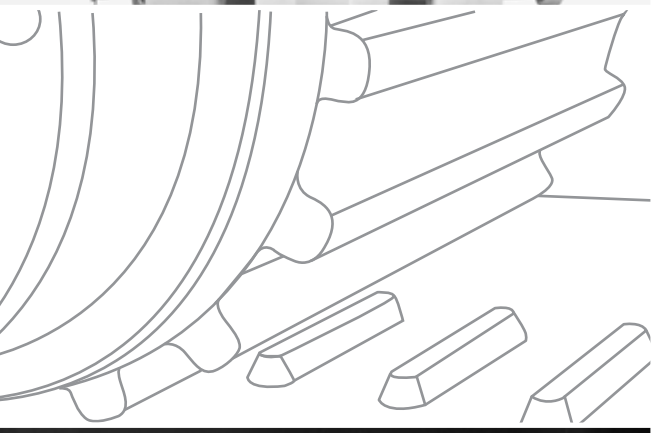
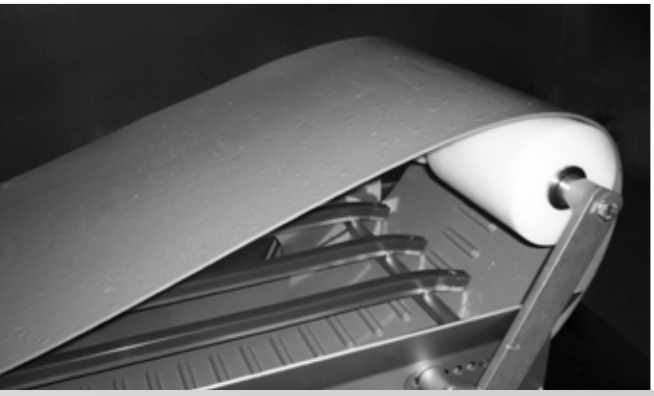
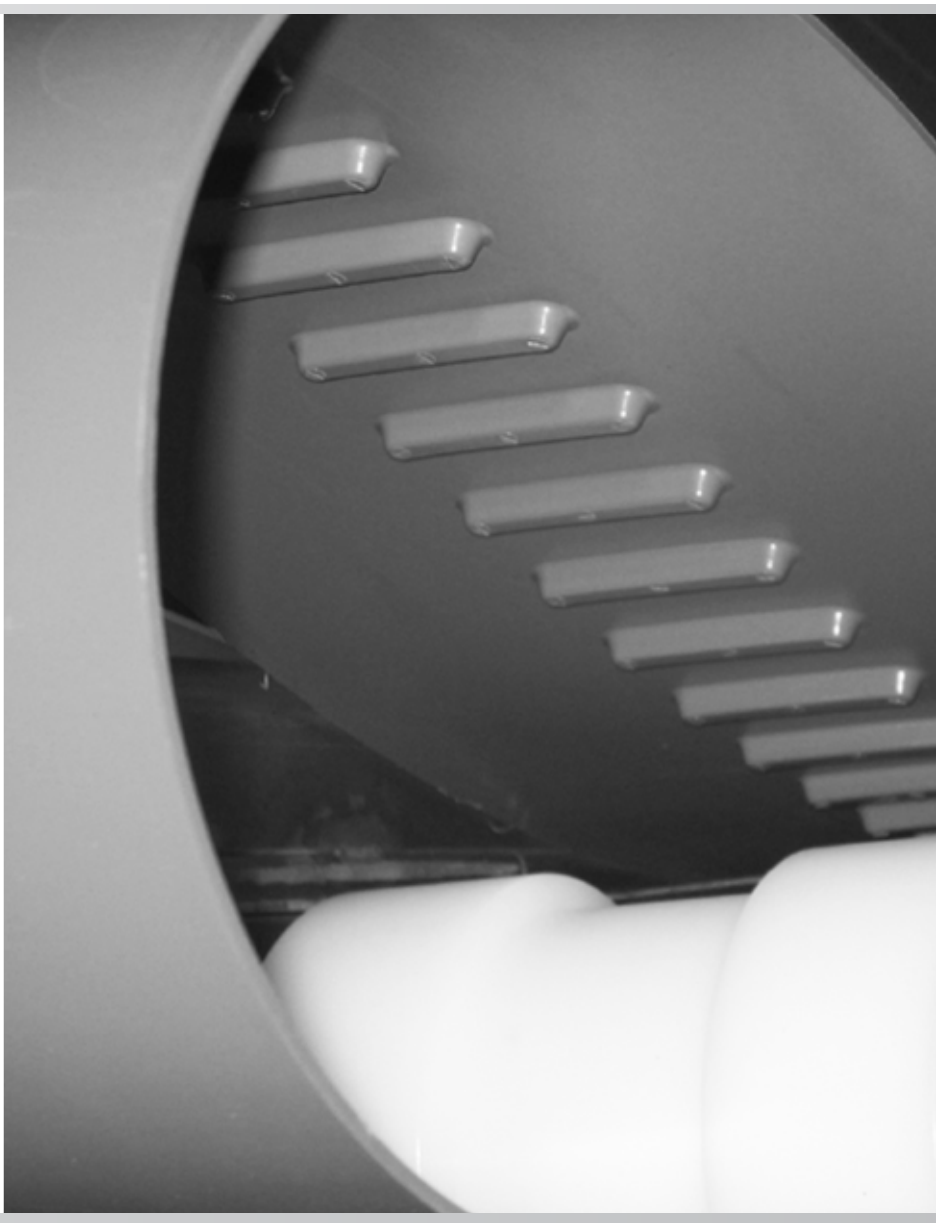
VOLTA BELTING Technology

Technical Manual
SuperDrive™







The Next Step in Belting

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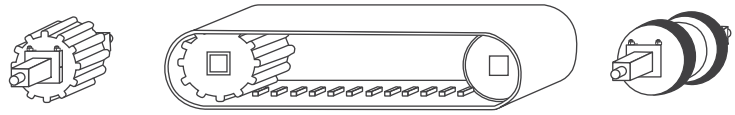
1. Introduction

SuperDrive™, the homogeneous positive drive belt, globally applauded as the best choice where hygiene control and conveying efficiency are essential. This distinctive design combines positive drive benefits with Volta's firm commitment to superior quality, increasing hygiene standards and productivity.



SuperDrive™ components

Fully extruded integrated teeth on the drive side function as a positive drive system and simultaneously serve as a built in guide mechanism reducing tensioning and off-tracking.The homogeneous character makes sure that there are no crevices where bacteria may harbor making cleaning simple and increasing product life considerably. Volta's eco - friendly belts allow drastic reduction in water usage and converts cleaning time to precious production time.

Material Features

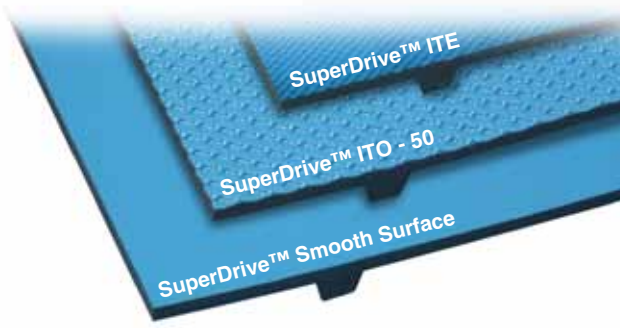
- Smooth homogenous non-porous surfaces prevent bacteria build-up resulting in maximum product shelf-life.
- No plies, edge fraying or modular components or hinges that can break apart and find their way into your final product.
- Non absorbent of water, oils or chemicals.
- Smooth surface prevents product sticking, considerably reducing waste.
- Not absorbent of smells.
- Wide operating temperature range.
- FDA/USDA AMS Equipment Acceptance Certificate in compliance with NSF/ANSI/3A 14159-3 – 2005 for Meat and Poultry Processing.
- USDA Dairy Equipment for selected products.
- Declaration of Conformity in compliance with EU Regulations No.: 10/2011, 1935/2004 and Directive 2002/72/EC.
- Supports the HACCP concept.

Mechanical Benefits

- Teeth are an integral part of the belt eliminating breakages at weak points and increasing the life of the belt.
- Extruded teeth and pulley system positively drive and track the belt creating a smooth running production line.
- Minimal pretension reduces strain on the belt and elongation.
- Reduces noise levels to a minimum.
- Easy to install and form a strong base for quality heat welded fabrications.
- Lightweight conveyor belt, cutting back on motor energy usage.

2. Technical Data

Volta 'H' Material SuperDrive™ Belts



FHW-SD and FHB-SD are designed for long conveyors with particularly heavy loads and for use in harsh chemical conditions.

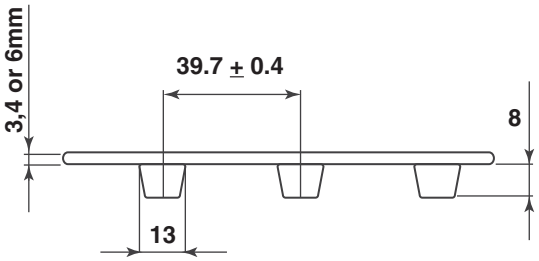
The 4mm and 6mm is most suitable for cutting and chopping on the belt.

Various textured tops are available.

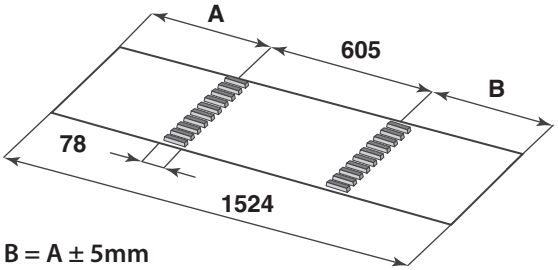
- **Material:** Volta HW, Beige / Volta HB, Blue
- **Shore Hardness:** 55D
- **Temperature Range :** -20° C to 75° C / -5° F to 170° F
- **Coefficient of Friction:** Steel: 0.4 / Stainless Steel: 0.4 / UHMW: 0.2
- **Certification:** FDA/ USDA/ USDA Dairy/ EU Approved

Product	FHB-3 SD FHW-3 SD	FHB-3 SD ITE FHW-3 SD ITE	FHB-3 SD FHW-3 SD ITO-50	FHB-4 SD FHW-4 SD	FHB-4 SD ITE FHW-4 SD ITE	FHB-4 SD FHW-4 SD ITO - 50	FHB-6 SD
Belt Thickness	3	3	3	4	4	4	6
Belt weight (kg/ m^2) Add for each row of teeth	3.6 kg/ m^2 + 0.180 kg/ m	3.6 kg/ m^2 + 0.180 kg/ m	3.5 kg/ m^2 + 0.180 kg/ m	4.8 kg/ m^2 + 0.180 kg/ m	4.8 kg/ m^2 + 0.180 kg/ m	4.5 kg/ m^2 + 0.180 kg/ m	7.2 kg/ m^2 + 0.180 kg/ m
Belt weight (lb/ ft^2) Add for each row of teeth	0.74 lb/ ft^2 + 0.121 lb/ ft	0.74 lb/ ft^2 + 0.121 lb/ ft	0.71 lb/ ft^2 + 0.121 lb/ ft	0.98 lb/ ft^2 + 0.121 lb/ ft	0.98 lb/ ft^2 + 0.121 lb/ ft	0.92 lb/ ft^2 + 0.121 lb/ ft	1.48 lb/ ft^2 + 0.121 lb/ ft
Minimum pulley diameter (normal flex)	100 mm/ 4"			140 mm/ 5½"			280 mm/ 11"
Minimum pulley diameter (back flex)	150 mm/ 6"			160 mm/ 6.3"			320 mm/ 12.6"
Max pull force (kg/ cm width)	7			9			14
Max pull force (lb/ in. width)	39.2			50.4			78.4

Note: All inch sizes has been converted from metric sizes.



Base Belt Thickness : 3,4 or 6mm
Pitch Between Teeth : 39.7 ±0.4
Tooth Width : 13mm
Tooth Height : 8mm



Standard width (2 rows of teeth) : 1524mm / 60"
Max recommended belt width with one row of teeth : 760mm / 30"
Distance between teeth rows, center to center : 605 ±2mm / 23.81 ±0.08"
Tooth Length: 78mm / 3.07"

Pulley Guidelines & Fabrication Options

Table 2.2

Belt Type	FHW-3 SD / FHB-3 SD		FHW-4 SD / FHB-4 SD	
MPD Base Belt	100mm	4″	140mm	5.50″
Minimum Pulley Diameter for V-Cleat				
Electrode	132mm	5.20″	155mm	6.10″
VW / VWB 10	157mm	6.18″	175mm	6.89″
VW / VWB 13	177mm	6.97″	200mm	7.87″
VW / VWB 17	217mm	8.54″	240mm	9.45″
Minimum Pulley Diameter for Flat Electrode Welded Flights				
Single Electrode 7	157mm	6.18″	180mm	7.08″
Single Electrode 9	177mm	6.97″	200mm	7.87″
Double Electrode 7	192mm	7.56″	215mm	8.46″
Double Electrode 9	NR		NR	

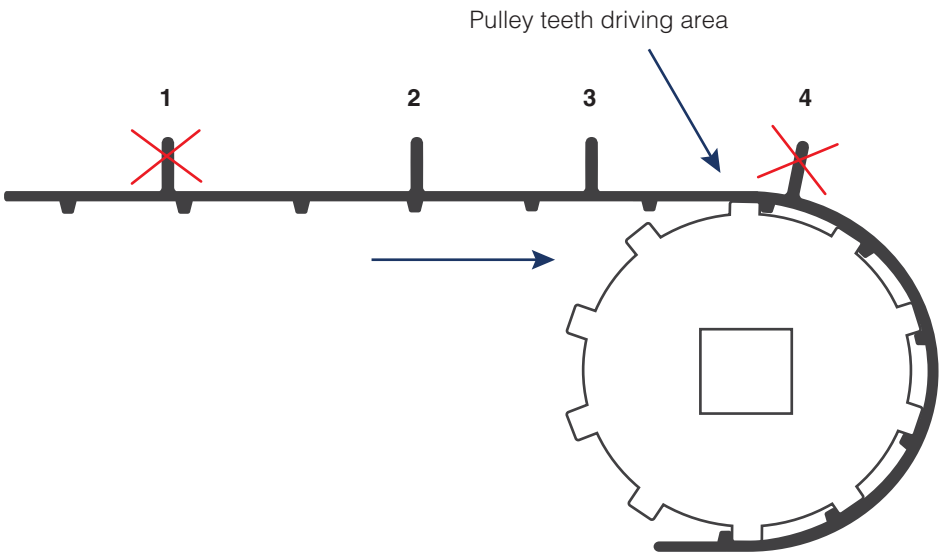
Note: **NR -** Not Recommended.
Contact your local distributor for further details regarding the 6mm thick SuperDrive™ belt.

Pulleys: when choosing the pulley size , it must be equal to or larger than the minimum pulley required.

Flights:can be welded on top of a tooth but they must not exceed the width of the tooth or between teeth. Flights can not be welded where pulley teeth make contact with the belt when driving it.

Recommended Flights Welding location

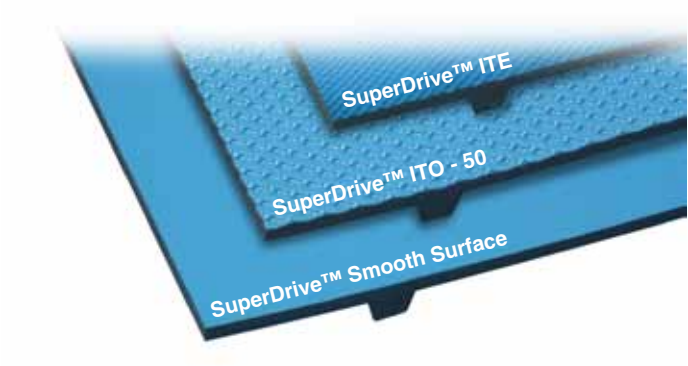
* Locations 1 & 4 are not recommended because the cleat is on top of the pulley teeth driving area.
* Location 2 & 3 are the recommended ones.



Note: In location 2, it is essential that the cleat and weld widths do not exceed the width of the belt tooth.

Technical Data

Volta 'M' Material SuperDrive™ Belts

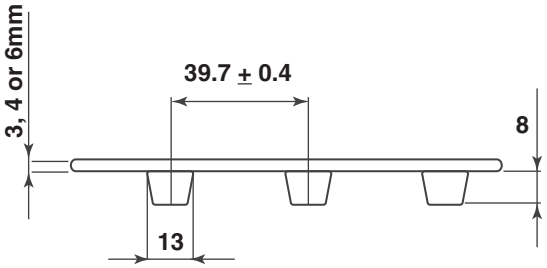


FMW-SD and FMB-SD are designed for shorter conveyors with lighter loads and where fabrications or sidewalls are needed.
We highly recommend using FMW-3-SD and FMB-3-SD with bigger pulleys for low temperature applications.

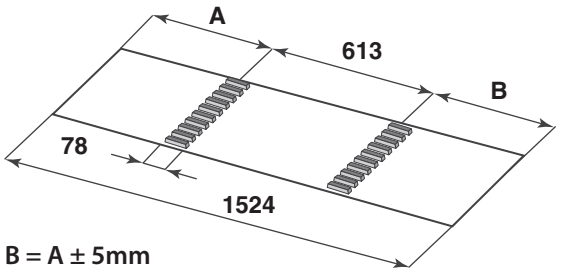
- **Material:** Volta MW, Beige / Volta MB, Blue
- **Shore Hardness:** 53D
- **Temperature Range :** -20° C to 60° C / -5° F to 140° F
- **Coefficient of Friction:** Steel: 0.5 / Stainless Steel: 0.5 / UHMW: 0.28
- **Certification:** FDA/ USDA/ USDA Dairy/ EU Approved

Product	FMB-3 SD FMW-3 SD	FMB-3 SD ITE FMW-3 SD ITE	FMB-3 SD ITO - 50	FMB-4 SD FMW-4 SD	FMB-6 SD
Belt Thickness	3	3	3	4	6
Belt weight (kg/ m ^{2}) Add for each row of teeth	3.6 kg/ m ^{2} + 0.180 kg/ m	3.6 kg/ m ^{2} + 0.180 kg/ m	3.5 kg/ m ^{2} + 0.180 kg/ m	4.8 kg/ m ^{2} + 0.180 kg/ m	7.2 kg/ m ^{2} + 0.180 kg/ m
Belt weight (lb/ ft ^{2}) Add for each row of teeth	0.74 lb/ ft ^{2} + 0.121 lb/ ft	0.74 lb/ ft ^{2} + 0.121 lb/ ft	0.71 lb/ ft ^{2} + 0.121 lb/ ft	0.98 lb/ ft ^{2} + 0.121 lb/ ft	1.48 lb/ ft ^{2} + 0.121 lb/ ft
Minimum pulley diameter (normal flex)*	80 mm/ 3¼"			120 mm/4 ¾"	240 mm/ 9.45"
Minimum pulley diameter (back flex)*	100 mm/ 4"			150 mm/ 6"	280 mm/ 11"
Max pull force (kg/ cm width)	6.25			8	12.5
Max pull force (lb/ in. width)	35			44.8	70

Note: *All inch sizes have been converted from metric sizes.



Base Belt Thickness : 3, 4 or 6mm
Pitch Between Teeth : 39.7 ±0.4
Tooth Width : 13mm
Tooth Height : 8mm



Standard width (2 rows of teeth) : 1524mm / 60"
Max recommended belt width with one row of teeth : 760mm / 30"
Distance between teeth rows, center to center : 613 ±2mm / 24.13 ±0.08"
Tooth Length: 78mm / 3.07"

Pulley Guidelines & Fabrication Options

Table 2.4

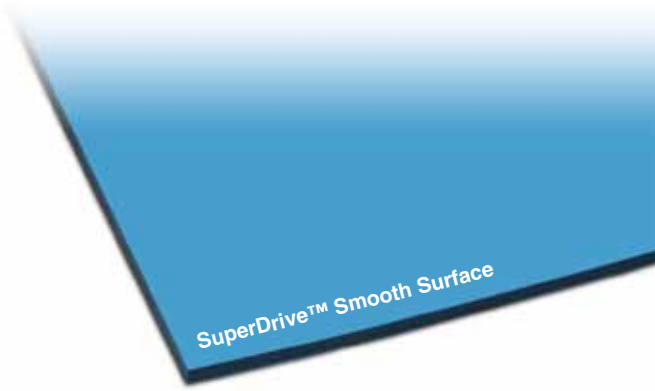
Belt Type		FMW-3 SD / FMB-3 SD				FMW-4 SD / FMB-4 SD			
MPD Base Belt		80mm		3¼″		120mm		4¾″	
Minimum Pulley Diameter for V-Cleat									
Electrode		120mm		4.72″		150mm		5.90″	
VLC / VLB 10		130mm		5.12″		170mm		6.70″	
VLC / VLB 13		140mm		5.51″		180mm		7.08″	
VLC / VLB 17		155mm		6.10″		195mm		7.68″	
Minimum Pulley Diameter for Flat Electrode Welded Flights									
Single Electrode 7		125mm		4.92″		150mm		5.90″	
Single Electrode 9		140mm		5.51″		165mm		6.50″	
Double Electrode 7		165mm		6.50″		190mm		7.48″	
Double Electrode 9		NR				NR			
Minimum Pulley Diameter for Flat High Frequency Welded Flights									
App. Temperature		Temp ≥ 0° C / 32° F		Temp < 0° C / 32° F		Temp ≥ 0° C / 32° F		Temp < 0° C / 32° F	
Flight 3 - 5 mm		101mm	3.97″	151mm	5.94″	128mm	5.04″	180mm	7.09″
Flight 6 - 8 mm		128mm	5.04″	180mm	7.09″	143mm	5.63″	200mm	7.87″
Minimum Pulley Diameter for Based Sidewalls - Normal Flex									
SW-20		92mm		3.62″		120mm		4.72″	
SW-30		92mm		3.62″		120mm		4.72″	
SW-40		100mm		3.94″		120mm		4.72″	
SW-50		110mm		4.33″		120mm		4.72″	
SW-60		120mm		4.72″		130mm		5.12″	
SW-80		155mm		6.10″		155mm		6.10″	
SW-100		210mm		8.27″		210mm		8.27″	
Minimum Pulley Diameter for Baseless Sidewalls									
		Normal Flex		Back Flex		Normal Flex		Back Flex	
B-SW 30mm/ 1”	1.6mm Thick	80mm	3.15″	110mm	4.33″	120mm	4.72″	150mm	5.90″
B-SW 40 mm/ 1.5”		90mm	3.54″	120mm	4.72″	120mm	4.72″	150mm	5.90″
B-SW 50 mm/ 2”		100mm	3.94″	150mm	5.90″	120mm	4.72″	160mm	6.30″
B-SW 60 mm/ 2.5”		110mm	4.33″	180mm	7.10″	120mm	4.72″	190mm	7.48″
B-SW 80 mm/ 3”		130mm	5.12″	230mm	9.05″	130mm	5.12″	240mm	9.45″
B-SW 100 mm/ 4”		160mm	6.30″	300mm	11.81″	160mm	6.30″	310mm	12.2″
B-SW 130 mm/ 5”	2mm Thick	210mm	8.27″	400mm	15.75″	210mm	8.27″	420mm	16.53″
B-SW 150 mm/ 6”		250mm	9.84″	450mm	17.72″	250mm	9.84″	470mm	18.5″
Minimum Pulley Diameter for 2 Upper Side Guides: see page 15									

Note: NR - Not Recommended.
Contact your local distributor for further details regarding the 6mm thick SuperDrive™ belt.
All inch sizes have been converted from metric sizes.

- **Electrode welded cleats:** we recommend welding the cleats above the teeth location and cleat thickness should not exceed the tooth base width.
- **Sidewalls:** must be positioned at a minimum distance of 100mm from the belt teeth.
- **Flights:** can be welded on top of a tooth but they must not exceed the width of the tooth or between teeth, but not in the area where pulley teeth make contact with the belt when driving it. (see page 5)
- **Pulleys:** when choosing the pulley size , it must be equal to or larger than the minimum pulley required.

Technical Data

Volta 'LT' Low Temperature Material SuperDrive™ Belts

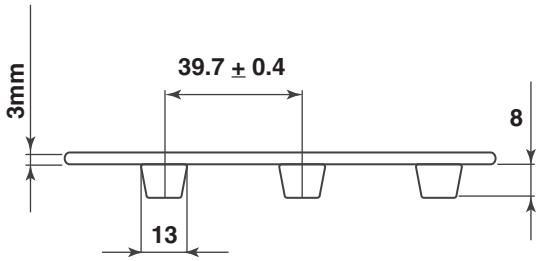


- **Material:** Volta MB LT, Blue
- **Shore Hardness:** 95A/ 46D
- **Temperature Range :** -35° C to 35° C / -31° F to 95° F
- **Coefficient of Friction:** Steel: 0.55 /Stainless Steel: 0.55 /UHMW: 0.30
- **Certification:** FDA/ USDA/ USDA Dairy/ EU Approved

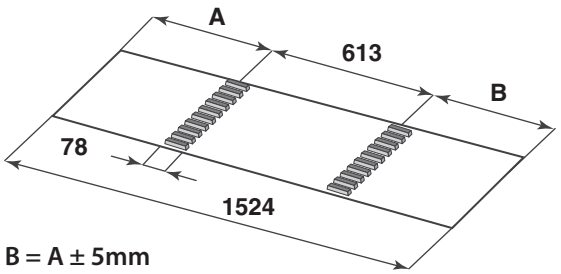
Table 2.5

Product	FMB-3 SD LT
Belt Thickness	3
Belt weight (kg/ m^2) Add for each row of teeth	3.6 kg/ m^2 + 0.180 kg/ m
Belt weight (lb/ ft^2) Add for each row of teeth	0.74 lb/ ft^2 + 0.121 lb/ ft
Minimum pulley diameter (normal flex)*	80 mm/ 3¼"
Minimum pulley diameter (back flex)*	100 mm/ 4"
Max pull force (kg/ cm width)	3
Max pull force (lb/ in. width)	16.8

Note: *All inch sizes have been converted from metric sizes.



Base Belt Thickness : 3mm
Pitch Between Teeth : 39.7 ±0.4
Tooth Width : 13mm
Tooth Height : 8mm



Standard width (2 rows of teeth) : 1524mm / 60"
Max recommended belt width with one row of teeth : 760mm / 30"
Distance between teeth rows, center to center : 613 ±2mm / 24.13 ±0.08"
Tooth Length: 78mm / 3.07"

Pulley Guidelines & Fabrication Options

Table 2.6

Belt Type		FMW-3 SD LT			
MPD Base Belt		80mm		3¼"	
*Minimum Pulley Diameter for V-Cleat (working temp. range -20°C to 40°C (-4°F to 104°F))					
Electrode		120mm		4.72"	
VLC / VLB 10		130mm		5.12"	
VLC / VLB 13		140mm		5.51"	
VLC / VLB 17		155mm		6.10"	
Minimum Pulley Diameter for Flat High Frequency Welded Flights					
App. Temperature		Temp ≥ 0° C	Temp ≥ 32° F	Temp < 0° C	Temp < 32° F
Flight 3 - 5 mm		101mm	3.97"	151mm	5.94"
Flight 6 - 8 mm		128mm	5.04"	180mm	7.09"
Minimum Pulley Diameter for Based Sidewalls (working temp. range -20°C to 40°C (-4°F to 104°F))					
SW-20		92mm		3.62"	
SW-30		92mm		3.62"	
SW-40		100mm		3.94"	
SW-50		110mm		4.33"	
SW-60		120mm		4.72"	
SW-80		155mm		6.10"	
SW-100		210mm		8.27"	
Minimum Pulley Diameter for Baseless Sidewalls					
		Normal Flex		Back Flex	
B-SW 30mm/ 1"	1.6mm Thick	80mm	3.15"	110mm	4.33"
B-SW 40 mm/ 1.5"		90mm	3.54"	120mm	4.72"
B-SW 50 mm/ 2"		100mm	3.94"	150mm	5.90"
B-SW 60 mm/ 2.5"		110mm	4.33"	180mm	7.10"
B-SW 80 mm/ 3"		130mm	5.12"	230mm	9.05"
B-SW 100 mm/ 4"		160mm	6.30"	300mm	11.81"
B-SW 130 mm/ 5"	2mm Thick	210mm	8.27"	400mm	15.75"
B-SW 150 mm/ 6"		250mm	9.84"	450mm	17.72"
Minimum Pulley Diameter for 2 Upper Side Guides: see page 15					

Note: All inch sizes have been converted from metric sizes.
*Special guides suited to Low Temperature (LT) applications are also available.

Guidelines and Suggested Materials for the Fabrication of FMB-3 SD LT belt

- **Sidewalls:** It is possible to weld Sidewalls from L material to the LT belts. Sidewalls must be positioned at a minimum distance of 100mm from the belt teeth.
- **Flights:** We recommend using LT material as preferred Flights material. MB material is also acceptable but in this case you should make sure that the temperature of your application does not exceed the regular MB LT materials limit. Flights can be welded on top of a tooth but they must not exceed the width of the tooth or between teeth, but not in the area where pulley teeth make contact with the belt when driving it. (see page 5)
- **Electrodes:** We do not recommend using electrodes for welding flights on these belts at all. The entire belt area around the welded electrode becomes rigid and we lose the belt flexibility advantage which characterizes Volta regular flat belts.
- **HF Welding:** We approve HF welding of flights on these LT belts only.
- **Endless Making:** We suggest joining these LT belts with a Butt weld using the FBW Tool.

3. Accessories

Volta Belting provides all the accessories required to operate the SuperDrive™ belt.

Volta Pulleys are manufactured from abrasion resistant materials that ensure a long and reliable operating life. All pulleys are made from FDA approved material.

Drive Pulley

SuperDrive™ pulleys are compatable with both 'H' and 'M' material belts.The standard pulley diameters are 100 mm (4"), 150 mm (6") and 200 mm (8") with a square bore. Other dimensions are available on request. For more information consult your local Volta dealer.

Drive Pulley

Tail Pulley

Tail Pulley

The tail pulley has smooth surfaces with a guide groove for the belt teeth. This pulley is available with the same dimensions and bore description as the drive pulley.

Support Pulley

The support pulleys are designed to support the belt for heavy loads or when the belt is significantly wider than the drive and tail pulleys (see Selection of Support Pulleys in Page 26). The support pulley has a smooth surface and is available in standard width of 100 mm/4". This pulley is available with the same diameter and bore description as the drive pulley.

Support Pulley

SuperDrive™ Pulley Specifications

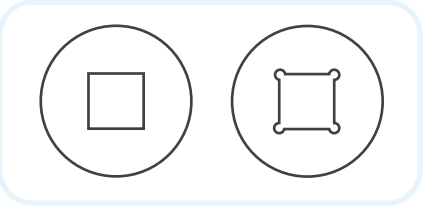
Number of Teeth	SuperDrive™ 3mm Thick Belts				SuperDrive™ 4mm Thick Belts				SuperDrive™ 6mm Thick Belts*			
	O.D. Ø		Pulley Pitch Ø		O.D. Ø		Pulley Pitch Ø		O.D. Ø		Pulley Pitch Ø	
	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
8	100.5	3.96	103.50	4.07	-	-	-	-	-	-	-	-
10	126.40	4.98	129.40	5.09	-	-	-	-	-	-	-	-
12	151.40	5.96	154.40	6.08	152.30	6.0	156.30	6.15	-	-	-	-
14	177.10	6.97	180.10	7.09	178.40	7.02	182.40	7.18	-	-	-	-
16	202.90	7.98	205.90	8.10	204.50	8.05	208.50	8.20	-	-	-	-
18	228.60	9.0	231.60	9.12	230.50	9.07	234.50	9.23	-	-	-	-
20	254.30	10.01	257.30	10.13	256.60	10.1	260.60	10.26	-	-	-	-
23*	-	-	-	-	-	-	-	-	289.9	11.41	295.9	11.65
24*	-	-	-	-	-	-	-	-	302.8	11.92	308.8	12.15

Note: 4mm material SuperDrive™ belts are usually used in heavy load applications and therefore, we recommend using 12 teeth or larger Drive Pulleys to ensure more engagement between belt and Drive Pulley teeth.
6mm material SuperDrive™ belts are usually used in heavier load applications and therefore we recommend using the largest Drive Pulley as possible to ensure more engagement between belt and Drive Pulley teeth.
* These special design pulleys are ONLY suitable for 6mm thick belts.

- Standard Drive & Tail Pulley Width = 190^{+10} mm / $7\frac{1}{2}^{+3/8}$"
- Standard Support Pulley Width = 95^{+5} mm / $3\frac{3}{4}^{+3/16}$"
- Standard Square Bore Dimensions = 40mm / 1½"
- Non-Standard Round Bores are available upon request.
- Non-Standard Square Bore Dimensions, available upon request: ■ 25mm / 1"; ■ 50mm / 2"; ■ 2½".

Pulley Bore Description

The SuperDrive™ drive, tail and support pulleys are available in two standard square bore dimensions 1 1/2" and 40 mm. The 1 1/2" square bore dimension is also available with round corners. The round corner bore is designed to provide a channel for water to carry debris away during washdown. Pulley bore dimensions should be chosen according to the load on the shaft to avoid shaft deflection and to transmit the required torque.



Standard bore Round Corner bore

Pulley bore patterns

Securing SuperDrive™ Pulleys: Locking Collars

Standard Metal Locking Collar is made of two parts of stainless spring wire that locks with two bolts. Can be assembled without dismantling the shaft. It can be used with all pulley types and is available in 1 1/2"//40mm.

Square Metal Locking Collar

Square Plastic Locking Collar (UHMW) is made of two plastic parts that locks with two bolts. Can be assembled without dismantling the shaft. It can be used with pulleys that have 12 or more teeth and are available in 1 1/2"//40mm. Can be ordered with round corners for 1 1/2" shaft. Locking Collar face width = 20mm.

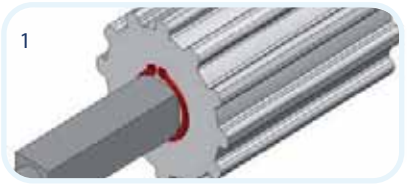
Square Plastic (UHMW) Locking Collar

Round Plastic Locking Collar (UHMW) is made especially for 8 teeth pulley, although it can be used with all pulley types. Dismantling the shaft is required in order to assemble this locking collar. Can be ordered in 1 1/2"// 40mm and also with round corners for 1 1/2" shaft.
Locking Collar face width = 20mm.

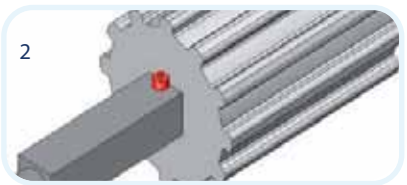
Round Plastic (UHMW) Locking Collar

Additional Options for Securing SuperDrive™ Pulleys

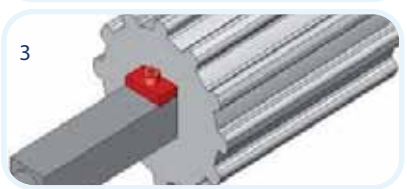
Volta offers three options for those customers who prefer to use a different method of securing the pulleys to the shaft. We recommend checking with your engineering department regarding the effects this will have on your conveyor shafts. Volta does not supply material for this procedure nor is responsible for damage or weakening of the shaft when using one of these options.



1. Use a "C" ring on the shaft on either end of the pulley. Cutting a groove suitable for the thickness of the "C" ring you are using is necessary. This method of securing the pulleys is standard with modular belting.



2. Drill and thread a hole at either end of the pulley. Mount an Allen screw in each hole to secure the pulley.



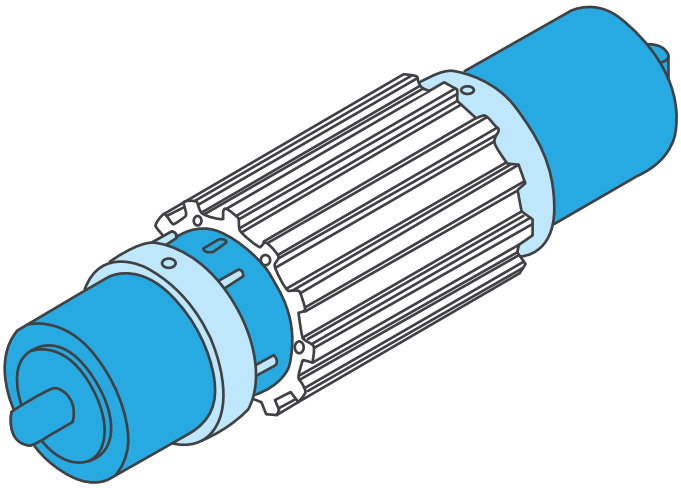
3. Mount a small piece of flat metal on either end of the pulley. Drilling and threading a hole in the shaft and mounting an Allen screw is necessary to secure the metal pieces.

Motorized Pulley

In the motorized pulleys, the motor, gearbox and shaft are totally enclosed within a drum motor shell. Power from the motor is transmitted through the gearbox, which is coupled to a geared rim fixed to the drum end housing.

It is especially useful on fish factory ships, meat and poultry processing lines and in the production of milk and dairy products. In these applications, the motor and gears are enclosed within the drum which makes it impervious to high pressure cleaning. This is a major benefit in food processing where hygiene is of the utmost importance. An added benefit when using our SuperDrive™ is that it creates a conveying system that is hygienic and easily cleaned, while withstanding the high pressure and temperature of water used in cleaning food processing facilities.

We cooperate with several of the best known motorized pulley manufacturers to develop drum motors fitted with pulleys and teeth suitable to the SuperDrive™ conveyor belt. Please contact your local Volta belting distributor or Volta Belting for more information.



For a better conveyor performance, we recommend using a UHMW drum adaptor. The drawing shows two stainless steel rings which have 3 or more pins that are inserted into the drum shell from both sides. The stainless steel rings are connected by 3 bolts or more to the drum motor shell and are placed in the rings and inserted into small grooves in the drum motor shell.

The ring diameter should be less than the diameter of the pulley teeth base to release the dirt and clean the pulley.

We recommend that the thickness of the pulley teeth base is not less than 15 mm (5/8 in). The stainless steel rings can be shaped sprocket-like or similar to the shape of the teeth. Then the pins can be inserted into the teeth area of the shell.

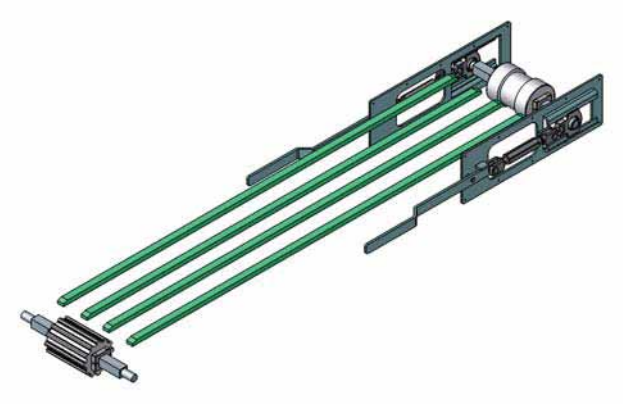
4. Conveyor Construction

Classic Conveyor Construction

The classic conveyor construction consists of the following parts:

- Volta Drive Pulley
- Slidebed made of UHMW Strips
- Tail Pulley with Tension Device
- Additional support pulleys depending on the belt width and the projected load (see Belt Calculations on Page 28).
- Return Rollers
- Snub Rollers when needed

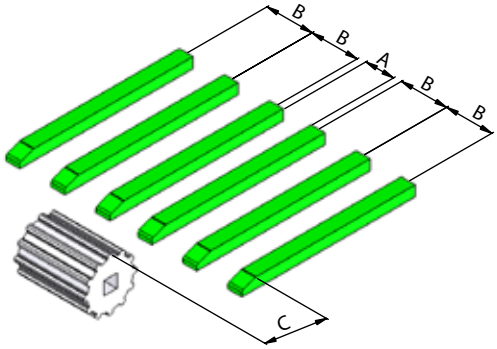
In particularly long conveyors with heavy loads we recommend using roller slide bed as shown on Page 15.



Many conveyors have a special construction that allows a complete and quick removal of the belt without using a lace.

Conveyor Construction Guidelines

Suggested Conveyor Slidebed Construction



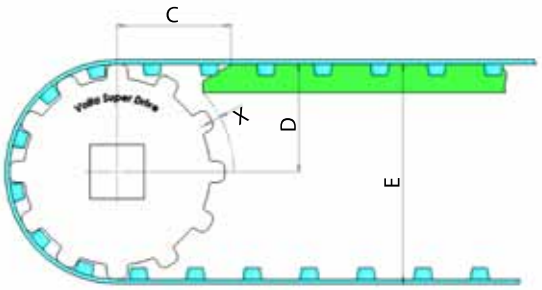
UHMW Strips

Recommended dimensions:

A. Distance between Guide Strips for the belt teeth: 85mm (3.35”)

B. Distance between Support Strips: 100-150mm (4-6”)

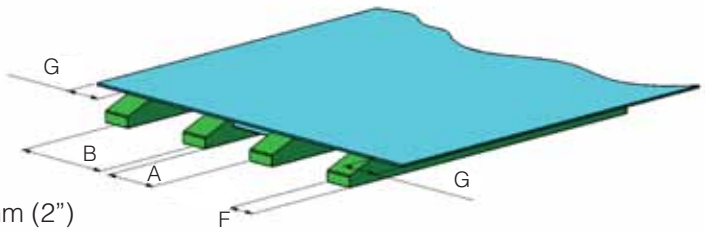
C. Distance of the front edge of the slide strip from the pulley depends on the cross - section of the slide strip and the slide strip supports. ‘C’ should be kept to a minimum possible distance as long as ‘X’ is at least 20mm



D. Distance between Drive Pulley Centre and Strip Surface: half of the drive pulley diameter.

E. Distance between Slide Bed Surface and Return Bed Surface at180° contact engagement between the belt and pulley: pulley pitch diameter (= pulley diameter + belt thickness).

F. Strips width: 25-50mm (1-2”)



G. Maximum distance between the belt edges and Strip : 50mm (2”)

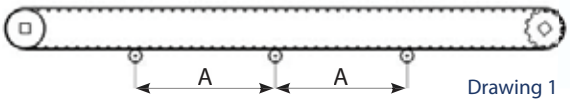
Return Rollers

If the conveyor has a tension device and the belt has been tensioned between 0.3 - 0.5%, it will work with almost any arrangement of return rollers. Usually the maximum distance between the rollers 'A' is 1.5 meters (5 ft) (See drawing 1).

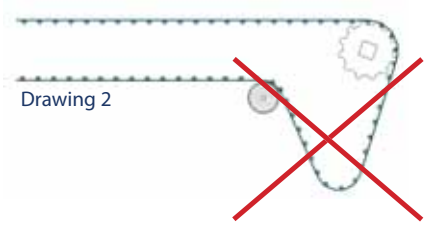
The belt can be allowed to sag between the return rollers. However, it is important to avoid slack around the drive pulley which will prevent the belt teeth from disengaging from the drive pulley during operation (See drawing 2).

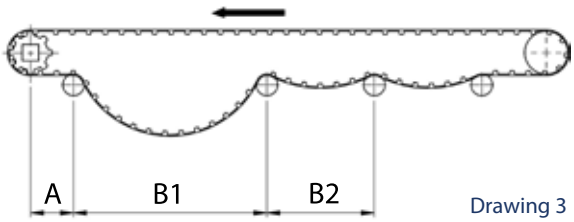
The distance between the return rollers should allow the belt weight to prevent slack around the drive pulley.

When positioning the return rollers, you can have a longer space in one location which can be used for the belt weight to create sagging at this location and ensure that sagging in the drive pulley area is prevented (See drawing 3).



Drawing 1


Drawing 2



Drawing 3

Standard Belt Tensioners

The SuperDrive™ belt requires hardly any pretension on most applications. The tension device has two functions on the conveyor. The first is to facilitate the mounting and splicing of the belt. Secondly, the quick release tension device makes cleaning of belt easier. Opening the quick release tension device provides slack between the belt and pulleys, making cleaning more efficient. Belt tensioning length and structure depends on a number of factors: conveyor length, cleaning method and conveyor structure. As a minimum, Volta recommends using a take-up of at least 5-8 inches (130-200 mm).

Quick Release Tensioner

The quick release tensioner maintains a consistent tensioning of the belt when returning the tensioner to its original position after releasing the belt for cleaning. The picture shows the tensioner in the open position. The belt may be lifted to provide easy and effective access to the underside of the belt, guides and pulleys for cleaning. After cleaning has been completed, close the quick release tension device in order to return the belt to its correct pretension and alignment without additional adjustments.

Snub Rollers

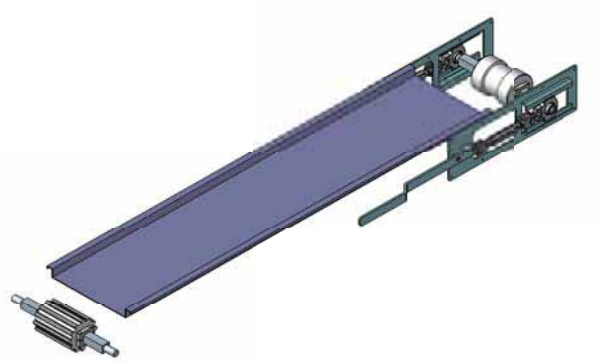
Snub rollers increase the arc of contact on the drive pulley, therefore, eliminating slack which can cause the belt to jump. Snub rollers are widely used when working with heavy loads or in order to prevent the belt from jumping out of the teeth for any reason. The snub roller is placed very close to the drive pulley, to prevent any slack between the drive pulley and the snub roller.

Conveyor Retrofit

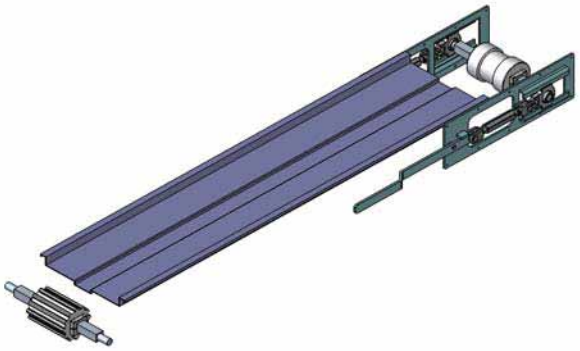
Retrofit of Conveyor with a Flat Slidebed

These conveyors typically have outside walls. In this case strips are not necessary to guide the belt teeth (remember that the belt should not press against either one of the conveyor walls). Several options for retrofit are available :

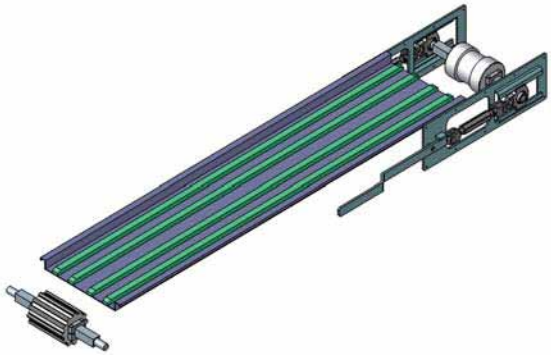
1. Flat Slidebed
The teeth can ride on the flat slidebed without affecting the belt operation. In this case, because of the SuperDrive™ teeth, the centre line of the belt will be slightly higher than the edges of the belt. This method is less recommended when using 'M' material belts.



2. Slidebed with a groove to accommodate SuperDrive™ teeth
When a groove is added to the slidebed the belt operation becomes smoother and more efficient. In this case the belt should be guided by its teeth in the centre groove and it should not touch the conveyor bed sidewalls.
This construction is not recommended with 'M' belts in applications with heavy loads and long conveyors.



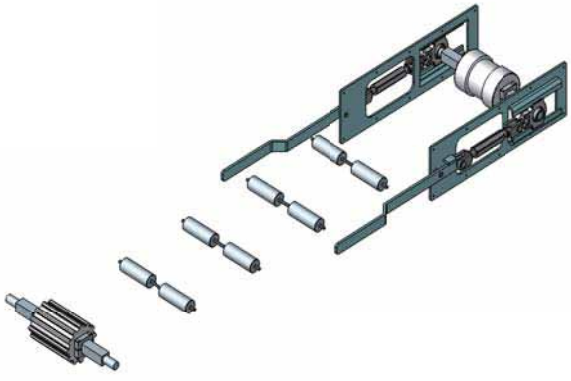
3. Slidebed with UHMW strips
Slidebed as seen in opposite drawing is the most highly recommended type, especially for SuperDrive™ 'M' material belt applications. The UHMW strips reduce the coefficient of friction between the belt and the slidebed. This increases the load that the belt is capable of carrying. In this case, it may be necessary to raise the position of the drive and tail pulleys.



Retrofit of Conveyor with a Roller Slidebed

This type of conveyor is not typical of food applications. If you wish to install a SuperDrive™ belt on a roller bed conveyor, use rollers with grooves in order to guide the teeth and allow a smooth belt operation.

Stainless Steel slidebed is least recommended especially when using SuperDrive™ 'M' belts.



"Z" or Swanneck Conveyor Construction

The "Z" or swanneck conveyor is in relatively common use for lifting the product from a lower to an upper level.

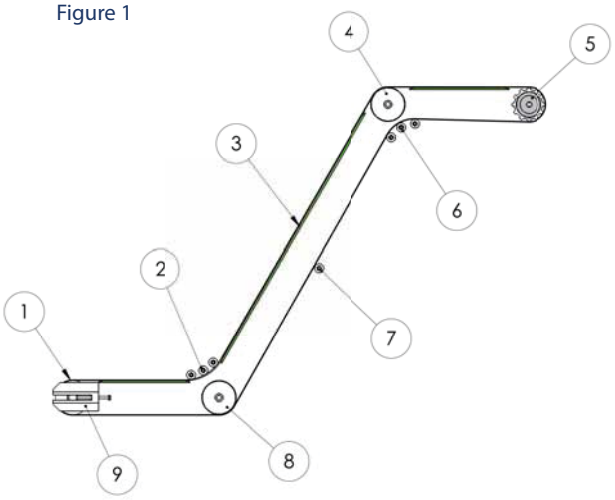
The SuperDrive™ is ideally suited to this application for several reasons:

- The SuperDrive™ material is relatively stiff across the belt and will not bend in the middle when the belt changes from a horizontal to an angled position.
- The SuperDrive™ operates without tension, therefore, eliminates problems of holding the belt in place.

The direction change (horizontal to angle) can be made as for regular belts by using a roller or a set of small rollers (see drawing below).

UHMW Strip Bed Construction

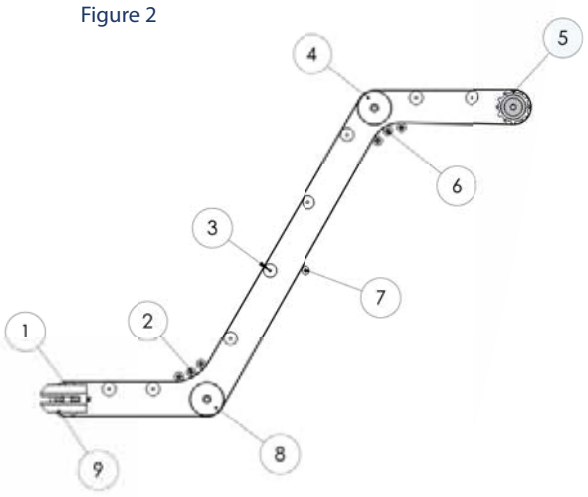
Figure 1



1. Tail Pulley
2. Roller Set: Transition Horizontal to Incline
3. Incline UHMW Slide Bed
4. Top Roller: Transition Incline to Horizontal
5. Drive Pulley.
6. Roller Set: Return transition horizontal to decline
7. Return Support Roller
8. Bottom Roller: Return transition decline to horizontal
9. Tensioning Device for tail pulley

Roller Bed Construction

Figure 2



1. Tail Pulley
2. Roller Set: Transition Horizontal to Incline
3. Roller Slide Bed
4. Top Roller: Transition Incline to Horizontal
5. Drive Pulley.
6. Roller Set: Return transition horizontal to decline
7. Return Support Roller
8. Bottom Roller: Return transition decline to horizontal
9. Tensioning Device for tail pulley

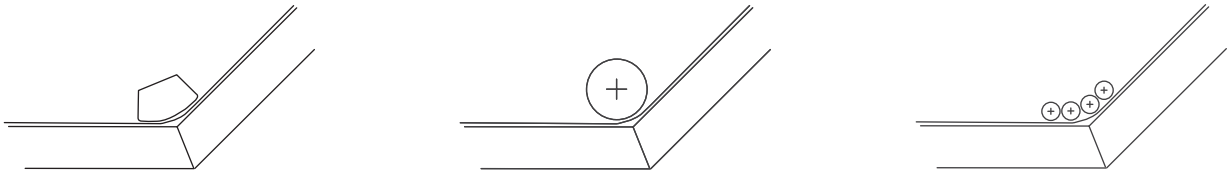
Figure 1 & 2 demonstrate typical Z-elevator conveyor constructions. The difference between the 2 configurations is the elevating slide belt type. In Fig. 1 a UHMW strip bed is shown and Fig 2 shows a roller slide bed. In applications with heavy loads & long conveyors it is important to use the roller slide bed type (Fig. 2) especially when using 'M' type belts.

In transition areas 2 + 4 – the belt rubs against the conveyor curved construction and creates a high strain area. Therefore, it is very important to use rollers at these two transition points which will minimize the strain and friction at these points.

There are 3 typical options for the transition areas.

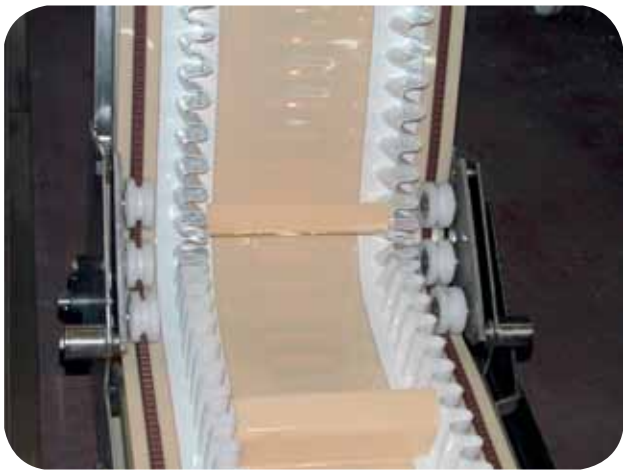
- The belt curve should be the maximum possible size and not less than the minimum pulley diameter of the belt + fabrications. In principle, the bigger the curve, the better. It is easiest to apply the roller set to larger curves.

- Do not use the shoe option with 'M' material belts, heavy loads or long conveyors. This type is least recommended.



Swanneck conveyor - transition rollers/ shoe (direction change) options

- For belts 600mm or wider we recommend using guides on both upper edge sides of the belt. The belt guides go through the v-pulleys in the transition section to hold the belt (see the picture). This is the most recommended method.



- When using wide belts, it is very important to support the belt on the return side. Using cleats may cause problems and you may have to make a center gap in the cleat to enable supporting the belt.

Minimum pulley Specifications for SuperDrive™ belt with two side guides

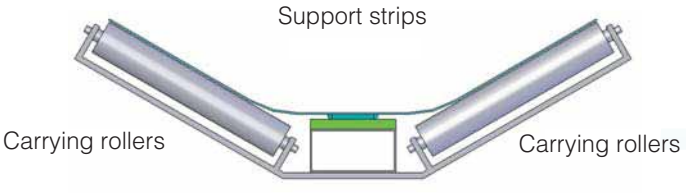
Guide Type	SuperDrive™ 'M' 3mm		SuperDrive™ 'M' 4mm	
	Normal Flex	Back Flex*	Normal Flex	Back Flex*
VLB/VLC-13	145mm / 5.70"	150mm / 5.90"	185mm / 7.28"	200mm / 7.87"
VLB/VLC-17	177.5mm / 7"	175mm / 6.89"	217.5mm / 8.56"	225mm / 8.85"
CLB/CLC-13	124mm / 4.88"	140mm / 5.51"	164mm / 6.45"	190mm / 7.48"
CLB/CLC-17	146mm / 5.74"	160mm / 6.30"	186mm / 7.32"	210mm / 8.26"
VSB/VSC-13	125.5mm / 4.94"	135mm / 5.31"	165.5mm / 6.50"	185mm / 7.28"
VSB/VSC-17	145mm / 5.70"	150mm / 5.90"	185mm / 7.28"	200mm / 7.87"
CSB/CSC-13	110.8mm / 3.96"	128mm / 5.04"	150.8mm / 5.93"	178mm / 7"
CSB/CSC-17	124mm / 4.88"	140mm / 5.51"	164mm / 6.45"	190mm / 7.48"

Note: * Back flex location can be seen in positions (2) and (6) on Figure 1 & 2 shown on page 16.
Note: Contact your local distributor for further details regarding the 6mm thick SuperDrive™ belt.

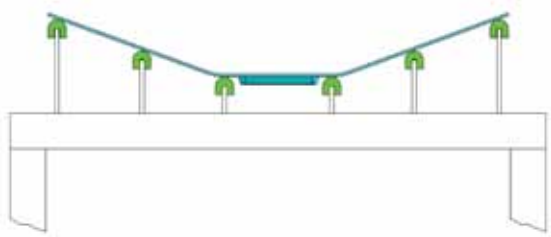
Trough Conveyors

The SuperDrive™ belt can be used in trough conveyors. The belt teeth are usually positioned at the center of the belt. When designing the trough conveyor allow enough space for the belt teeth to lay flat.

Trough Bed Construction

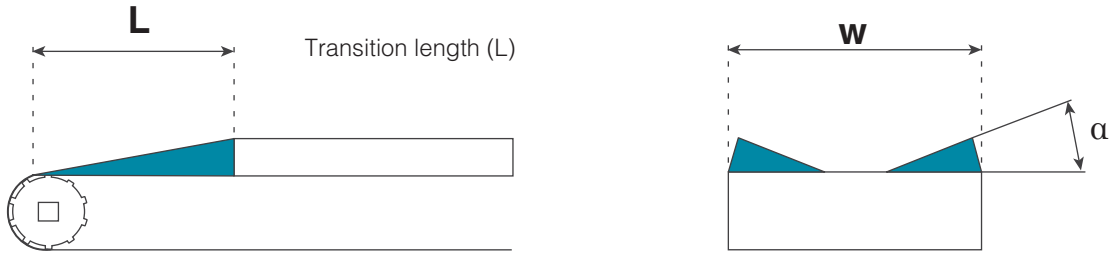


Roller bed construction



Transition Length

There must be a minimum distance between the drive/ tail pulleys and the beginning of the trough since high tension is created in the belt sides and edges.This distance is the transition length.

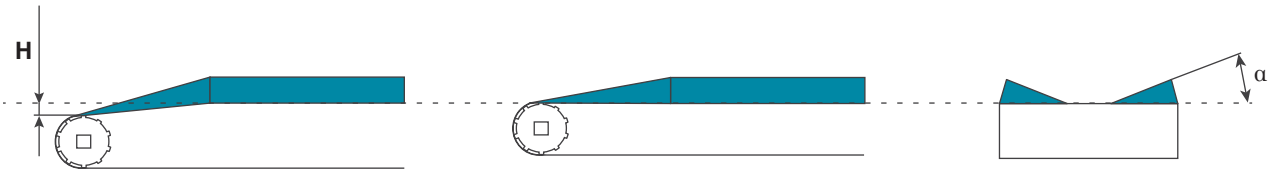


L = C * W **L** - Transition length = **C** - Factor from table* **W** - Belt width

Trough Angle ( )	10°	20°	30°	45°
C Factor	1	1.5	1.5	2

The Pulley Construction and Height Location

Due to the high tension in the belt sides and edges, it is very important to use support pulleys to cover all the belt face length (width) or at least 80% of the face length, particularly on the belt edges.
The drive and tail pulleys should be placed at the full trough depth or 20 - 40 mm//¾ " - 1½" lower than the trough base depending on the conveyor construction and the belt width.This will enable the belt to take the trough shape when the loads are low, the belt is relatively narrow or the belt is short.



Pulley lower than the trough depth

Pulley at the full trough depth

Full trough depth

Belt Tension

The belt used on a trough conveyor must have a tension of 0.3 - 0.5% for the belt to take the trough shape.

Allowed belt trough angle - FHW- 3 SD and FHB-3 SD

Belt Width / Trough Angle ( )	300 mm/12”	400 mm/16”	500 mm/20”	600 mm/24”
10°	No	Yes	Yes	Yes
20°	No	Yes	Yes	Yes
30°	No	Yes	Yes	Yes
45°	No	*	*	*

Note: Discuss trough angle with your local distributor when choosing thicker SuperDrive™ belt.

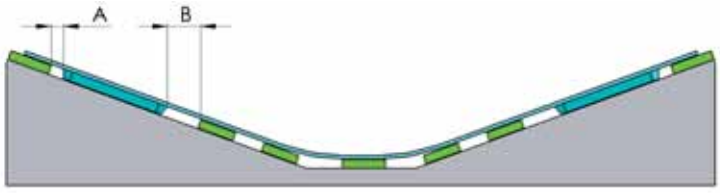
Allowed belt trough angle - FMW- 3 SD and FMB-3 SD

Belt Width / Trough Angle ( )	300 mm/12”	400 mm/16”	500 mm/20”	600 mm/24”
10°	*	Yes	Yes	Yes
20°	*	Yes	Yes	Yes
30°	*	Yes	Yes	Yes
45°	*	*	Yes	Yes

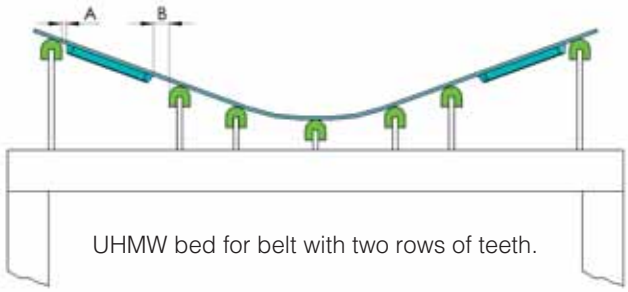
Note: * When loaded, the belt will take the trough shape.
Note: Discuss trough angle with your local distributor when choosing a thicker SuperDrive™ belt.

You may also use a side shoe to form the trough shape in the belt; in this case, the belt must be supported by the trough bed. The side shoe should only be used in short sections. At this side shoe point, the belt must be supported with an underside support piece that is longer than the side shoe piece.

Construction of Trough Conveyor when Using SuperDrive™ Belt with Two Rows of Teeth



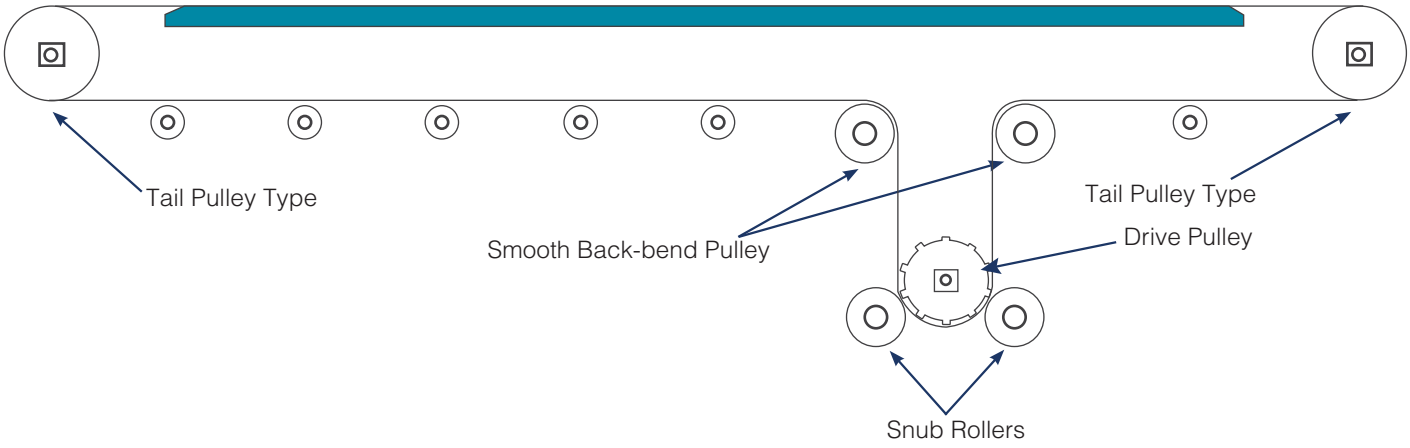
Trough stainless steel bed for belt with two rows of teeth.



UHMW bed for belt with two rows of teeth.

The same principle as in the belt with one row of teeth should be taken into consideration when strips are used to support the belt. It is important to leave a gap between the belt teeth and the nearest strip to the center side (B) to enable the belt to take the trough shape. The belt can be guided by the strips on the teeth closest to the outer side (A). When adding UHMW strips on an existing frame (see figure above), the strips should be at least 10 mm (3/8”) high.

Center Drive Conveyor



This conveyor is used in two typical applications:

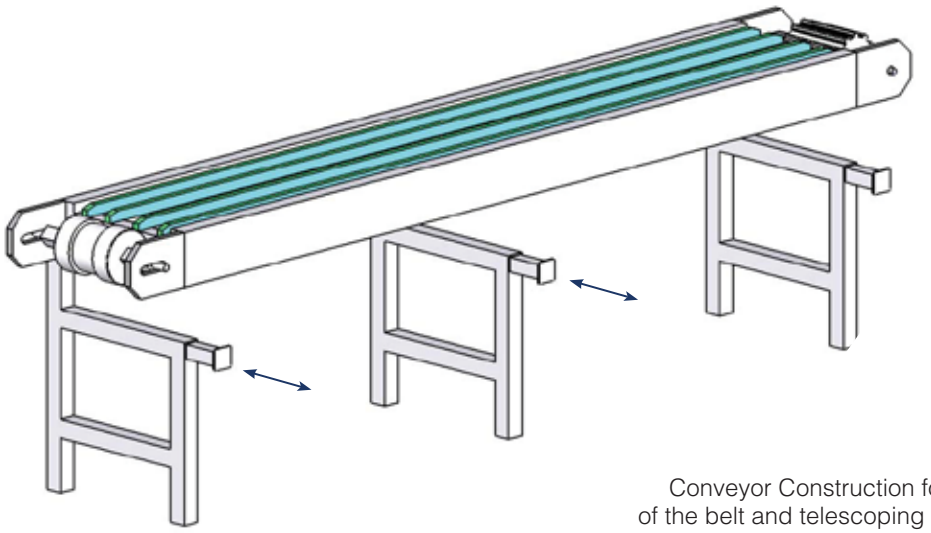
• One option is when the drive pulley is large and tail pulleys can be much smaller within the limitations of the minimum pulley diameter of the base belt making the conveyor most suitable for tight transition of products. Only one snub roller can be used. In many cases only one snub roller is used by positioning it tightly against the drive pulley.

• Another option is when the conveyor works in two directions. In this case you would need two snub rollers to ensure smooth working.To prevent slippage and jumping the belt must be tensioned up to 0.5%. In most cases, snub rollers are placed both before and after the drive pulley, positioned tightly against the drive pulleys on both sides. This ensures smooth operation when the belt is running in both directions.

Removing the Belt for Cleaning

There are a number of options in the conveyor construction that allow the belt to be removed from the conveyor without being opened.

• Quick Release Tensioner - This device permits the release of belt tension without losing belt alignment (Page 14).
In some conveyors the telescoping supports are used. During normal operation of the conveyor, the supports are flush with the sides of the conveyor. During cleaning or maintenance, the supports are pulled out and are in a position to hold the conveyor belt during cleaning and maintenance (see drawing).
• The Hinge Lace or Metal Lace can be used to open the belt for cleaning and maintenance (Page 22).



Conveyor Construction for quick dismounting
of the belt and telescoping supports to hold the belt

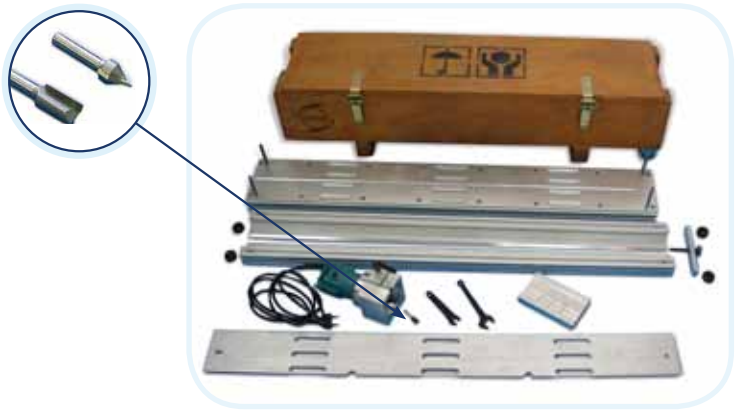
5. Splicing the SuperDrive™

The SuperDrive™ conveyor belt is extruded with a series of teeth as an integral part of the belt. These teeth are designed to mesh with the teeth on the SuperDrive™ drive pulley. To ensure efficient performance, it is necessary to maintain the spacing between the teeth in the region of the weld.

We recommend using Volta Tools for this procedure. These tools are designed for use with all our belts and materials. They are also designed to maintain the correct spacing between the teeth on the SuperDrive™ belt.

FT - Electrode Welding Kit

The FT Welding System is a tool for electrode welded endless making highly suitable for Volta flat belts and SuperDrive™, DualDrive and DualDrive SP. The FT Welding System uses a router to cut the angle on the belt edges and to trim the weld on completion. The weld is carried out by using a Leister Hot Air Gun and Volta electrodes. When joining up to 2mm thick belts, use the 7mm section electrode and for a belt thicker than 2mm, the 9mm section electrode is used. This tool is supplied with a built-in adaptor for welding SuperDrive™ belts. The FT tool is capable of joining belts up to a width of 1500mm.



FT electrode Welding kit

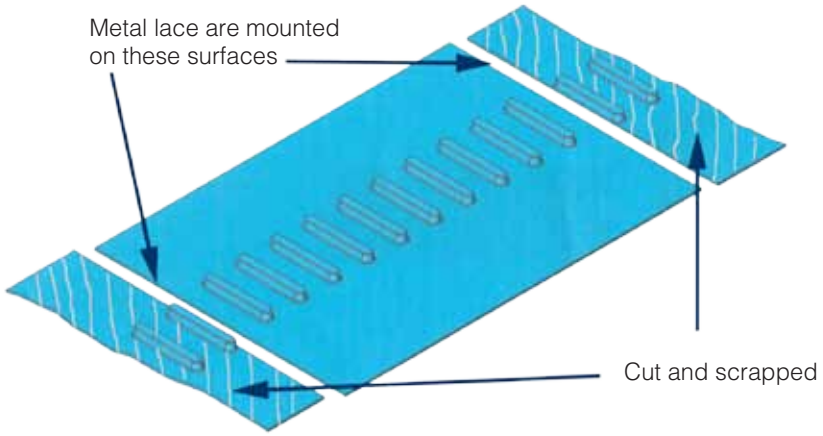
FBW Welding Kit

FBW Flat Butt Welding Tool

The FBW System was created to butt-weld flat belts making them endless. The FBW Welding System can be used for Super-Drive™, DualDrive, DualDrive SP and special textured top flat belts. The FBW tool is capable of joining belts up to a width of 2100mm.

Metal Lace

- There are occasions when it may be necessary to splice the SuperDrive™ belt using lace.
- When working with lace, it is important that you work according to the recommendations of the lace manufacturer.
- When using lace for splicing the SuperDrive™ belt, the Pull Force calculations provided by Volta are not applicable.
- The distance between the teeth at the splice must be the same as the distance between the teeth on the rest of the belt.



Note: The spacing at the splice can be reduced by up to 2-3 mm without adversely affecting belt operation. However, the distance between the teeth should never be increased.

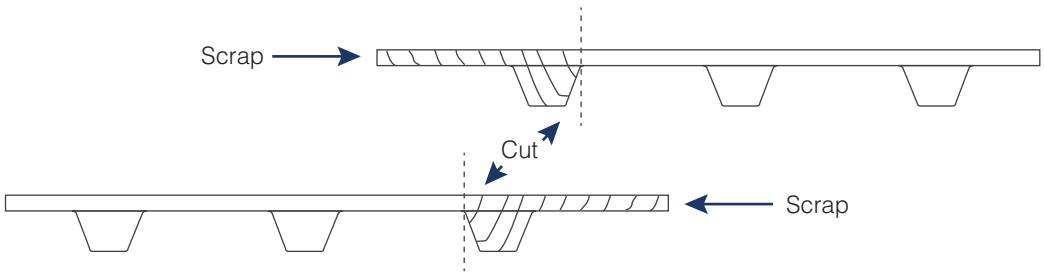


Figure 5a: Tooth pattern after closing the SuperDrive™ belt with lace

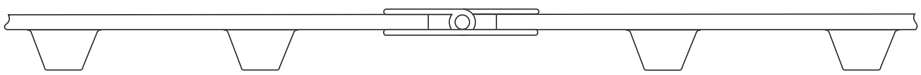


Figure 5b: Shows the correct spacing between teeth with one missing tooth

With some lacing products, such as the Alligator brand model RS62 and RS125, it may be necessary to remove one tooth completely. For these products, it will be necessary to cut each end of the belt at the base of a tooth (Figure 5a). After mounting the Alligator brand metal lacing, the belt will have a gap of one tooth (Figure 5b). The loss of one tooth will not affect the operation of the belt. We do not recommend using this method when using pulleys of 12 teeth or less.

Plastic Hinge Lace

The Plastic Hinge Lace allows you to easily open the belt by taking the hinge pin out, clean or service the conveyor, reinstall the belt and close the lace with a new pin. The Plastic Hinge Lace is made of Volta homogeneous food approved materials and is compatible with Volta M family product belts. Volta belts are renowned for their homogeneous and hygienic characteristics and, therefore, they do not require opening and closing on a regular basis - unlike modular belts.

Closing belt with Universal Lace

Hinge Lace Benefits

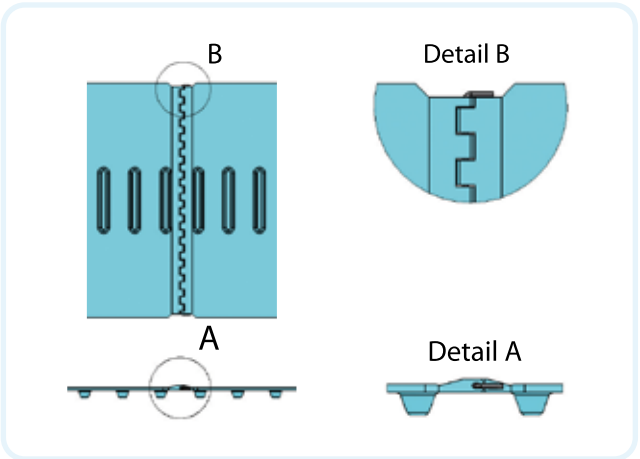
Easy Open-Close Technique

The fastening structure allows you to easily open the Plastic Hinge Lace by removing the hinge pin from the lace. After setting up the belt on the conveyor, fasten the lace and close it by inserting a new hinge pin into the slit and crimp up the pin ends.

Reduced Maintenance Downtime

Since Volta belts are extremely hygienic, you don't have to regularly install and uninstall your belt for cleaning. In cases where belt dismantling is necessary, Universal Lace provides you with the best solution. Why? Volta Universal Lace will not tear off from the belt, since it is welded onto your belt and is made of the same homogeneous material.

We recommend using the Universal Lace only when absolutely necessary. Make sure that the conveyor pulleys fully support the entire face length of the belt or al least 80% of the face length. Note that the maximum allowed pull force for the lace (per cm/ inch.) is lower than the allowed pull force of the belt (per cm/ inch.). Therefore, check that the calculated pull force of your belt is lower than the maximum allowed pull force of the lace.



Plastic Hinge Lace Specifications

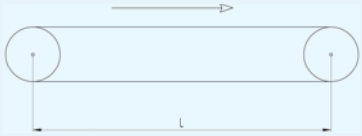
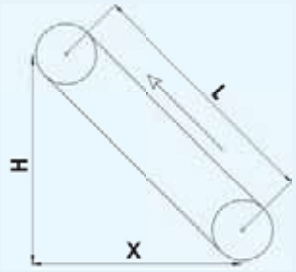
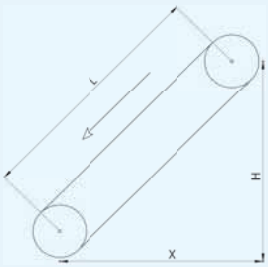
	Volta LMW-U	Volta LMB-U
Description	Flat toothed strip	Flat toothed strip
Material	Volta MW, beige	Volta MB, blue
Hardness	95A	95A
Working Temp Range	-20°C to 60°C/ -5°F to 140°F	-20°C to 60°C/ -5°F to 140°F
Dimensions	5 x 16 mm - 0.2 in x 0.63 in	5 x 16 mm - 0.2 in x 0.63 in
Max Length	3.05 m - 10 ft	3.05 m - 10 ft
Max Pull Force	3 kg/cm - 16.8 lb/in	3 kg/cm - 16.8 lb/in
Minimum Pulley Normal Flex with SD 3mm	80 mm/ $3^{1}/_{8}$ in.	80 mm/ $3^{1}/_{8}$ in.
Minimum Pulley Back Flex with SD 3mm	100 mm/ 4 in.	100 mm/ 4 in.
Hinge Pin	Stainless Steel: 1.65 mm / FDA approved	

6. Belt Calculations

Pull Force Calculation Procedure

1. Net Pull Force F on the belt is calculated by the formula

$$F = f_S * (G_1+G_2) \frac{X}{L} + f_R * G_2 * \frac{X}{L} + f_R * G_3 + C * G_1 * \frac{H}{L} + 0.25 * G_4$$

	Conveyor with slide bed		
			
Return Bed	Rollers with Bearings $f_R = 0.03$	Rollers with Bushing $f_R = 0.1$	UHMW Sliders f_R = refer to technical data sheet
Slide Bed	fs = refer to technical data sheet, pgs. 4, 6 and 8		
1. Horizontal transport 	C = 0; L = X; H = 0		
2. Incline 	C = 1		
3. Decline 	C = -1		

Symbols and Dimensions

f_R = Coefficient of friction of rollers (Bearings or Bushing)
f_S = Coefficient of friction of belt on slidebed
L = Conveyor length (m)/ (ft)
H = Elevating height (m)/ (ft)
X = Horizontal distance of conveyor (m)/ (ft)
G_1 = Maximum load on the conveyor (kg)/ (Lb)
G_2 = Belt weight (one direction) (kg)/ (Lb)
G_3 = Weight of supporting rolls-upper and lower section (kg)/ (Lb)
G_4 = Maximum accumulated weight (kg)/ (Lb)

* In case of Z Conveyor the calculation is made up of two conveyors, one horizontal and one inclined. In order to find the total Pull Force, add the results of both calculations.

2. Pull Force per unit belt width

Divide the Calculated Pull Force from Step 1 by the belt width (cm or inch.) and record the answer.

3. Determine allowed pull force and pulley diameter

Pulley diameter affects the maximum allowable pull force (Fa). To determine the Allowable Pull Force (Fa), find the number of meshed teeth in the left hand column of Table 6a. If the number of meshed teeth is less than 6, multiply the Maximum Pull Force (Table 2.1, Page 4 or Table 2.3, Page 6 or Table 2.5 page 8) by K Factor below.

Table 6a: K Factor

Teeth in Mesh	K Factor	Comments
6 or more	1	180° arc of contact at standard 150 mm/6" pulley
5	0.8	
4	0.6	180° arc of contact at standard 100 mm/4" pulley

Fa = Fmax * K

Fa = Allowed pull force

Fmax = Maximum pull force allowed for the belt (Technical Data table, pgs. 4, 6 and 8)

K= Factor from Table 6a

4. Verify that the selected belt can carry the calculated pull force

Compare the answer in step 2 to the Maximum Allowable Pull Force. If the Calculated Pull Force in Step 2, is less than or equal to Maximum Allowable Pull Force (Fa), then the selected belt is suitable for the application. You should continue with Step 5 to select the correct combination of Drive/Tail and Support Pulleys.
If the Calculated Pull Force in Step 2 is greater than maximum Allowable Pull Force in Step 3, you must change one of the following parameters:

- Increase the belt width.
- Change the slidebed to reduce the coefficient of friction. Volta recommends using UHMW strips.
- Add a snub roller to increase the arc of contact (to increase the number of meshed teeth).
- Choose a larger diameter Pulley (to increase the number of meshed teeth).
- Reduce the load on the belt.

5. Determine the number of support pulleys required

For belts with one row of teeth add support pulleys in pairs.
Tables 6b and 6c give the different pulley combinations based on the Pull Force. Locate the Calculated Pull Force from Step 1 in Tables 6b and 6c. The row heading indicates the pulley combination you need for the conveyor drive and tail shafts. Volta recommends using support pulleys for any belt 600mm/24" or wider regardless of the load weight.

Table 6b: Selection of Support Pulleys for FMW/ FMB-3 SD and FMW/ FMB-4 SD

	FMW/ FMB-3 SD		FMW/ FMB-4 SD	
Required Pulley Combination	**Pull Force (kg) up to**	**Pull Force (lb) up to**	**Pull Force (kg) up to**	**Pull Force (lb) up to**
Drive Pulley	138	304	176	387
Drive Pulley with 2 support pulleys	263	578	336	739
Drive Pulley with 4 support pulleys	388	854	496	1091
Drive Pulley with 6 support pulleys	513	1130	656	1443
For Two Rows of Teeth				
2 Drive Pulleys (one for each row of teeth)	276	608	352	774
For each support pulley add:	62	136	80	176

Table 6c: Selection of Support Pulleys for FHW/ FHB-3 SD and FHW/ FHB-4 SD

	FHW/ FHB-3 SD		FHW/ FHB-4 SD	
Required Pulley Combination	**Pull Force (kg) up to**	**Pull Force (lb) up to**	**kg up to**	**lb up to**
Drive Pulley	203	448	261	574
Drive Pulley with 2 support pulleys	343	756	441	970
Drive Pulley with 4 support pulleys	483	1065	621	1366
Drive Pulley with 6 support pulleys	623	1374	801	1762
For Two Rows of Teeth				
2 Drive Pulleys (one for each row of teeth)	406	896	522	1148
Each support pulley can be loaded up to:	70	154	90	198

Note: Contact your local distributor for further details regarding the 6mm thick SuperDrive™ belt.
Discuss support pulleys with your local distributor when choosing thicker SuperDrive™ belt.

For belts with two rows of teeth determine the number of Support Pulleys as follows

5.1. If the Calculated Pull Force from Step 1 is less than the values shown in Table 6b for SD-M or Table 6c for SD-H for the Pull Force of a Standard Pulley (one for each row of teeth), you will need two Drive Pulleys without Support Pulleys. Nevertheless, Volta recommends the use of one Support Pulley mounted between the two Drive Pulleys.

For a belt wider than 1200mm we recommend using at least 3 support pulleys regardless of load (one support between two rows of teeth and one on either end side of the teeth).

5.2. If the Calculated Pull Force in Step 1 is greater than the value shown in Table 6b for SD-M or Table 6c for SD-H:

5.2.1. Subtract the value in Table 6b or 6c from the calculated Pull Force (For example, for "M" material we substract 276 kg / 608 lbs).

5.2.2. Divide the answer by 62 kg/136 lbs (for "M" material, Table 6b) and round up the given value. This gives the number of Support Pulleys needed to meet the Pull Force requirements.

For example, if the Pull Force is 320 kg/ 704 lbs. for a SD 'M' belt with two rows of teeth, then the number of support pulleys that you need is calculated as follows:

Metric Calculation

(320 - 276) /62 = 0.7 and round up to 1

English Calculation

(704 - 608) /136 = 0.7 and round up to 1

You will need one support pulley for each one of your conveyor drive and tail shafts.

After selecting the number of Support Pulleys required, add the lengths of all the Pulleys (Drive and Support or Tail and Support) together and make sure that the total length of pulleys is not larger than the width of the belt.

Installation and Positioning of Support Pulleys

- Volta recommends using support pulleys for any belt 600 mm/ 24" or wider regardless of the load.
- For belts with two rows of teeth, we recommend including at least one support pulley between the two drive pulleys.
- For a belt wider than 1200mm we recommend using at least 3 support pulleys regardless of load (one support between two rows of teeth and one on either end side of the teeth).
- Support pulleys should be added according to the load to be carried on the belt and the belt width. The support pulleys should be positioned to remove any depressions in the belt surface.

The figures below show how to arrange the support pulleys in the right position.

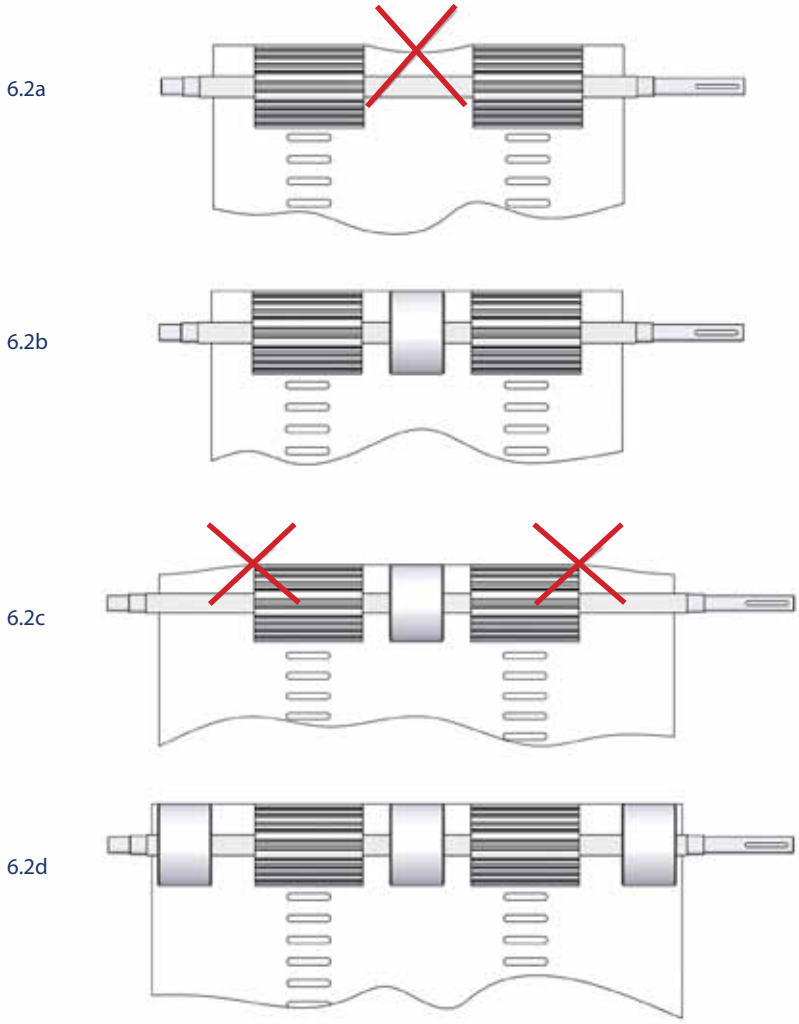


Figure 6.2a shows a depression between the two drive pulleys. In this situation, install at least one support pulley between the two drive pulleys as shown in **Figure 6.2b.**

Figure 6.2c shows the belt with support pulley between the drive pulleys but with the ends of the belt left unsupported.

Figure 6.2d shows the installation of support pulleys under each belt edge. The support pulleys should be positioned symmetrically.

Calculation Example

A Stainless Steel slidebed conveyor that elevates meat packages. Check if the 450 mm (18".) FHB3-SD belt is suitable for the application and choose the pulley set (drive, tail and support pulleys) and the pulley diameter.

Conveyor Conditions		
Package Weight	13.6 kg	30 lbs
Maximum number of packages on the belt	30	30
Conveyor Length (L)	15.2 m	50 ft.
Conveying Height (H)	3 m	9.84 ft.
Converyor Horizontal Distance (X)	14.9 m	48.8 ft.
Weight of Return Rollers	4.5 kg	10 lbs
Number of Return Rollers	6	6
Pulley Diameter	152 mm	6"
Number of Teeth in Mesh	6	6
Accumulated Weight	0	0

1. Calculate the Maximum Pull Force

F=fs*(G1+G2)*X/L+fr*G2*X/L+fr*G3+C*G1*H/L+0.25*G4	
Metric	**English**
X=14.9	X=48.8
H=3	H=9.84
L=15.2	L=50
fs = 0.4 (stainless steel slidebed)	fs = 0.4 (stainless steel slidebed)
fr = 0.1	fr = 0.1
G1= 30*13.6=408 kg	G1= 30*30=900 lbs
G2= (3.6*0.45*15.2)+(0.180*15.2)=27.4 kg	G2=0.74*(18/12)*50+(0.121*50)=61.5 lbs
G3= 6*4.5=27 kg	G3= 6*10=60 lbs
G4= 0	G4= 0
F=0.4*(408+27.4)*14.9/15.2+0.1*27.4*14.9/15.2+0.1*27+1*48*3/15.2+0.25*0	F=0.4*(900+61.5)*48.8/50+0.1*61.5*48.8/50+0.1*60+1*900*9.84/50+0.25*0
F=256.6 kg	F=584.5 lbs

2. Calculate the Pull Force per unit width of belt

256.6/45 = 5.7 kg/cm or 584.5/18 = 32.5 lbs/inch.

3. Determine Allowable Pull Force and pulley diameter

Fa=Fmax * K

Fmax = 7 kg/cm (39.2 lb/in.) - see Maximum Pull Force in Technical Data on Page 4
K = 1 (180° arc of contact at standard 15 0 mm/6 in. pulley)

4. Verify that the Selected Belts can Carry the Calculated Pull Force

The Pull Force per unit width of belt, 5.7 kg/cm (32.5 lbs/ft) is less than the allowable Pull Force for 6 or more teeth in mesh. Therefore you can use 150 mm (6") pulleys with 180° arc of contact.

If you require a 100 mm (4") pulley for design reasons, calculate as follows:

Fa=7*0.6=4.2 kg/cm or Fa=39.2*0.6=23.5 lb/in. (k = 0.6 for 4 teeth in mesh)

The allowable Pull Force 4.2 kg/cm (23.5 lb/inch.) is less than the application requirements 5.7 kg/cm (32.5 lb/inch). You must change one of the parameters listed in Step 4, Page 25. For example, if you change the slidebed to UHMW strips, the coefficient of friction will be 0.2 and therefore, the Calculated Pull Force from Step 1 will be 171.3 kg (377.6 lbs). The Pull Force per unit width of belt will be:

171.3/45 = 3.8 kg/cm or 377.6/18 = 21 lbs/inch.

This change brings the Pull Force per unit width below 4.2 kg/cm (23.5 lbs/ft). So you can use a 100 mm (4") pulley.

5. Determine Support Pulley Requirements

The calculated pull force is 256.6 kg (584.5 lbs) and the Pull Force for a Standard Pulley without supports is 203 kg (448 lbs.) as shown in Table 6b, Page 27. Therefore we must use the standard Drive Pulley with 2 Support Pulleys.

This arrangement can take up to 343 kg (756 lbs.) of Pull Force.
The length of the drive pulley and two support pulleys is shorter than the belt.

200 + 2 * 100 = 400mm **8 + 2 * 4 = 16 inch.**
And the belt is: 450 mm **18 inch.**

7. Motor Capacity Calculation

Calculation Procedure (for constant speed)

1. Calculation of the required torque for the drive pulley

Metric	English
$M = \frac{F * 9.81 * Dp}{1000 * 2}$	$M = \frac{F * Dp}{12 * 2}$
M = torque [N∗ m]	M = torque [lb.∗ ft.]
F = calculated pull force [kg] - see section 6.1, pg. 24	F = calculated pull force [lb.] - see section 6.1, pg. 24
Dp = pulley pitch diameter [mm] - see page 10	Dp = pulley pitch diameter [in.] - see page 10
2. Calculation of drive pulley revolution [rpm]	
$n = \frac{V * 1000}{\pi * Dp}$	$n = \frac{V * 12}{\pi * Dp}$
n = number of drive pulley revolution [rpm]	n = number of drive pulley revolution [rpm]
Dp = pulley pitch diameter [mm] - see page 10	Dp = pulley pitch diameter [in.] - see page10
V = belt speed [m/min]	V = belt speed [ft./min]
3. Calculation of the motor capacity	
$P = \frac{M * n}{9550 * \eta} * k$	$P = \frac{M * n}{5250 * \eta} * k$
P = power in [Kw] (0.746 Kw = 1 HP)	P = power in [HP] (1 HP = 0.746 Kw)
M = torque [N· m] (from step 1)	M = torque [lb.· ft.] (from step 1)
n = number of drive pulley revolution [rpm] (from step 2)	n = number of drive pulley revolution [rpm] (from step 2)
η = efficiency of the drive transmission equipment (η < 1)	η = efficiency of the drive transmission equipment (η < 1)
It depends on the drive type and motor data provided by the manufacturer. In most cases it may vary from 0.6 to 0.85.	
k = correction/ safety coefficient (K > 1)	k = correction/ safety coefficient (K > 1)
Take into account working conditions according to the motor and drive gear data provided by the manufacturer.	
4. Choose a motor: the next size up	

8. Frequently Asked Questions

How much pretension is required on the SuperDrive™ for best operation?
The SuperDrive™ can work with little or no pretension (in most cases you probably could get away with no pretension at all). In spite of this we recommend the installation of a tension device. The maximum pretension needed should be no more than 0.5%.

If the SuperDrive™ doesn't require pretension, why do we need a tension device (take-up)?
As stated above, the SuperDrive™ requires hardly any pretension on most applications. The tension device has two functions on the conveyor. The first is to facilitate the mounting and splicing of the belt. Secondly, the quick release tension device makes the conveyor cleaning easier. Opening the quick release tension device provides slack between the belt and the pulleys to make cleaning more efficient. At the conclusion of cleaning, closing the quick release tension device returns the belt to its correct pretension and alignment without additional adjustments.

What is the recommended length of the take-up?
This depends on a number of factors of the application including: length of the conveyor, method of cleaning, structure of the conveyor. As a minimum Volta recommends using a take-up of at least 5-8 inches (130 - 200 mm).

How do I calculate the correct belt length for the SuperDrive™?
The belt length for the SuperDrive™ is calculated the same as for any conveyor belt with one exception. With standard flat belting you first reduce the distance between the shafts to their minimum. Then measure the distance between the shafts and add ½ the circumference of the drive pulley and ½ the circumference of the tail pulley. Errors in splicing/welding are corrected by cutting a few millimeters from the belt and resplicing/rewelding. With the SuperDrive™, an error in welding will necessitate removing two teeth from the belt (approximately 80 mm / 3.14") in order to maintain the correct spacing between the teeth. For this reason, when measuring the conveyor belt length, the take-up should be extended to ¾ of its maximum position and then the distance should be measured between the shafts. This will leave sufficient room for applying pretension if required. You should be aware that when you calculate the belt length it is an approximate calculation because the length of the belt depends on the conveyor construction and the ability to close the belt on the conveyor, therefore, it is very important to take measurements on-site.

How do I clean the SuperDrive™?
The SuperDrive™ should be cleaned in accordance with standard Volta instructions. A copy of Volta's cleaning instructions is available from your local Volta representative.

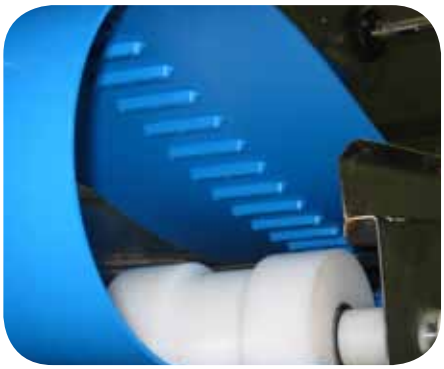
What is the maximum water temperature that can be used to clean the SuperDrive™?
The water temperature should not exceed 80°C (176°F).

Can cleats be fabricated on the SuperDrive™ belt?
Yes they can. See technical data on pages 5, 7 and 9.

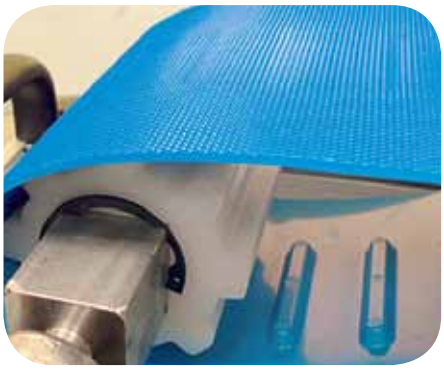
Will the SuperDrive™ develop edge waves?
The waves at the edge of the belt are typically caused by an off-tracking condition where the belt edge comes into contact with the conveyor's frame. Because the SuperDrive™ eliminates off-tracking, you should experience no waves on the edges of the belt. The condition may also be caused by certain maintenance practices. For example, the use of broom handles to hold the belt up during cleaning with hot water. If these are left while the belt cools, waves could remain where the broom handles were.

What is the maximum offset from the center line allowed for the drive pulley?
It is preferred that the SuperDrive™ operate with the drive pulley in the center of the conveyor to ensure correct and efficient operation.

Think Positive! Think SuperDrive™!



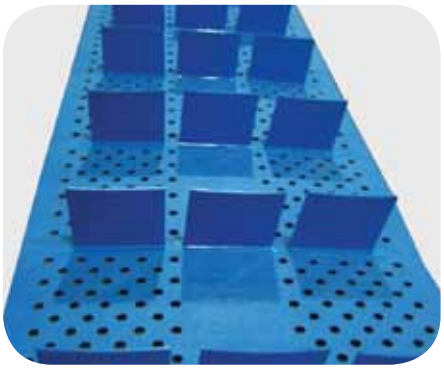
SD™ Tail pulley



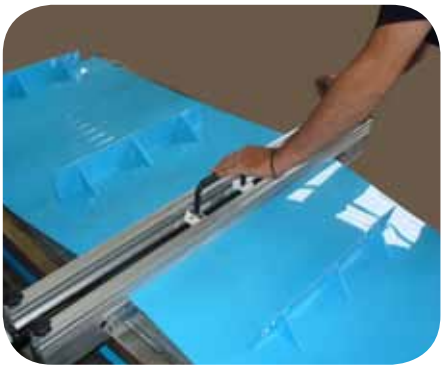
SD™ Drive pulley

SD™ Drive & Support pulley

SuperDrive™
working under water

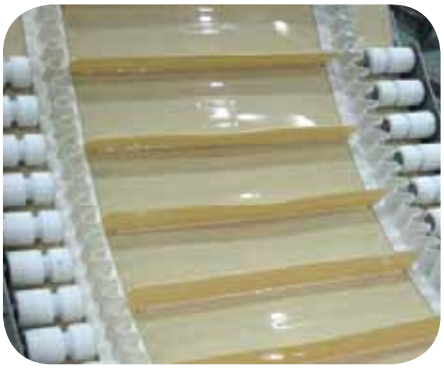


Perforated SD™ belt
with cleats



On site welding

SD™- LT Low Temperature



"Z" or Swanneck Conveyor

Trough conveyor

VOLTA **BELTING** Technology

Corporate Headquarters
Sales and Manufacturing
sales@voltabelting.com

USA
Tel: +1 973 276 7905
Fax: +1 973 276 7908
Toll Free: 1-877-VOLTAUS

EUROPE
Tel: +31-546-580166
Fax: +31-546-579508

www.voltabelting.com

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