

## MATERIALS [POLYPROPYLENE]

*STANDARD POLYPROPYLENE (PP)*

Temperature range	+1 °C to +104 °C
Available colours	White Grey Blue
Fit for food industry	Suitable

It is the basic material in order to manufacture conveyor belts for most of processes, both in food industry and in industry generally speaking.

With a good mechanic resistance, and a temperature range from +1 °C to +104 °C, it has a specific gravity of approximately 0.9, and it floats in the water.

Given its excellent chemical resistance to most of the acids and concentrated bases, salts, and detergents, it is essential for corrosive work environments.

It is very resistant to penetration of micro organisms.

Though it has a resistance to impact close to 3.5 kJ/m<sup>2</sup>, it becomes slightly fragile at temperatures below 9 °C. That is why it is not recommended for processes in which there will be strong impacts on the belt.

It observes the International Regulations to be used in food processes.

*ELECTRICALLY CONDUCTIVE  
POLYPROPYLENE (PPE)*

Temperature range	+1 °C to +104 °C
Available colours	Black
Fit for food industry	Unsuitable

Polypropylene with a very low resistivity rate, both volumetric and superficial, being ideal for those applications in which it is necessary to dispel the electrostatic charges, created on the belt, through the conveyor's structure.

Specially indicated for conveyance applications in environments classified as ATEX.

Unsuitable for direct contact with food.

Ask for availability and delivery time according to belt types and series.

## MATERIALS [POLYETHYLENE]

*STANDARD POLYETHYLENE (PE)*

Temperature range	-50 °C to +65 °C
Available colours	Natural Blue
Fit for food industry	Suitable

Thanks to a temperature range from -50 °C to +65 °C, it is the most suitable material for belts to be used in freezing processes.

With a specific gravity of 0.95 approximately, it floats in the water. It stands out for its excellent resistance to impact and fatigue, and for its flexibility.

Good chemical resistance to many acids and concentrated bases, salts, and detergents.

Its low coefficient of friction provides excellent sliding properties, with a minimum of adherence and absorption.

It observes the International Regulations to be used in food processes.

*ELECTRICALLY CONDUCTIVE  
POLYETHYLENE (PEE)*

Temperature range	-50 °C to +65 °C
Available colours	Black
Fit for food industry	Unsuitable

Polyethylene with a very low coefficient of resistivity, both volumetric and superficial, which makes it ideal for those applications in which it is necessary to dispel the electrostatic charges, created on the belt, through the conveyor's structure.

Special for conveyance applications at low temperatures in environments classified as ATEX.

Unsuitable for direct contact with food.

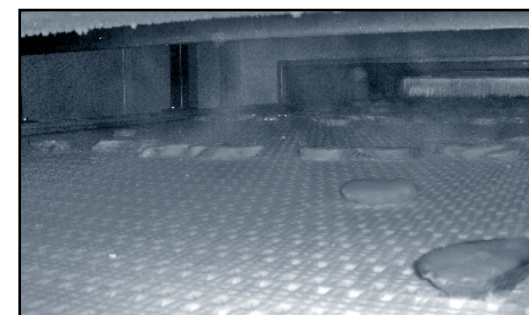
Ask for availability and delivery time according to belt types and series.

*UV-RAYS POLYETHYLENE*

We have a black polyethylene resistant to UV rays for conveyor belts to be used in applications that will be out in the open, at low temperatures, and exposed to solar radiation.

Black colour.

Ask for availability and delivery time according to belt types and series.



## MATERIALS [POLYACETAL]

## STANDARD POLYACETAL (AC)

Temperature range	-40 °C to +90 °C
Available colours	White Grey Blue
Fit for food industry	Suitable

With a specific gravity of 1.5 approximately, the technical polyacetals are thermoplastics of low friction coefficient with the greatest resistance to scratching and breakage. That is why it is the material used in accumulation tables for all kind of containers, as it avoids any damage on the product surface, as well as crushing.

Its great mechanical resistance enables it to transport heavy loads.

With a wide temperature range from -40 °C to +90 °C, it is used for manufacturing belts that will convey heavy loads and in applications involving the use of sharp tools.

It has a good chemical resistance to solvents, greases, and a large list of chemicals.

It observes the International Regulations to be used in food processes.

ELECTRICALLY CONDUCTIVE  
POLYACETAL (ACE)

Temperature range	-40 °C to +90 °C
Available colours	Black
Fit for food industry	Unsuitable

Polyacetal with a very low resistivity rate, both volumetric and superficial, being ideal for those applications in which it is necessary to dispel the electrostatic charges, created on the belt, through the conveyor's structure.

Unsuitable for direct contact with food.

Ask for availability and delivery time according to belt types and series.

POLYACETAL DETECTABLE BY METAL  
DETECTORS (ACD)

Temperature range	-40 °C to +80 °C
Available colours	Blue
Fit for food industry	Suitable

This material has the capability of altering the electromagnetic fields of the metal detectors. It is used in belts for lines in which avoiding any plastic particle to get mixed with the product is required.

Suitable for direct contact with food.

Ask for availability and delivery time according to belt types and series.

## MATERIALS FOR SPECIAL APPLICATIONS

## NYLON (PA)

Belts manufactured in nylon have a good geometrical stability with regard to heat, as well as both a great hardness and rigidity.

They are also characterized by their retarded wear in abrasive and dry environments.

Having a high hygroscopic level, this material is not recommended to be used in humid environments, as the belt dimensions would vary visibly.

We have two types:

**Nylon in black colour:** Unsuitable for direct contact with food.

Stable with regard to heat at temperatures up to 140 °C if working continuously, and up to 180 °C in specific peaks. In case of extreme temperatures, the decrease of its mechanical properties must be taken into account.

Its rate of inflammability is HB (Test method UL94 rating at 1.6 mm thickness).

**Nylon in natural colour:** Suitable for direct contact with food, except for those containing alcohol.

Stable with regard to heat at temperatures up to 120 °C if working continuously, and up to 135 °C in specific peaks.

Likewise, in case of extreme temperatures, the decrease of its mechanical properties must be taken into account.

Its rate of inflammability is V-2 (Test method UL94 rating at 1.6 mm thickness).

Ask for availability and delivery time according to belt types and series.

## THERMOPLASTIC ELASTOMERS (TPE)

It is a thermoplastic vulcanized, flexible and with a very good adherence. It is used for obtaining the maximum grip of the product to the transport surface in order to prevent it from sliding in incline conveyors.

Good resistance to fatigue, oil, and chemicals in general.

The temperature range runs from -40 to 100 °C.

When designing an application with belts manufactured in this material, we should take into account:

- The environmental conditions regarding the work area (temperature, humidity, possible spilling of liquids, etc.).

- The geometrical peculiarities of the application (inclination degrees, speed, possible vibrations, etc.).

- The characteristics of the product (weight, dimensions, material of its packing, etc.).

- The belt return way will be designed avoiding always the friction of the rubber on the support surfaces, on the inverse turn rollers, etc.

We have three hardness grades:

**Shore A35**, in grey colour, suitable for direct contact with food.

**Shore A45**, in black colour, unsuitable for direct contact with food.

**Shore A60**, in beige colour, suitable for direct contact with food.

Ask for availability and delivery time according to belt types and series.

MATERIALS FOR SPECIAL APPLICATIONS

MATERIAL DETECTABLE BY X-RAYS  
DETECTORS (ACX)

Temperature range	-40 °C to +80 °C
Available colours	White
Fit for food industry	Suitable

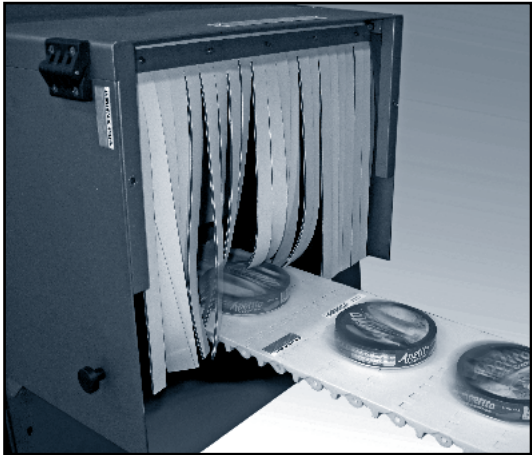
Material that can be detected by the X-rays. Spherical particles with a diameter of hardly 2.5 mm have been detected in tests carried out in a production line by a Dylog X-rays detector.

Exceptional for processes in which the removal of any polluting particle is essential or in which a high security control is required.

In white colour, its work temperature range runs from -40 to +80 °C.

Suitable for direct contact with food.

Ask for availability and delivery time according to belt types and series.



WEAR-RETARDANT MATERIAL

Special material to prolong the average life of the belts, as their wear gets reduced when working in abrasive environments.

It is used in all those applications in which the belt is exposed to scratches due to the abrasion caused by the product itself or by other elements like sand, abrasive dust, etc.. conveyed together with it.

Unsuitable for direct contact with food.

Ask for availability and delivery time according to belt types and series.

FLAME-RETARDANT

With good mechanical properties and chemical resistance, it is retardant to the flames with an inflammability rate of V-0 (Test method UL94).

As it is lubricated, it has both a very low absorption rate and friction coefficient.

This material is not suitable for direct contact with food, and its work temperature range runs from -20 to +60 °C.

Ask for availability and delivery time according to belt types and series.

HIGH TEMPERATURE MATERIAL

This material is one of the most important polymers due to its excellent properties.

- Continuous working temperature up to 200 °C.
- High fatigue resistance, both mechanical and chemical.
- Flame retardant, V-0 inflammability ratio.
- Low water absorption, near zero (0.02%)
- Suitable for direct contact with food.

Ask for availability and delivery time according to belt types and series

TABLE OF MATERIALS AND COLOURS IN STOCK

TYPE		PP			PE		AC			PPE	
		W	G	B	N	B	W	B	N	O	
SERIES C12											
FT	FLAT TOP	•	•	•	•	•		•			
FG	FLUSH GRID	•	•	•	•	•		•	•		
SERIES E20											
FT	FLAT TOP	•	•	•	•	•		•			
FG	FLUSH GRID	•	•	•	•	•		•			
RR	RAISED RIB		•					•			
TF	TRIAN FRICTION	On Request <a href="#">[page 188]</a>									
TR	TRIAN	•			•			•			
SR	SLIDING ROLLER	On Request <a href="#">[page 188]</a>									
SERIES A24											
FT	FLAT TOP	•	•	•	•	•		•	•		
FG	FLUSH GRID	•	•	•	•	•		•	•		
RR	RAISED RIB		•					•			
SERIES E30											
FT	FLAT TOP	•	•	•	•			•			
PF	PERFORATED	•	•		•			•			
OG	OPEN GRID	•			•			•			
FG	FLUSH GRID	•	•		•	•		•			
RR	RAISED RIB		•					•			
TF	TRIAN FRICTION	On Request <a href="#">[page 188]</a>									
FF	FLAT FRICTION										
SR	SLIDING ROLLERS										
SERIES E31											
LT	LATERAL TRANSFER							•			
SERIES E32											
FT	FLAT TOP - 82,5 mm							•			
FT	FLAT TOP - 114,3 mm							•			
FT	FLAT TOP - 152,4 mm							•			
FT	FLAT TOP - 190,5 mm							•			

Materials: [\[PP\]](#) Polypropylene - [\[PE\]](#) Polyethylene - [\[AC\]](#) Polyacetal - [\[PPE\]](#) Electrically Conductive Polypropylene  
Colours: [\[W\]](#) White - [\[G\]](#) Grey - [\[B\]](#) Blue - [\[N\]](#) Natural - [\[O\]](#) Black  
The materials and colours that are normally in stock are those above indicated. In special cases in which it is needed a belt in a material or colour different from those above mentioned, you should ask directly to EUROBELT.

TABLE OF MATERIALS AND COLOURS IN STOCK

TYPE		PP			PE		AC			PPE
		W	G	B	N	B	W	B	N	O
SERIE E40										
FT	FLAT TOP	•	•		•			•		
FG	FLUSH GRID	•	•		•			•		
NS	NON SLIP									•
SR	SLIDING ROLLERS	On Request <a href="#">[page 188]</a>								
SERIE E41										
RR	RAISED RIB		•							
SERIE E50										
FT	FLAT TOP	•	•		•	•				
PF	PERFORATED	•	•		•					
FG	FLUSH GRID	•	•		•	•				
OG	OPEN GRID	•		•	•	•				
OH	OPEN GRID HIGH	•		•	•	•				
KN	KNURLED	•	•					•		
CO	CONIC	•	•		•			•		
TF	TRIAN FRICTION	On Request <a href="#">[page 188]</a>								
CF	CONIC FRICTION									
SR	SLIDING ROLLERS									
SERIE B50										
FT	FLAT TOP	•		•	•	•	•			
PF	PERFORATED	•		•	•	•	•			
FG	FLUSH GRID	•		•	•	•	•			
SERIE E80										
FT	FLAT TOP	•	•	•	•			•	•	
PF	PERFORATED	•	•		•			•	•	
SERIE E93										
SL	FLUSH GRID - Without Edge Tab	•	•		•			•	•	
CL	FLUSH GRID - With Edge Tab	•	•		•			•	•	
CO	CONIC	•	•		•			•	•	
CF	CONIC FRICTION	On Request <a href="#">[page 188]</a>								
SR	SLIDING ROLLERS									

Materials: [\[PP\]](#) Polypropylene - [\[PE\]](#) Polyethylene - [\[AC\]](#) Polyacetal - [\[PPE\]](#) Electrically Conductive Polypropylene  
Colours: [\[W\]](#) White - [\[G\]](#) Grey - [\[B\]](#) Blue - [\[N\]](#) Natural - [\[O\]](#) Black  
The materials and colours that are normally in stock are those above indicated. In special cases in which it is needed a belt in a material or colour different from those above mentioned, you should ask directly to EUROBELT.

MATERIALS AND COLOURS - FRICTION TOP BELTS

TYPE		RUBBER		PP			PE	
		HARDNESS	COLOURS	W	G	B	N	B
SERIES E20								
TF	TRIAN FRICTION	A60	BEIGE	●	●		●	
SERIES E30								
TF	TRIAN FRICTION	A35	GREY	●				
		A45	BLACK		●			
		A60	BEIGE	●			●	
FF	FLAT FRICTION	A35	GREY	●				
		A45	BLACK		●			
		A60	BEIGE	●			●	
SERIES E50								
TF	TRIAN FRICTION	A60	BEIGE	●	●		●	●
CF	CONIC FRICTION			●	●		●	●
SERIES E93								
CF	CONIC FRICTION - Without Edge Tab	A60	BEIGE	●	●		●	
	CONIC FRICTION - With Edge Tab			●	●		●	

The materials and colours that are normally in stock are those above indicated. In special cases in which it is needed a belt in a material or colour different from those above mentioned, you should ask directly to EUROBELT.

MATERIALS AND COLOURS - SLIDING ROLLERS BELTS

TYPE		DIAMETER ROLLER	PP			PE		AC		
			W	G	B	N	B	W	B	N
SERIES E20										
FG	FLUSH GRID	Ø 15 MM	●	●	●	●	●		●	
SERIES E30										
FG	FLUSH GRID	Ø 15 MM	●	●	●	●			●	
SERIES E40										
FG	FLUSH GRID	Ø 25 MM	●	●		●			●	
SERIES E50										
FG	FLUSH GRID	Ø 25 MM	●	●		●	●			
OG	OPEN GRID		●	●		●	●			
SERIES E93										
FG	FLUSH GRID - Without Edge Tab	Ø 20 MM	●	●		●			●	●
	FLUSH GRID - With Edge Tab		●	●		●			●	●

The materials and colours that are normally in stock are those above indicated. In special cases in which it is needed a belt in a material or colour different from those above mentioned, you should ask directly to EUROBELT.

Materials:  
[\[PP\]](#) Polypropylene  
[\[PE\]](#) Polyethylene  
  
Colours:  
[\[W\]](#) White  
[\[G\]](#) Grey  
[\[B\]](#) Blue  
[\[N\]](#) Natural

Materials:  
[\[PP\]](#) Polypropylene  
[\[PE\]](#) Polyethylene  
[\[AC\]](#) Polyacetal  
  
Colours:  
[\[W\]](#) White  
[\[G\]](#) Grey  
[\[B\]](#) Blue  
[\[N\]](#) Natural



EFFECTS CAUSED BY THE TEMPERATURE

DIMENSIONAL VARIATIONS IN THE BELT

The plastic materials undergo dimensional variations, expansions or contractions, when they are exposed to temperature changes with regard to a room temperature of 21° C.

These dimensional variations must be taken into consideration when designing and building the conveyor for its proper functioning.

Therefore the conveyor will have to be designed so that it allows to absorb the longitudinal variations in the return way and the width variations in the frame sides.

In order to calculate the expansions or contractions both of the belt and the wearstrips, the formulae below will be applied:

VARIATION IN THE BELT LENGTH:

$$\Delta = L.\text{Initial} \times (T.\text{Final} - T.\text{Initial}) \times \alpha$$

- Δ (mm) :

Dimensional variation in the belt length.  
- A positive value shows an expansion.  
- A negative value shows a contraction.
- L.Initial (mtr.):

Belt length at the initial temperature.
- T.Final (°C):

Final temperature of the application.
- T.Initial (°C):

Initial temperature of the application.
- α (mm/mtr/°C):

Thermic expansion coefficient.

VARIATION IN THE BELT WIDTH:

$$\Delta = A.\text{Initial} \times (T.\text{Final} - T.\text{Initial}) \times \alpha$$

- Δ (mm):

Dimensional variation in the belt width.  
- A positive value shows an expansion.  
- A negative value shows a contraction.
- A.Initial (mtr.):

Belt width at the initial temperature.
- T.Final (°C):

Final temperature of the application.
- T.Initial (°C):

Initial temperature of the application.
- α (mm/mtr/°C):

Thermic expansion coefficient.

THERMIC EXPANSION COEFFICIENTS

Belts	(mm./m./°C)	(inch/foot/°F)
Polypropylene (below 38° C)	0.12	0.0008
Polypropylene (above 38° C)	0.15	0.0010
Polyethylene	0.17	0.0011
Acetal	0.09	0.0006
Wearstrips	(mm./m./°C)	(inch/foot/°F)
HDPE	0.17	0.0011

Example:

Product transport application under the conditions below:

- Belt material: polypropylene (.... according to the table).
- Length: 20 m. (Linitial).
- Width: 1 m. at 21° C (A.Initial and T.Initial).
- Final working temperature: 80° C (T.Final).

Applying the above formulae we will obtain:

Length Δ : 20 x (80-21) x 0,15 = 177 mm.

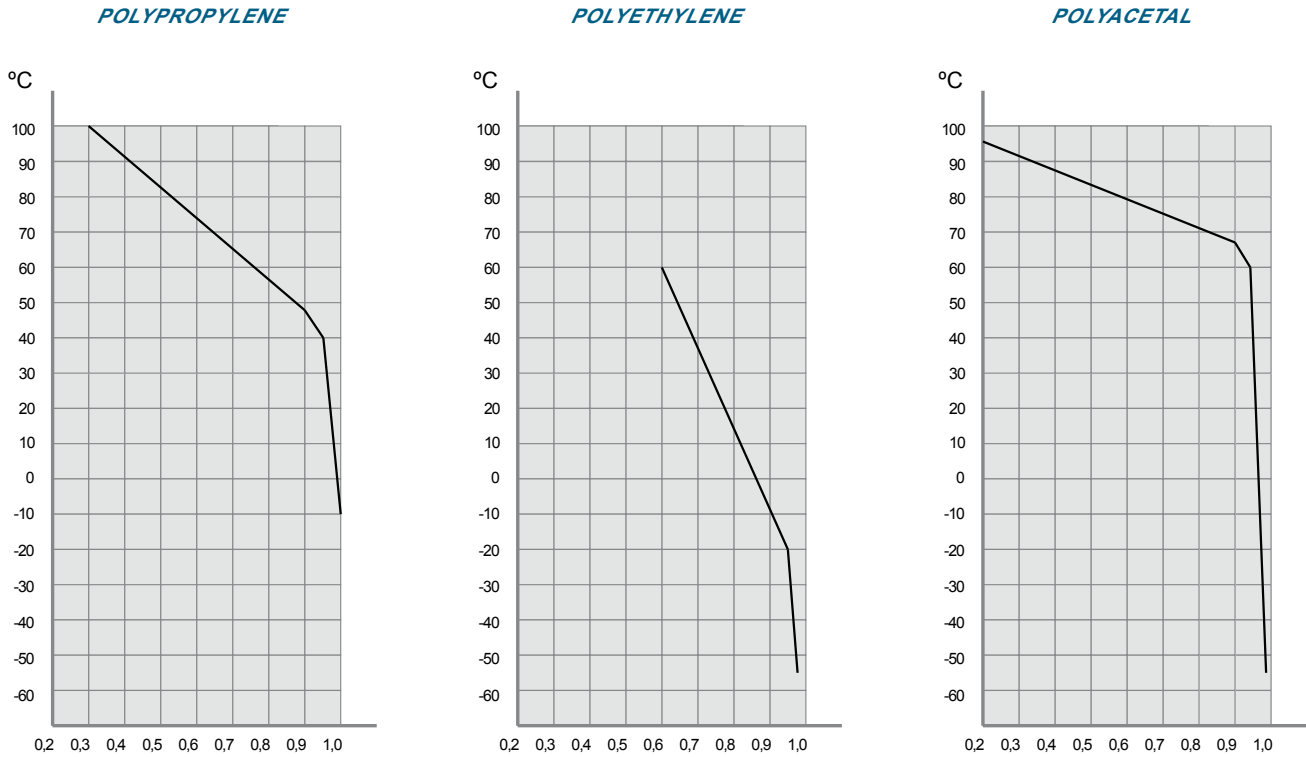
Width Δ : 1 x (80-21) x 0,15 = 8,85 mm.

Therefore, whenever we carry out the conveyor design it will have to be taken into consideration that 177 mm must be absorbed by their catenaries in the return way, otherwise by its take up, and 8.85 mm by the conveyor sides for its proper functioning.

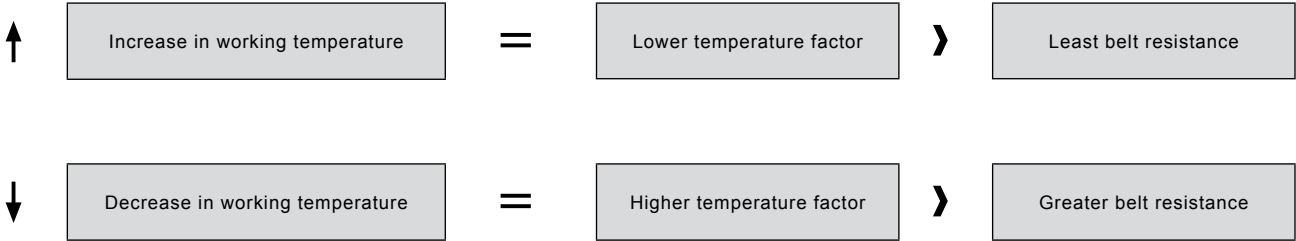
VARIATIONS IN THE MECHANICAL PROPERTIES OF THE BELT

All plastic materials undergo changes in their properties when they are subject to temperature variations.

These variations determine a Temperature Factor (CT) that has an influence on the belt resistance and that must be taken into consideration when making the feasibility calculations of the application and when choosing the most appropriate belt and material.



It can be observed in the above graphics that:



Likewise it will have to be taken into consideration that the lower the temperature is, the more brittle the belt surface is, which is important in applications with impacts.

EFFECTS CAUSED BY THE FRICTION

FRICTION BETWEEN THE BELT AND THE SUPPORT SURFACES

The belt movement entails a negative strength caused by the friction between the support surfaces of the belt and the belt itself due to the belt weight and that of the product conveyed.

This friction determines a Friction Factor (CF) that must be taken into consideration for calculating the feasibility of the application as well as for the belt choice.

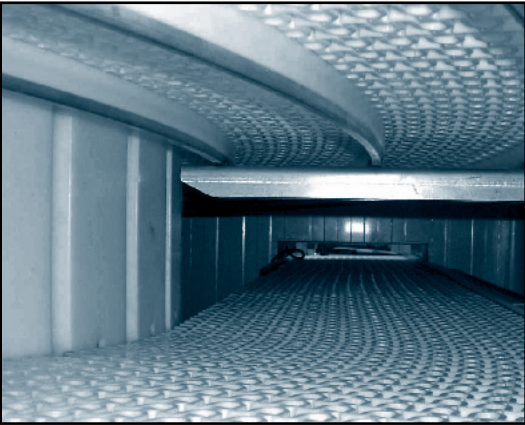
Small values of this factor will imply softer belt movements, less wear, a lower motor power, and a longer useful life of the belt.

The most common values for this Friction Factor are:

FRICTION FACTOR (CF) BETWEEN THE BELT AND THE SUPPORT SURFACE

SUPPORT SURFACE MATERIALS	POLYPROPYLENE				POLYETHYLENE				ACETAL			
	SMOOTH SURFACE		ABRASIVE SURFACE		SMOOTH SURFACE		ABRASIVE SURFACE		SMOOTH SURFACE		ABRASIVE SURFACE	
	HUMID	DRY	HUMID	DRY	HUMID	DRY	HUMID	DRY	HUMID	DRY	HUMID	DRY
U.H.M.W.	0.11	0.13	NR	NR	0.24	0.32	NR	NR	0.10	0.10	NR	NR
H.D.P.E.	0.09	0.11	NR	NR	NR	NR	NR	NR	0.09	0.08	NR	NR
Nylon impregnated with molybdenum or silicone	0.24	0.25	0.29	0.30	0.14	0.13	NR	NR	0.13	0.15	NR	NR
Stainless steel or carbon steel cold rolled	0.26	0.26	0.31	0.31	0.14	0.15	NR	NR	0.18	0.19	NR	NR

[NR] Not recommended



FRICTION BETWEEN THE BELT AND THE TRANSPORTED PRODUCT

In some applications there can be other type of negative forces caused by the friction between the belt contact surface and that of the product which appears when the belt is running and the product stops on its surface. A characteristic example is that of the accumulation tables.

The Factor of Friction by Accumulation ( $C_{AC}$ ) will have to be taken into account for calculating the feasibility of our application as well as for the belt choice.

As in the previous case, small figures of this Factor will imply softer belt movements, less belt wear and fewer damages on the product surface, a lower motor power, and a longer useful life of the belt.

The most common values of this Factor are:

FRICTION FACTOR BETWEEN THE BELT AND THE PRODUCT ( $C_{Ad}$ )

MATERIAL OF TRANSPORTED PRODUCT	POLYPROPYLENE		POLYETHYLENE		ACETAL	
	HUMID	DRY	HUMID	DRY	HUMID	DRY
GLASS	0.18	0.19	0.08	0.09	0.13	0.14
STAINLESS STEEL	0.26	0.32	0.10	0.13	0.13	0.13
PLASTIC	0.11	0.17	0.08	0.08	0.13	0.16
CARDBOARD	—	0.21	—	0.15	—	0.18
ALUMINIUM	0.40	0.40	0.20	0.24	0.33	0.27

The above friction values are theoretical and can be altered according to other factors like high speed, heavy load, and working conditions, dirty or abrasive environments, etc.

