

## T-Rex Rubber International ..... at your service !

with belt types and qualities for virtually every area of  
conveyor belt technology in every circumstance imaginable



TSN International is gradually finding its way into Europe, becoming the international partner with the complete product package for every vulcanising company.

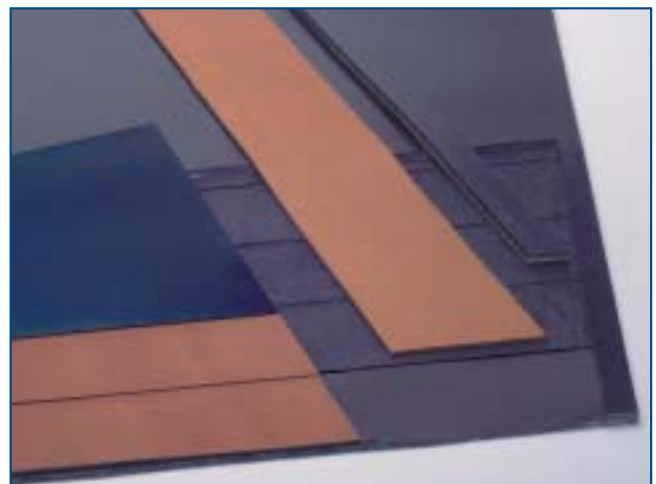
This remarkable growth over the last few years is the result of intense contact with all industrial sector where rubber conveyor belts are used.

Therefore TSN International understands the needs of their vulcanising colleagues abroad and can offer the best solution from own experience. TSN International can not only offer a constructive and innovating contribution to several technical developments in the application of rubber conveyor belts, but the synergy between both parties also leads to the mutual benefit that TSN International can utilize their ample technical knowledge and years of experience in the field to assist their international colleagues in successfully operating in their own home market.

In this brochure you will find a general overview of rubber conveyor belts. With a schematic set-up the belt widths and the structure of conveyor belts are shown, conform the international values (DIN22.102 and ISO 251). This assembly leads to the abbreviated type nomination of the conveyor belts. Furthermore one can determine, with the aid of a table, which is the minimal drum diameter required for a specific belt type.

Next to the 'normal' quality conveyor belting (conveyor belts in general industrial applications), these values also apply to special rubber quality conveyor belting.

Examples of these are heat resistant, flame retarding, oil and grease resistant, conveyor belts with chevron and also qualities such as 'RIP STOP', 'AUTOSTABLE' or any other conveyor belt type with steel cord plies. For the detailed information we refer to our documentation.

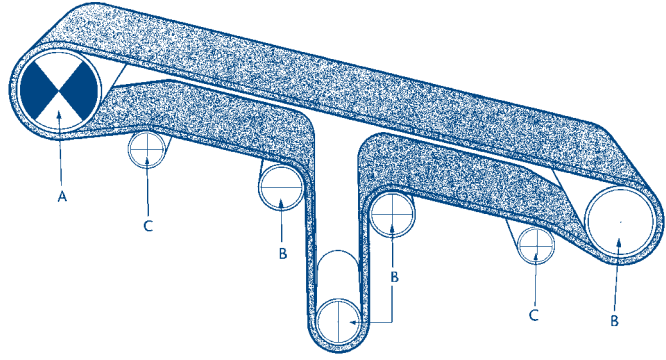


## Minimal drum diameters:

In general the drum diameters are determined by the thickness (number of plies) of the conveyor belt.

Next to that, the degree of loading is important. In the table shown below the calculation is made with a degree of loading of 65-100% and with the most applied plies. For example, if the conveyor belt has a longitudinal strength of (EP)500 N/mm and the belt has 4 plies, then the relevant information can be found in the table under EP125. On the horizontal line of the number of plies one has to look under the four.

The drum diameters A, B and C will then be respectively 400 mm, 320 mm and 250 mm.



Nr. of plies	EP100			EP125			EP160			EP200			EP250 + EP315		
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
2	160	160	125	200	160	160	250	200	160	320	250	200	-	-	-
3	200	200	160	320	250	200	400	320	250	500	400	320	630	500	400
4	320	250	200	400	320	250	500	400	320	630	500	400	800	630	500
5	400	320	250	500	400	320	630	500	400	800	630	500	1000	800	630
6	-	-	-	630	500	400	800	630	500	1000	800	630	1200	1000	800

\*When dealing with lesser belt tensions or lower degrees of loading smaller drum diameters may be applied after consultation.

## Tension length:

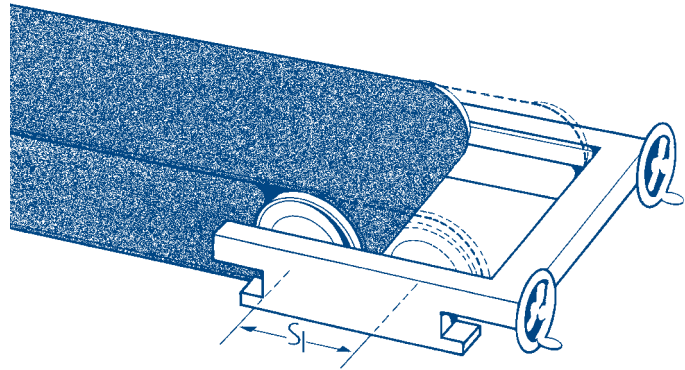
Theoretically the minimal tension length (in mm) of the rubber conveyor belt with an EP-fabric carcass is calculated with the formula  $SL = 1,5\% Lc$ . Lc stands for the distance (in mm) between both drums of the installation.

Example:

Pitch installation: 43.300 mm (x 1,5 %)

minimal tension length: 650 mm

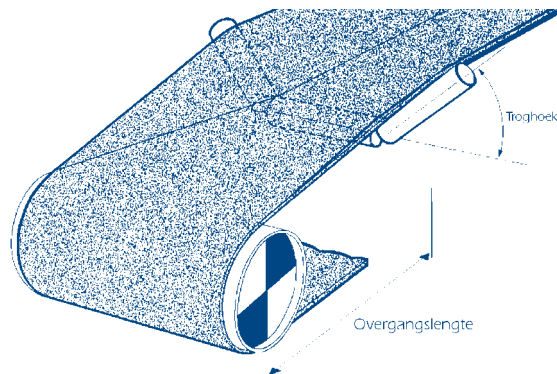
Depending on, amongst other things, the belt width, the degree of loading and the company circumstances (see "cover thickness"), is the maximal length Lc 60.000 to 72.000 mm of a conveyor installation, which is executed with a conventional tensioning unit. When dealing with longer pitches often so called weight-tensioning units are applied.



SL = Tension length

## Transition length:

The transition length is the length between the heart of the drive or tensioning drum and the heart of the roller of the next or previous throughing idler assembly. For the protection of these rollers, the life expectancy of the rubber conveyor belt on the edges and to improve the "tracking" of the conveyor belt one should take into account (depending on the throughing angle) a minimal transition length, as follows:



Throughing angle	Belt width																
	300	400	500	650	800	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3200
20°	250	330	410	540	660	830	1000	1160	1320	1490	1650	1820	1980	2150	2310	2480	2640
30°	260	350	430	560	690	870	1040	1210	1380	1560	1730	1900	2080	2250	2420	2600	2770
45°	-	-	-	830	1020	1270	1520	1780	2030	2290	2540	2790	3050	3300	3560	3810	4060

## Belt length

TSN International supplies rubber conveyor belts with an endless length, conform the conditions mentioned below, in the Dutch market and conveyor belts with an open length to their vulcanising colleagues abroad, who do the jointing.

Net length (measured on return part) in mm	Length tolerance
up to 15.000	± 50 mm
from 15.000 to 20.000	± 75 mm
over 20.000	± 0,5 %

The length tolerances according to the international standards also apply to the open length conveyor belts. In short this means that a tolerance of plus 2,5 % for a conveyor belt measured in the workshop and a tolerance of plus / minus 5 % for a conveyor belt in a full roll (directly from factory).

## Belt width

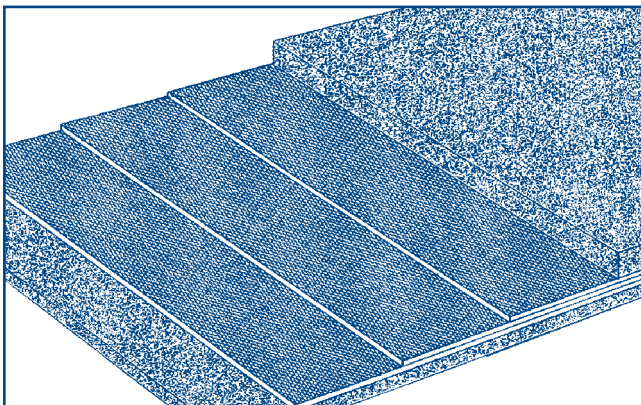
The belt widths are internationally normalised according to DIN 22.102-1/04-91 and ISO 251/1987 and are indicated in millimeters, as follows:

Belt width (mm)	Width tolerance
300 - 400 - 500	± 5 mm
650-800-1000-1200-1400-1600-1800- 2000-2200-2400-2600-2800-3000-3200	+/- 1 %
Other belt widths on demand	

## Structure of rubber conveyor belts

Simply put, a rubber conveyor belt consists of four parts, as follows: a top cover, the fabric carcass (plies), a bottom cover and the sides. The fabric carcass is the most important part because it needs to absorb the tensile forces, carry the weight (of the transported material) and deal with the mechanical circumstances.

To protect the fabric carcass, rubber covers are placed on both sides. Depending on the type of fabric, it may be necessary to complete the conveyor belt with moulded or closed (meaning with rubber) edges.



## Fabric plies

The fabric package can be constructed from a maximum of six plies, which are connected together by intermediate rubber. The fabric plies can be made up of several materials:

Nomination	Ply-material
B	Cotton
Z	Cell tissue
P	Polyamid (nylon)
E	Polyester
D	Aramid
G	Glass fiber

Nowadays the plies are mainly made from fully-synthetic materials, because these materials have the proper qualities to obtain the best results, as experience has shown. This fabric carcass consists of polyester threads (E) lengthwise and polyamid strands widthwise, together named EP. These EP-fabric plies are very well suited for the absorption of high tensile strengths yet stretch very little. Next to that, they possess very good qualities such as resistancy to many chemicals, impact resistancy, proper adhesion, and insensitivity to moisture and damp.

The fabric package indicates the tensile strength lengthwise. This value, the tensile strength of the complete fabric carcass, is always shown in N / mm belt width.

The normalised values for the tensile strength of the plies separately are:

63 - 80 - 100 - 125 - 160 - 200 - 250 - 315 - 400 - 500 - 630 (N/mm)

The tensile strength of the complete fabric package is the sum of the number of plies, rounded off to the nearest strength. The normalised values (DIN 22.102-1 / 04-91) of the complete carcass are:

200-250-315-400-500-630-800-1000-1250-1600-2000-2500-3150 (N/mm)

## Examples:

- EP 200/2 : 2- ply belt, per ply 100 N/mm,  
accumulated tensile strength 200 N/mm
- EP 400/3 : 3- ply belt, per ply 125 N/mm,  
accumulated tensile strength 400 N/mm
- EP 630/4 : 4- ply belt, per ply 160 N/mm,  
accumulated tensile strength 630 N/mm
- EP 1000/5 : 5- ply belt, per ply 200 N/mm,  
accumulated tensile strength 1000 N/mm

## Cover thickness

The thickness of the top cover (conveying side) and bottom cover (run side) is noted in millimeters (mm). The thickness of the top cover depends mainly on the material that needs to be transported and the conveyor features such as the way of loading, the drop height, angle of the conveyor, etc. The bottom side of the fabric carcass is protected from the conveyor rollers by a rubber bottom cover. The so-called min-tolerance of the cover thickness may not be more than a maximum of 0,2 mm with thicknesses of 4 mm and no more than a maximum of 5 % with thicknesses of over 4 mm. There is no regulating for the max-tolerance of the cover thickness.

## Cover quality

The quality and the nature of the surface (smooth of with profile) need to be adjusted to the conveyed material and operation-circumstances. The quality of the rubber and the demands thereof with regards to the wear resistancy and such, need to comply with the DIN or ISO standard.

DIN 22.102-1/04-91:

Quality of the cover	W	X	Y	Z
tensile strength min. (N/mm)	18	25	20	15
allongation at break min. (%)	400	450	400	350
wear resistancy min. (mm3)	90	120	150	250

ISO 10.247 (1990):

Quality of the cover	H	D	L
tensile strength min. (N/mm)	24	18	15
allongation at break min. (%)	450	400	350
wear resistancy min. (mm3)	120	100	200

Bovengenoemde waarden gelden niet voor de speciale transportbanden met de technische eigenschappen volgens de aanduiding T, G, A en C.

Furthermore the DIN 22.102-1/04-91 norm acknowledges special qualities / characteristics for which no mechanical values have been set.

Nomination	Technical feature
E	anti-static covers
K	anti-static and inflammable (flame retardent) covers
S	completely inflammable and anti-static
T	heat resistant
R	cold resistant
G	oil and grease resistant
A	food quality
C	chemical products quality

## Belt thickness

The thickness of a rubber conveyor belt depends on the structure of the belt. According to the DIN standard 22.1022-1/04-91 the following tolerances in belt thicknesses are applied. Thickness up to 10 mm: deviation  $\pm 1$  mm; thickness from 10 mm and up: deviation  $\pm 10$  %.

## Belt sides

Rubber conveyor belts can be supplied with moulded (full rubber) sides or with cut (sealed) edges. When dealing with fully synthetique fabric plies it is not necessary to apply conveyor belts with moulded edges.

## Belt jointing

Depending on many factores rubber conveyor belts can be vulcanised cold or warm. Also jointing by means of a mechanical connection is possible. For more detailed infromation on belt jointing we referr to the DIN 22.102-3/04-91 (vulcanized belt jointing for textile-ply conveyor belts) and the DIN 22.131-4 /04-89 (belt jointing for steelcord-ply conveyor belts).

### Example of a smooth conveyor belt

Belt length (open)	75,0 m
Belt width	1000
Fabric type	EP
Tensile strength of the belt (N/mm)	400 / 3
Nr. of plies	4 + 2 mm
Top cover thickness	
Bottom cover thickness	
Cover quality	Y

\*Other special type and quality appellation can be put behind the cover quality.