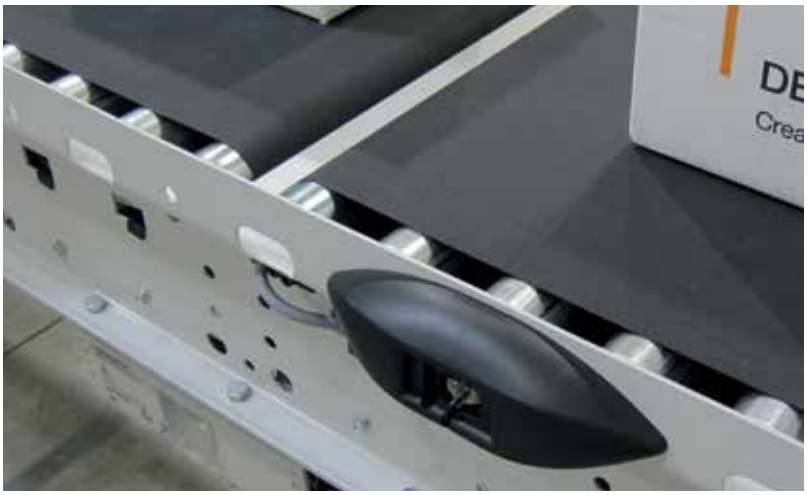
siegling transilon
conveyor and processing belts

ELASTIC BELTS
RECOMMENDATIONS FOR MACHINE DESIGN



Contents

RECOMMENDATIONS FOR MACHINE DESIGN

Calculating the shaft load and elongation at fitting

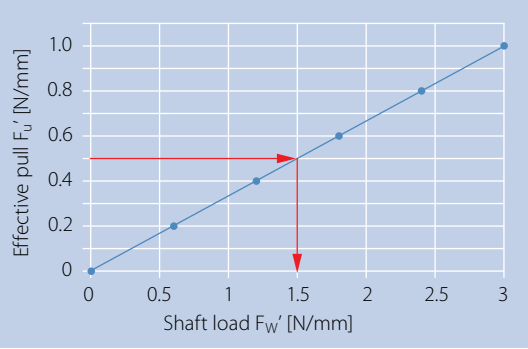


Diagram 1: Calculating the minimum shaft load

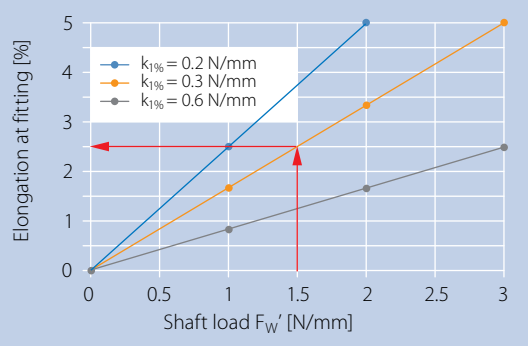


Diagram 2: Calculating elongation at fitting

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]	360	
Conveying speed	[m/s]	2	
Acceleration a	[m/s²]	2	
Friction coefficient μ_{steel}		0.2	(for new belts)
Friction coefficient μ_{steel}		0.3	(on older friction surfaces)
Friction coefficient μ_{Roll}		0.03	(with rolling support)
Friction coefficient $\mu_{galvanized\ steel}$		0.4	(with galvanized support)
relaxed $k_{1\%}$ value		0.3	

$F_u = m \cdot g \cdot \mu + m \cdot a +$ number of returns x 20 N
$= 35\ kg \cdot 9.81\ kg \cdot m/s^2$ x 0.2 + 35 kg · 2 m/s^2 + 2 · 20 N = 179 N
$F_u' = F_u / b = 179\ N / 360\ mm = 0.5\ N/mm$

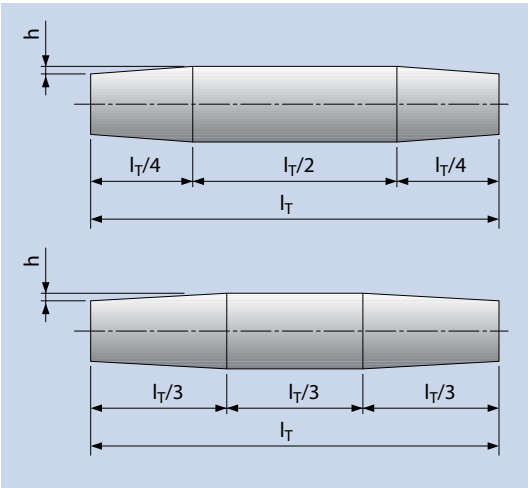
> See diagram 1 for the shaft load (in this example, F_W' = 1.5 N/mm)
> See diagram 2 for the elongation at fitting, in this case, for a belt with a $k_{1\%}$ = 0.3 N/mm

F_W = F_W' x b = 1.5 N/mm x 360 mm **= 540 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



Recommended design of conical-cylindrical drums

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.

Drive types

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

Head drive

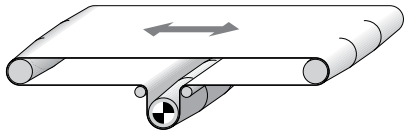
Drive drum: conical-cylindrical

End drum: cylindrical

Tail drive

Drive drum: conical-cylindrical

End drum: cylindrical (optionally: conical-cylindrical)



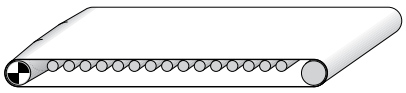
Center drive and reversing operation

Drive drum: conical-cylindrical

End drum: conical-cylindrical

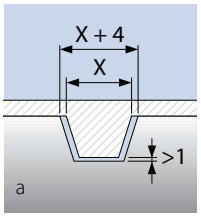
Snub roller: cylindrical

Rolling support



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

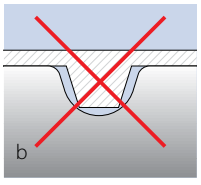
Design information for belts with tracking profile



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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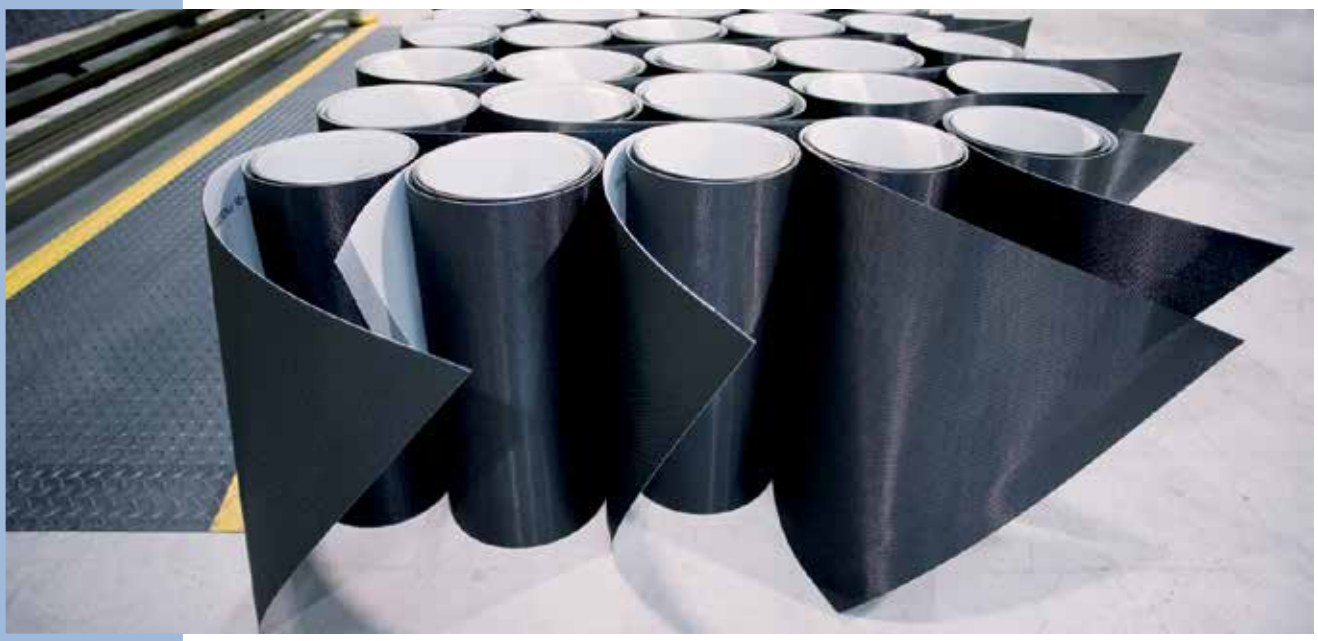

Our service – anytime, anywhere

Forbo Movement Systems employs around 2,500 people in its group of companies. Our products are manufactured in ten production facilities across the world.
You can find companies and agencies with warehouses and workshops in over 80 countries.
Service points are located in more than 300 places worldwide.

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