum groove (in the case of very short and wide belts with profiles we advise belt guidance via the drum and not the slider bed – in contrast to the recommendation for long belts).

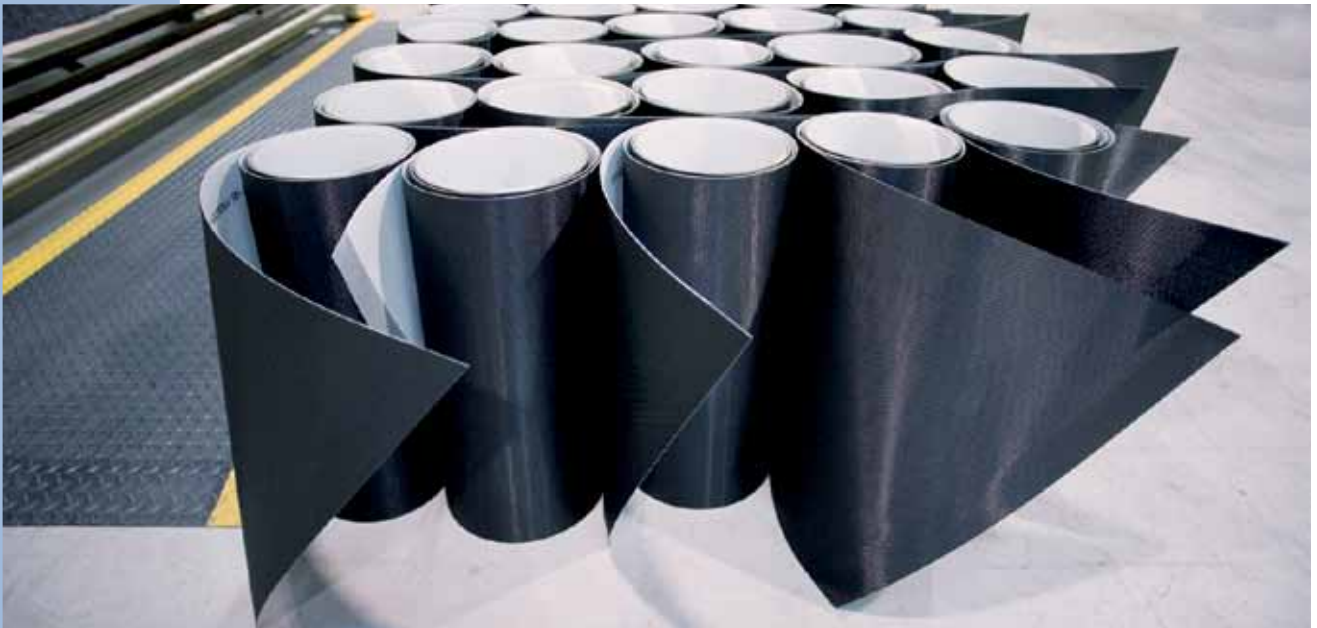


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