10. Construction / Installation Instruction

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Construction (A)

Construction of conveyors using ScanBelt modular belts

The construction and assembly of conveyor systems using ScanBelt modular belts are not significantly different from conveyor systems utilising other belt types. There are, however, certain points which we would like to emphasise. Therefore we have prepared general assembly guidelines, which we hope will be helpful when designing and constructing a conveyor system.
Note that belt widths under 500 mm have a tolerance of ±3 mm and belt widths over 500 mm have a tolerance of ±6 mm.

There are 3 diagrams illustrating horizontal conveyor systems.

Fig. 1 relates to short lightly loaded conveyor systems. This type of construction means the belt is tightened and tensioned by adjustment at one or both shafts. This conveyor system can be used in a reversing operation. It is important to be aware of temperature fluctuations when using this type of construction. In the event of low temperatures, the belt will contract significantly. At high temperatures the belt will expand, which could result in poor or even complete lack of engagement from the sprockets on the drive wheels.

Fig. 2 relates to longer and more heavily loaded conveyor systems. This conveyor system cannot be used in a reversing operation. The first support after the drive wheel ensures the best possible engagement.
The second support should be located in a position where the weight of the belt "sag" between the first and the second support is sufficient to maintain the correct belt tension. This ensures continuous positive engagement from the sprockets on the drive wheel. Another advantage of this type of construction, which features a series of belt supports, is that it is possible to accommodate any belt contraction/expansion by fluctuating the degree of belt "sag" between all other supports.

Fig. 3 is similar to the conveyor system shown in the middle diagram. The only exception is that it can be used in a reversing operation. However, it cannot handle the same heavy loads.

Fig. 1

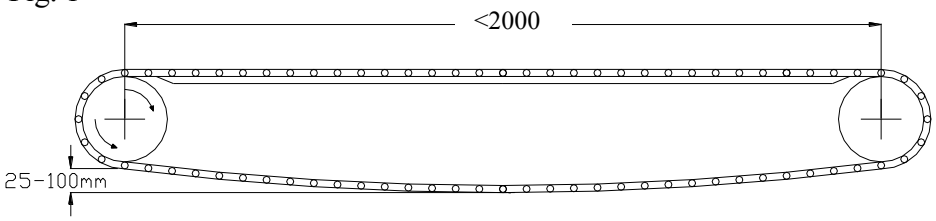


Fig. 2

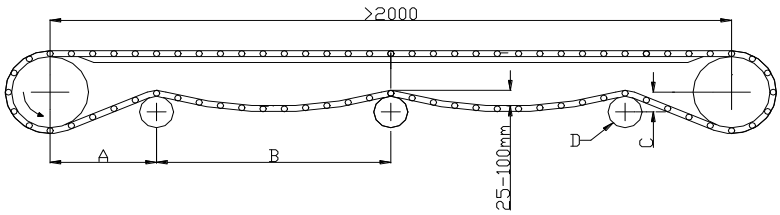
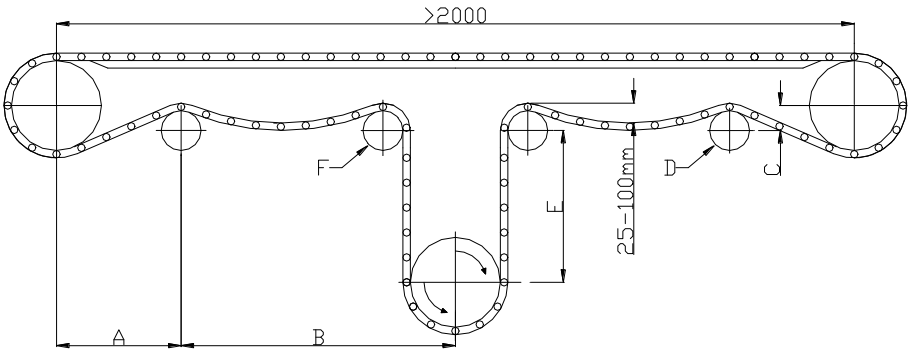


Fig. 3



A = 200 - 300 mm.
B = Min. 1000 mm - max.10% of the centre distance.
C = 0 - 50 mm.
D = S. 12 min. Ø20mm - S. 25 min. Ø50 mm. - S. 50 min. Ø 100 mm.
E = S. 12 min. Ø50mm - S. 25 min. Ø75 mm - S. 50 min. 150 mm.
F = S. 12 min. Ø20mm - S. 25 min. Ø100 mm - S. 50 min. Ø150 mm

Construction examples (B)

Construction of conveyors using ScanBelt modular belts

There are 2 diagrams illustrating elevator conveyor systems.

Fig. 1 shows a very common construction. The drive sprocket is at the top of the elevator system.
The first support after the drive sprocket ensures the best possible engagement. The second support should be located in a position, so that the weight of the belt "sag" between the first and the second support is sufficient to maintain the correct belt tension. This ensures continuous positive engagement from the sprockets on the drive sprocket. If there is insufficient distance between the first two supports, the tensioning belt "sag" should be moved to the area between the second and the third support. When provision has been made for adequate tensioning by following the above points, the belt can then be enclosed and allowed to run inside the conveyor framework for the remainder of the return leg.

At the point where the belt runs negatively, between the horizontal and incline (E-radius), it can be held in position and retained at the sides by the synthetic guide rails. Another option is the use of the hold-down segment built into the underside of the belt. These segments attach onto a suitable rail incorporated in the conveyor support bed.

Fig. 2 shows a similar elevator system. It is constructed in the same way.

In some exceptional cases, more tightening/tensioning may be necessary.
This can be achieved by using counter-weights or springs.

Construction example

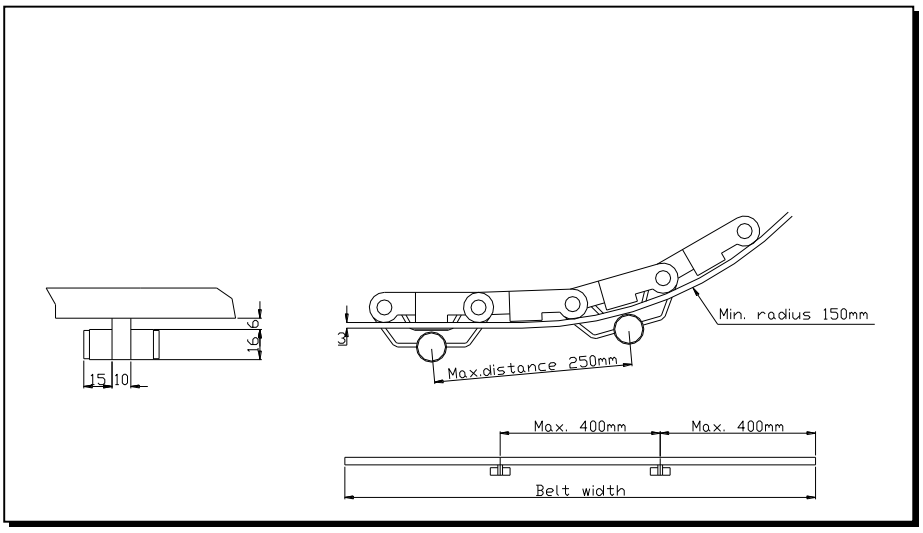


Fig. 1

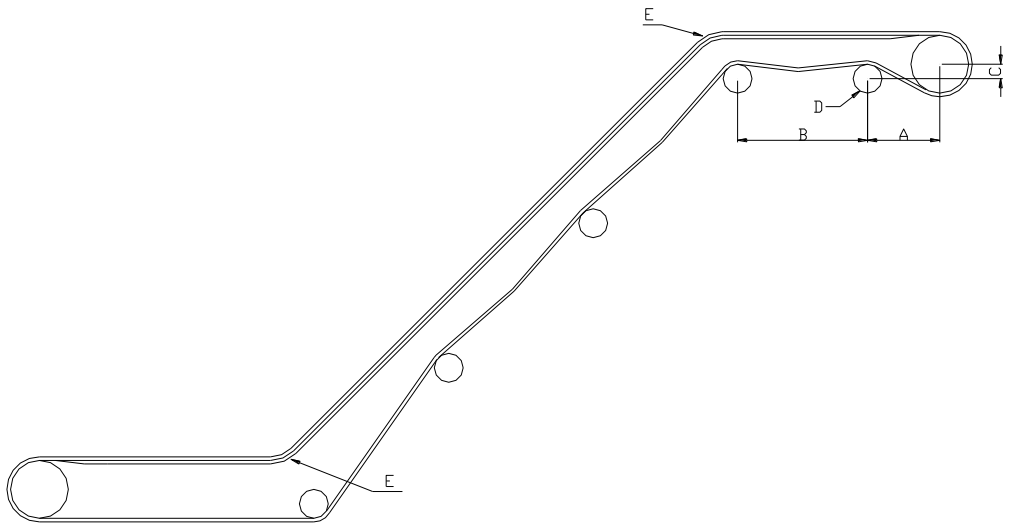
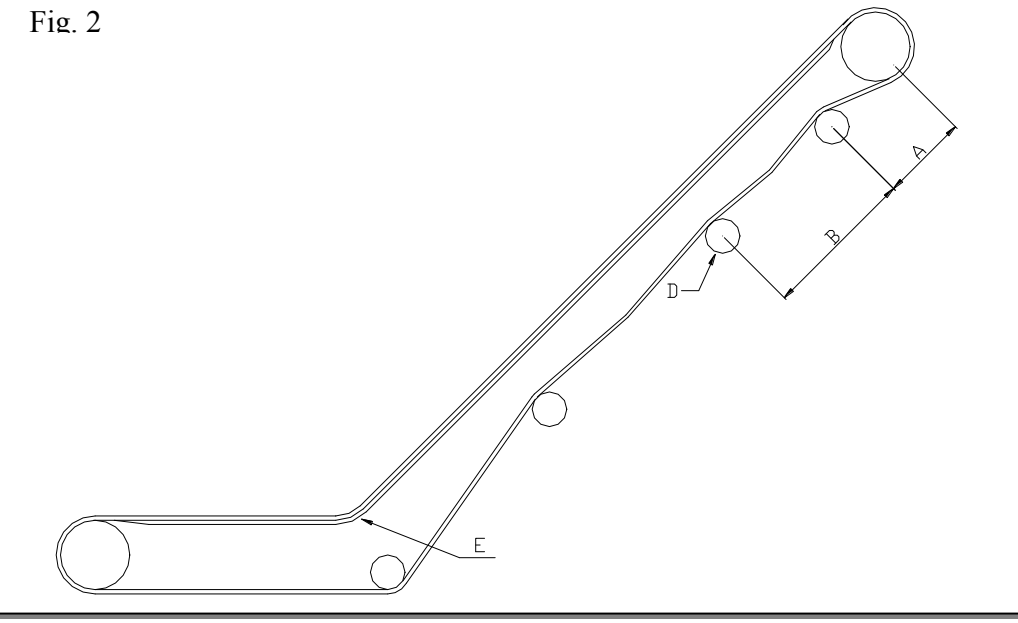


Fig. 2



A = 200 - 300 mm.
B = Min. 1000 mm - max.10% of the centre distance.
C = 0 - 50 mm.
D = S. 25 min.Ø 50 mm. - S. 50 min. Ø 100 mm.
E = Min. radius 150 mm

Recommendations for sprocket and belt support (C)

Sprockets						
Nominal belt width	Standard load			Heavy load		
mm	Series 12	Series 25	Series 50	Series 12	Series 25	Series 50
50	2	1	1	2	1	1
100	3	2	2	3	2	2
150	3	2	2	4	3	2
200	4	3	2	5	4	3
250	5	3	3	7	5	3
300	6	4	3	8	6	4
350	7	5	4	9	7	5
400	8	6	4	10	8	6
450	9	6	5	12	9	6
500	10	7	5	13	10	7
600	12	8	6	15	12	8
700	15	10	8	19	15	10
800	16	11	8	20	16	11
900	18	12	9	23	18	12
1000	20	14	10	25	20	14
1200	24	16	12	30	24	16
1500	30	20	15	38	30	20
1800	36	24	18	45	36	24
2100	44	28	21	53	42	28
2400	48	32	24	60	48	32
3000	60	40	30	75	60	40
3600	72	48	36	90	72	48
4000	80	54	40	100	80	54
	Max. space between sprockets	Max. space between sprockets	Max. space between sprockets	Max. space between sprockets	Max. space between sprockets	Max. space between sprockets
	50mm	75 mm	100 mm	40 mm	50 mm	75 mm

Belt support						
Nominal belt width	Serie 12		Serie 25		Serie 50	
mm	carry way	return way	carry way	return way	carry way	return way
50	2	2	2	2	2	2
100	2	2	2	2	2	2
150	2	2	2	2	2	2
200	3	2	3	2	2	2
250	3	2	3	2	3	2
300	3	2	3	2	3	2
350	4	3	4	3	3	3
400	4	3	4	3	3	3
450	4	3	4	3	3	3
500	5	3	5	3	4	3
600	5	3	5	3	4	3
700	6	4	6	4	5	4
800	7	4	7	4	5	4
900	7	4	7	4	5	4
1000	8	5	8	5	6	5
1200	9	5	9	5	7	5
1500	11	6	11	6	8	6
1800	13	7	13	7	9	7
2100	15	8	15	8	11	8
2400	17	9	17	9	12	9
3000	21	11	21	11	15	11
3600	25	13	25	13	17	13
4000	29	15	29	15	19	15
For other widths	Max. distance 150 mm	Max. distance 300 mm	Max. distance 150 mm	Max. distance 300 mm	Max. distance 225 mm	Max. distance 300 mm
When distance between shafts is more than 4 m, a roller is recommended on the return way.						

Thermal expansion/contraction (D)

All types of materials change dimensions when the temperature changes
Therefore you need to take this into consideration, when calculating a belt's dimensions and the frame constructions.

Below are the relevant factors for calculating a ScanBelt conveyor belt.

Material		Expansion/contraction mm/m/°C
Belt:		
Polypropylene	**PP**	0.12
Polyethylene	**PE**	0.22
Polyacetal	**POM**	0.09
Wear strip:		
U and V profile	**PEHD**	0.14
Frame material:		
Aluminium		0.02
Stainless steel		0.01

Formula:

E = L x (T2 - T1) x K
C = L x (T2 - T1) x K
E = Expansion (mm)
C = Contraction (mm)
L = Length/width of belt (m)
T1 = Normal temperature (21°C)
T2 = Working temperature
K = Coefficient

Example:

17 M.long, 1345 mm wide, PP. Normal temp. 21,° Working temp. 85 °C.

Length:
E = 17 x (85 - 21) x 0.12
E = 130.56 mm

Width:
E = 1.345 x (85 - 21) x 0.12
E = 10.33 mm

SERVICE FACTOR (SF)		
Unloaded starts & load applied gradually		1.0
Frequent starts under load, more than 1/hr.	+ 0.2	
Belt speed greater than 30 mtr./min.	+ 0.2	
Elevating conveyors	+ 0.4	
Pusher conveyors	+ 0.2	
SF total		

All frition values are theoretical and may not reflect the working conditions. For new belt on new wear strips, the values will in most cases be higher to begin with. The theoretical values are in any respect given under optimal condition. For more details please contact your ScanBelt distributor.

Coefficient of start-up friction between wear strip and belt								
Wearstrip material	Belt material							
	Polypropylene				Polyethylene		Acetal POM	
	Smooth			xx Abrasive		Smooth	Smooth	
	Wet		Dry	Wet	Dry	Wet	Dry	Wet	Dry
PEHD	0.09		0.11	-	-	-	-	0.09	0.08
UHMW	0.11		0.13	-	-	0.24*	0.32*	0.10	0.10
Steel	0.26		x 0.26	0.31	0.31	0.14	0.15	0.18	0.19
xx = Contact Scanbelt						x = Not recommended over 15 mtr./min.			

*Note that the wear will increase with the belt speed. It should be expected to be extensive for speeds greater than 15M/min

Coefficient of friction between product and belt						
Material:	Polypropylene		Polyethylene		Acetal POM	
	Smooth		Smooth		Smooth	
	Wet	Dry	Wet	Dry	Wet	Dry
Glass	0.18	0.19	0.08	0.09	0.13	0.14
Metal	0.26	0.32	0.10	0.13	0.19	0.20
Plastic	0.11	0.17	0.08	0.08	0.13	0.15
Cardboard	-	0.21	-	0.15	-	0.13

Material description (E)

Polyethylene (PE):

Thermal plastic with a weight mass of approx 0.92. grams/cm³.
Suitable for use in cold areas.
Temperature range from - 73 °C to + 66 °C.
High chemical resistance.
FDA approved.
Tough yet flexible material with a high impact strength.

Polyethylene Plus:

Thermal plastic with a weight mass of approx. 0.92 grams/cm³.
Suitable for use in medium temperature areas.
Temperature range from - 20° C to + 80°C.
High chemical resistance.
FDA approved.
Same characteristics as Polyethylene, with a 30% larger tensile strength as well as a reduced impact strength.

Polypropylene (PP):

Thermal plastic with a weight mass of approx. 0.92 grams/cm³.
Suitable for use in higher temperature areas.
Temperature range from + 5°C to + 100°C.
High chemical resistance.
FDA approved.
A strong material with a medium tensile strength, low impact strength at low temperatures.

Polypropylene heat stabilized:

Thermal plastic with a weight mass of approx. 0.92 grams/cm³.
Suitable for use in high temperature areas.
Temperature range from + 5°C to 100°C.
High chemical resistance.
FDA approved.
Medium tensile strength, low impact strength at low temperatures.

Polypropylene Composite:

Thermal plastic with a weight mass of approx. 1.25 grams/cm³.
Suitable for use in high temperature areas.
Temperature range from -20°C to + 130°C.
High chemical resistance.
FDA approved.
A strong and consistently stable material. Extremely high tensile strength, but has increased friction between the support and the belt. Low impact strength at low temperatures.

Polypropylene antistatic:

Thermal plastic with a weight mass of approx. 0.98 grams/cm³.
Suitable for use in areas requiring electrical diversion.
Temperature range from + 5°C to + 100 °C.
High chemical resistance.
Not FDA approved
Tensile strength as normal polypropylene.

Polyacetal (POM):

Thermal plastic with a weight mass of approx. 1.4 grams/cm³.
Suitable for use in both warm and cold areas.
Temperature range from - 43°C to + 95°C.
Has a limited resistance to certain chemicals. If in doubt, please contact ScanBelt.
FDA approved.
Consistently stable material with a high tensile strength.
Low friction between belt and support.
Low impact resistance at low temperatures.

Polyacetal antistatic:

Thermal plastic with a weight mass of approx. 1.4 grams</cm³.
Suitable for use in areas requiring electrical diversion.
Temperature range from - 43°C to + 95°C.
Not FDA approved
Other characteristics, are the same as polyacetal.

POM Cut Resistant (POM CR):

Temperature range from - 43°C to + 95°C.
The Cut Resistant POM has an improved cut resistance compared to the regular POM and PP materials. It has a superior abrasion resistance and a better impact strength than regular POM materials and it is highly rigid while maintaining pulling force and surface hardness. It also has a low coefficient of friction.

The Cut Resistant POM is offered in the S.25-800 S-L and S.50-808 S-L Flat top series. It is available in POM/Blue for both types.

Nylon 6:

Thermal plastic with a weight mass of approx. 1.08 grams/cm³.
Suitable for use in both warm and areas.
Temperature range from - 45°C to + 110°C.
High chemical resistance. Not suitable in damp areas at high temperatures.
FDA approved.
Tough yet flexible material with a high tensile strength as well as a high impact strength.

Nylon 6.6:

Thermal plastic with a weight mass of approx. 1.1 grams / cm³.
Suitable for use in both warm and cold areas.
Temperature range from - 45°C to + 150°C.
High chemical resistance, though not suitable for use in very damp areas at high temperatures.
Not FDA approved
Tough yet flexible material with a high tensile strength as well as a high impact strength.

Nylon antistatic:

Thermal plastic with a weight mass of approx. 1.1 grams/cm³.
Suitable for use where electrical diversion is required.
Temperature range from - 45°C to + 110°C.
High chemical resistance. Not suitable in wet areas.
Not FDA approved
Tough yet flexible material with a high tensile strength as well as a high impact strength.

Fire retarding polypropylene:

Thermal plastic with a weight mass of approx. 0.98 grams/cm³.
Suitable for use in fire hazard areas, as in microwave ovens and the like.
Temperature range from + 5°C to + 120°C.
High chemical resistance.
Flammability VO (3,2 mm).
FDA approved.
Strong material with medium tensile strength. Low impact strength at low temperatures.

Friction material:

Thermal plastic with a weight mass of approx. 1.14 grams/cm³.
Suitable for use in both warm and cold areas.
Temperature range from - 25°C to + 80°C.
High chemical resistance.
FDA approved.
Soft material with high friction, low tensile strength.
Suitable to put on the surface of PE and PP belts.
Used for belts with slight inclination.

Silicone and teflon material:

An additive added to polyethylene and polypropylene.
This material prevents products from freezing or sticking to the belt.
FDA approved.
The characteristics of the basic material are not changed essentially.

Metal detectable:

An additive added to polypropylene.
The compound is designed to be detected by metal detectors.
Sensibility degrees may vary with customer's equipment.

The material complies with FDA regulations for use in food processing and packaging.

Chemical resistance (F)

The chemical resistance of plastic materials.

The values in the following tables are guideline values. Factors such as filling material, temperature, concentrations, stress, stress time etc. can alter these values dramatically. Therefore no guarantee can be given for the correctness of said values. The values are valid at an ambient temperature of 20 °C, and unless otherwise stated, with strong concentrations.

Explanation of symbols:

+ : resistant:	None or only negligible changes in weight (< 0.5%). No changes in mechanical characteristics.
± : qualified resistance:	After a period of time, significant changes in weight and mass (0.5 - 5.0%). Possible discoloration and reduction in strength and ductility. Qualified usability, though only when dealing with simple material requirements.
- : inconstant:	It is rapidly subjected to serious attack, and changes in weight and mass (> 5%), and critical in strength and ductility. Not recommended for use.
%: concentration:	If value is not given it is because no test results are available from our suppliers.

Plastic material					
Vehicle	%	POM	PE	PP	PA
Acetaldehyde	40	+	+	+	
Acetaldehyde	12	+	+	+	+
Acetic acid	10	±	+	+	+
Acetic acid	80	-	+	+	+
Acetone	100	+	+	+	±
Alcohol	15	+	+	+	+
Allyl alcohol	100	+	+	+	
Aluminium chloride	10	+	+	+	±
Ammonia water	10	+	+	+	±
Ammonium chloride		+	+	+	±
Ammonium chloride	10	+	+	+	+
Aniline	100	+	+	+	±
Benzene	100	+	+	-	-
Benzyl alcohol	100	+	+	+	±
Boiled salt - cf. Sodium chloride	10	+	+	+	+
Boracic acid	10	+	+	+	±
Bromine acid	50	-	+	+	
Butanol	100	+	+	+	+
Butyl acetate	100	+	+	-	+
Calcium carbonate		+	+	+	+
Calcium chloride - aqueous	10	+	+	+	+
Calcium chloride - with sprit	20	+	+	+	±
Calcium hydroxide		+	+	+	+
Calcium carbonate - Carbon dioxide		+	+	+	+

Plastic material					
Vehicle	%	POM	PE	PP	PA
Caustic potash soln	10	+	+	+	+
Caustic potash soln	10	+	+	+	+
Caustic potash soln	50	+	+	+	+
Cellulose acetate		+	+	+	-
Citric acid	10	+	+	+	+
Chalk cf. - Carbon disulphide	100	+	+	+	-
Chlorine gas	100	-	+	-	
Chlorine water		-	+	+	-
Chloro-benzene	100	+	+	+	+
Chloroform	100	-	-	+	+
Chrome acid	10	-	+	+	-
Copper chloride		+	+	+	±
Copper sulphate		+	+	+	±
Diesel fuel	100	+	+	+	+
Dioxane	100	±	+	±	+
Di -vinyl chloride	100	+	-	+	
Edible oil		+	+	+	
Ethyl acetate	100	+	+	+	+
Ethyl alcohol	96	+	+	+	+
Ethyl ether	100	+	+	+	+
Formaldehyde - Flourine, dry		-	-	-	+
Freon 11		+	+	-	
Freon 12			+	-	
Freon 22			+	-	
Freon 113			+	-	
Glycerol	90	+	+	+	+

Plastic material Medie	%	POM	PE	PP	PA
Heptane	100	+	+	+	+
Hexane	100	+	+	+	+
Hydrargyrum	100	+	+	+	+
Hydrochloric acid	10	-	+	+	+
Hydrochloric acid	2	-	+	+	+
Hydrofluoric acid	40	-	+	+	-
Hydrogen peroxide	0.5	+	+	+	+
Hydrogen peroxide	1	+	+	+	±
Hydrogen peroxide	3	+	+	+	±
Hydrogen peroxide	10	+	+	+	±
Hydrogen peroxide	30		+	+	±
Hydrogen sulphide	2	-	+	+	
Iodine/Iodine - pot. -					-
Iron - 111 - Chloride		+	+	+	+
Isopropanol	90	+	+	+	+
Kerosine	100	+	+	+	+
Lactic acid	10	+	+	+	+
Leaching solution - 0.1 % free chlorine		-	+	+	-
Lead sugar		+	+	+	+
Liquid butane		+	+	+	+
Magbesium chloride - Aqueous	10	+	+	+	+
Manganese sulphate	10	+	+	+	+
Mercury chloride - Aqueous	5	+	+	+	+
Methanol	98	+	+	+	+
Metal acetate	100	+	+	+	+
Methylethylketone	100	+	+	+	+
Methylene chloride	100	-	+	+	+
Mineral oil	100	+	+	+	+
Nitric acid	10	-	+	+	+
Nitric acid - Concentrated	65	-	+	-	+
Nitrobenzene	100	+	+	+	±
Oleic acid - Concentrated	40	+	+	+	+
Oxalic acid	10	-	+	+	±

Plastic material Vehicle	%	POM	PE	PP	PA
Ozone		-	+	+	±
Petrol		+	+	+	±
Phenol, melted	100	-	+	+	±
Phenol, aqueous	10	-	+	+	±
Phosphoric acid	10	+	+	+	+
Phosphoric acid - Concentrated	80	-	+	+	+
Potassium	10	+	+	+	±
Pot. Bichromate	5		+	+	
Pot. Permanganata	1	+	+	+	
Salt cake - CF Sodium sulphate					±
Sea water	100	+	+	+	+
Silicone oil			+	+	+	+
Soap solution	1	+	+	+	
Soda lve, aqueous	50	+	+	+	
Soda lve, aqueous	10	+	+	+	+
Soda - cf. Sodium carbonate					
Sodium bisulphate	10	-	+	+	
Sodium carbonate	10	+	+	+	
Sodium hydroxide - cf. Sode lve					
Sodium sulphate	10	+	+	+	
Solution	3		+	+	
Sulphur dioxide		+	+	+	±
Sulphuric acid	98	-	-	-	-
Sulphuric acid	10	+	+	+	+
Sulphuric fuming		-	-	-	-
Terachlorocarbon	100	+	-	-	
Tetraline	100	+	+	+	+
Thionyl chloride	100	+	-	-	
Toluene	100	+	+	+	+
Trichloroethylene	100	+	-	+	±
Vinyl benzene	100	+	+	+	+
Water, cold		+	+	+	+
Wine		+	+	+	+
Wax, melted		+	+	+	+

Installation and maintenance (G)

Installation and maintenance instructions for ScanBelt conveyor belts

Although belts made by ScanBelt are easy to install and maintain, there are some points which should be observed:

Sprockets:

1. ScanBelt sprockets can be supplied for two types of shafts:

A - Square shaft.

- Ensure that the sprockets are aligned, so that the gear teeth are not displaced.
- For sprockets with lateral control, the middle sprocket should be fixed and the others allowed to float freely.
- For sprockets without lateral control, spacers can be mounted between the sprockets to prevent them from moving sideways.
- An acetal plastic (POM) retainer ring is also supplied with a 6 mm stainless centre screw which should be screwed down into the shaft. The groove for the screw should be made with a drill, file or right-angle grinder (depth 1 - 2 mm).

B - Round shaft with key way (ISO standard).

- Ensure that the sprockets are aligned, so that the gear teeth are not displaced.
- For sprockets with lateral control, the middle sprocket should be fixed and the others allowed to float freely.
- For sprockets without lateral control, spacers can be mounted between the sprockets to prevent them from moving sideways.
- An acetal plastic (POM) retainer ring is also supplied with a 6 mm stainless centre screw which Should be screwed down into the shaft. The groove for the screw should be med with a drill, file or right-angle grinder (depth 1 - 2 mm.)

2. The sprockets are normally supplied in acetal plastic (POM), but are also available in Nylon (PA6), and Polypropylene (PP) in cases where aggressive substances are used. (When in doubt, please contact ScanBelt.)

3. Wherever possible, the drive sprocket should be located between the supports.

4. The number of drive sprocket and supports can be seen from the table.

5. For correct dimensions and specifications, refer to the drawings and tables for the respective belt types.

6. Clean the sprockets regularly, as the accumulation of dirt on the sprockets can result in poor, or a complete lack of, engagement with the belt.

Belt:

1. Installation:

When installing a belt from ScanBelt, it is advantageous to ensure that the sprockets engage correctly, although not strictly necessary since the sprockets engage during operation. One should be careful to ensure that the side of the belt has a straight edge before securing with the plastic rod when assembling a belt from ScanBelt. The plastic rod used for assembling the belt is equipped, either a) with a head at one end or b)with clips.

a) After installation, any excess plastic rod should be cut off 1 - 2 mm from the belt´s outer edge. Soldering/plugging can be carried out with a special soldering iron which can be supplied by ScanBelt. If a soldering iron is not available, the plastic rod can be heated using, for instance, a lighter, after which soldering can be carried out with a soft press.

b) After installation, all rods are being locked, with the clips supplied with the belt

2. Maintenance:

In order to minimise wear and to prevent the belt from slipping it should be cleaned regularly.
Slipping of the belt can be caused by the belt being insufficiently tightened. If the conveyor is equipped with a tightening device, then this should be used to try to tighten the belt. If this is not sufficient, the belt should be shortened (see trouble-shooting table).
If the belt continues to slip, then contact ScanBelt.
New belts stretch, and it is therefore necessary to shorten the new belt shortly after operation has begun. This will usually be necessary after approx. 50 hours of operation.

3. Shortening/replacing damaged modules:

Always ensure that there are spare plastic rods and modules for the belt. Three extra rods are supplied with every new belt. Spare modules in standard widths of 200 mm, or other customized widths, can be supplied by ScanBelt upon request.
When shortening/replacing damaged modules, the plastic rod can be removed most easily by cutting it as close to the edge of the belt as possible. The part which has been cut off can then be removed using a knife or screwdriver, and the rest of the rod can be knocked out using a punch.
When shortening the belt, excess modules should be removed. In the case of damaged modules, these should be removed and replaced by new modules.
The belt can then be reassembled with new rods as described above in the section on installation.
In case of emergency, when no spare rods are available, the link closest to the edge can be removed so that an old rod can be used. This must be done only in cases of emergency. If more extensive repairs are required, then contact ScanBelt for a quotation. In the event of extensive damage, it may be more economical to buy a new belt.

Malfunction (H)

If the belt is malfunctioning

If the belt is not properly aligned:

Test / check: That the drive shaft and the flange roller are adjusted correctly.

If the belt pulls to one side:

Test / check: That the shaft is adjusted correctly; that the belt mounting stands rectangular. That the belt is tightened to the same degree on both sides.

If the edges of the belt wear:

Test / check: That the shaft is adjusted correctly; that the gap between the edges of the belt and the frame is wide enough when the operating temperature is at its highest and that the belt's supporting structure stands rectangular. That the shafts are locked in place so that they cannot move from side to side (if necessary, use retainer rings).

If the belt jumps a notch on the sprockets:

Test / check: That the sag on the belt is adjusted so that it engages the sprockets correctly (tighten as little as possible). That the products / materials do not collect on the return track.

If the belt is subject to severe wear and tear:

Test / check: That it is not being operated with excessive amounts of gravel, sand or similar products. That the belt is operating with a uniformly distributed load. That the belt is supported correctly. That the belt is not running at excessive speeds. That the correct wear strips are being used. That the belt´s supporting structure is level.

If the sprockets are subject to severe wear and tear:

Test / check: That the shafts are not twisted or bent, and that they are adjusted correctly. That the sprockets have been fitted correctly and that there are enough of them. That the belt is not being run too quickly or too tightly. That the belt is not being operated with excessive amount of gravel, sand or similar products.

If the rods are subject to severe wear and tear:

Test / check: That the belt is not being operated with excessive amounts of gravel, sand or similar products. That the belts is not being run too quickly. That the materials do not become congested on the belt.

If the rods work themselves loose from the belt:

Test / check: That the gap between the belt edges and the frame is wide enough when the operating temperature is at its highest. That the rods are fitted correctly and locked.

If the wearstrip are subject to severe wear and tear:

Test / check: That the belt is being operated with the correct type of wear strip. That the belt is not too tight.

If the edges of flights become worn:

Test / check: That there is enough space on the return track.

If the flights break:

Test / check: That the flights do not hit against the frame. That blockage do not occur at the in-feed.

If the belt becomes discoloured or is attacked by chemicals:

Test / check: That correct cleaning procedures are followed. That white belts are not exposed to strong sunlight (they turn a yellowish colour - use dark coloured belts instead!). That the operating tem-
perature is not too high.

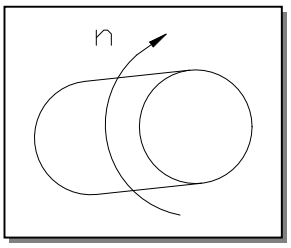
Calculation of motor power (I)

Sprocket Pitch diameter	D [mm]:
Belt Speed	V [m/min]:
Shaft Speed	n [rpm]
Belt Power	F [N]
Torquemoment	T [Nm]
Motorpower	P [kW]

EKS.

Sprocket Pitch diameter	97 mm
Belt Speed	10 m/min
Belt Power	25000 N

Shaft Speed of rotation

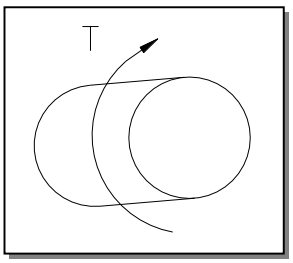


$$n = \frac{V * 10^3}{D * \pi}$$

$$n = \frac{10 * 10^3}{97 * \pi}$$

$$n = \underline{32.82 \sim 33 \text{ rpm}}$$

Torsionsmoment of shaft



$$T = \frac{F * D * 10^{-3}}{2}$$

$$T = \frac{25000 * 97 * 10^{-3}}{2}$$

$$\underline{T = 1213 \text{Nm}}$$

Motorpower

$$P = \frac{T * n}{9500}$$

$$P = \frac{1213 * 33}{9500}$$

$$P = \underline{4.2 \text{kW}}$$

11. Conditions of Sale and Delivery

General conditions of Sales and Delivery

1.Validity.

These conditions apply to all sales and deliveries unless other terms are agreed upon and confirmed in writing by ScanBelt A/S.

2. Price.

2.1 All prices are in Danish Kroner (Dkr.) and exclusive of VAT. Until the delivery, the buyer is obliged to accept any changes in price as a result of a documented increase in expenses for the seller due to a change in foreign exchange, quotations, taxes, duties etc. regarding the order previously agreed on.

3. Payment

3.1 Payment shall be made no later than the date which is specified on the invoice as the last date for payment.
If such a date is specified, the conditions of payment shall be cash on delivery.

3.2 If the delivery is postponed due to buyer conditions (creditor's default), the buyer is nonetheless obliged to make all payments to the seller as if the delivery had arrived at the time agreed upon - unless the seller, in writing, has informed the buyer of any changes.

3.3 Any delay in payment will automatically and without further notice be subject to a penalty of 2% per commenced month on any amount.

3.4 Under no circumstances may the buyer withhold all or part of any payment to the seller or offset all or part of any payment to the seller against any outstanding claim against the seller.

4. Retention of title

4.1 The seller, or a third party, to whom he has assigned his rights (cf. 9), retains the title to the goods sold, within those limitations prescribed by statute until the invoice amount and any expenses incurred have been received in full.

4.2 If the items are sold with a view to their being built into a larger unit or being joined with other objects, then said items are not subjected to the above retention of title provision after any such building in or joining has taken place.

5. Delivery

5.1 Unless other terms are agreed upon and confirmed in writing by ScanBelt A/S, delivery is ex. works.

5.2 The specified time of delivery is set by the seller as the best estimate in the light of conditions prevailing at the time the quotation was made and the agreement entered into. Unless specifically agreed elsewhere, a deferment of the delivery by as much as fourteen days due to circumstances at the seller shall in every respect be understood as constituting a delivery within a reasonable period of time, and the buyer may not on the basis of such a deferment bring any claims against the seller.

5.3 If delays in the delivery occur because the seller finds himself in one of the circumstance started in 6.4., deferment in delivery shall be to that period of time for which the circumstances persists, though either party shall be entitled, without incurring any further liability, to annul the agreement if the delay caused by said circumstances exceeds three months. This provision applies no matter whether the cause to such a delay began prior of or after expiration of the agreed delivery schedule.

5.4 The seller shall in the above-mentioned situation and without undue delay inform the buyer of the changes in the delivery schedule.

6. Packing

6.1 The buyer pays for the packing, unless it is clearly evident that it is included in the price.

7. Defects and claims

7.1 Upon receiving the items the buyer shall immediately inspect them in a accordance with proper business practice.

7.2 Any claim regarding defects in the goods supplied must be submitted in writing by the buyer to the seller immediately. When such defects are noticed or should have been noticed if they are to be upheld. If the buyer notices or should have noticed a defect but does not make a claim as outlined above, he may not make such a claim at a later time.

7.3 The seller may elect either to remedy the defect on the delivered item or re-deliver.

7.4 Having received written notice as described in 7.2. The seller shall deal with the defect without undue delay.
The seller shall cover all costs associated with this. Repairs shall be carried out on the buyers premises unless the seller feels it expedient for the defective part or materials to be returned so that the seller can repair or replace it in his own workshop. If the disassembly and assembly of such defective parts require technical expertise then the seller is obliged to undertake said disassembly or assembly. If such technical expertise is unnecessary the sellers liabilities regarding the defective part are met when a suitable repaired or new part is delivered to the buyer.

7.5 If the buyer has made a claim as specified in 7.2. and events prove that no defect exists for which the seller is found liable, the seller shall be entitled to remuneration for the work and the expenses incurred in investigating the claim.

7.6 If remedy or re-delivery as detailed in 7.3. does not occur within a reasonable period of time, buyer, in compliance with normal Danish Law and under the terms of these general conditions of sale and delivery, is entitled to terminate the agreement, demand a price reduction, or demand compensation.

7.7 If the buyer has not drawn the sellers attention to any defect in the delivered items within twelve months of their being delivered, then no such claim can be made in the future. The seller shall have similar liabilities for parts which are replaced or repaired as for the original items (cf. 7.3.) for a further period of twelve months, though with the provision that the sellers defect liability for any part of the item shall not extend longer than two years after the original date of delivery.

7.8 If any changes or alterations are made to the items supplied without the sellers written agreement, the seller shall be released from all liability.

8. Limitations of liability.

8.1 Any claim made by the buyer may not exceed the invoice amount for the item in question.

8.2 The seller's liabilities only cover defects which occur under the operating conditions described in this agreement and during correct use of the items supplied. The sellers liabilities shall not extend to defects that arise due to causes which occur after liability has passed to the buyer. Liability does not cover defects due to poor maintenance, incorrect assembly carried out by the buyer, changes made without the sellers prior written permission, or repairs carried out in an inadequate manner by the buyer.
Liability does not include the consequences of any errors or defects in the design used by the seller, nor a failure to follow the sellers instructions. Finally, liability does not cover normal wear and tear.

8.3 The terms of this agreement do not make the seller liable for loss of production, loss of profit, or any other indirect loss which may occur, including indirect loss which may occur as a result of delays or of defects in the items supplied.

8.4 The following circumstances shall result in the seller being exempted from liability if they prevent the terms of the agreement being met or make meeting the terms of the agreement unreasonably burdensome:
Labour disputes and any situation over which the parties have no control, such as fire, war, the general mobilisation of troops or unforeseen call up orders affecting straff on a similar scale, commandeering of facilities and/ or raw materials, foreign currency restrictions, riots and unrest, lack of transportation facilities, normal shortages of goods, and energy supply restrictions and in addition defects in or delays to deliveries from subcontractors which are due to one or more of the circumstances named above. Any of the above-mentioned circumstances which began prior to the quotation being made and the agreement entered into shall only exempt the seller from liability if their effect on the fulfilment of the agreement could not reasonably be foreseen at that time.

8.5 The seller is obliged to inform the buyer in writing and without undue delay should any of the circumstances named in 8.4. occur.

9. Return of items.

9.1 Unless otherwise agreed, items sold can be returned only on the receipt of the written agreement of the seller and with a ten percent deduction.

9.2 In case the seller has a right to annul the agreement or if the sold goods are returned to the seller with the intention that they are to be repaired or replaced, the freight is to be paid by the buyer and at the buyer's own risk.
If the seller is inflicted any freight charges etc. the seller is entitled to demand that these are refunded by the buyer and/or include them in any claims the buyer might have against the seller.

10. Product liability.

10.1 Product liability is subject to Danish Law current at the time in question. Except to the extent to which he is made liable for any loss of production, loss of profit or any other indirect loss.
The sellers liability is in all situations limited to the cover available through the sellers product liability insurance.

11. Transfer or rights and obligations.

11.1 The seller is entitled to transfer all rights and obligations named in this agreement to a third party.

12. Disputes.

12.1 Any disputes that may arise between the parties relating either to these general conditions of sale and delivery or to other commercial transactions between the parties is to be resolved by arbitration and according to Danish Law.