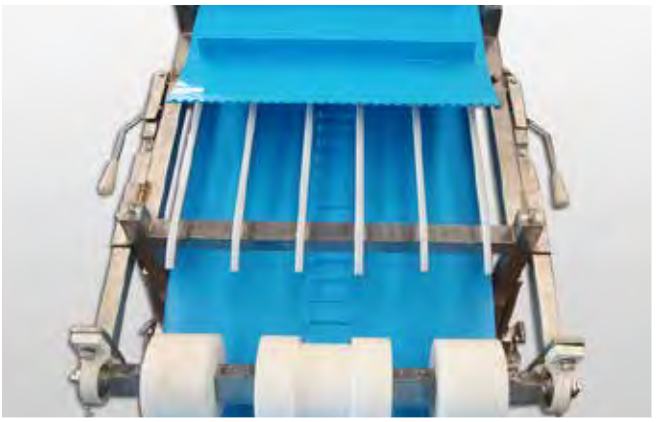
VOLTA BELTING Technology

SuperDrive™

Technical Manual



1965-2015

The Next Step in Belting

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1. Introduction

SuperDrive™, the homogeneous positive drive belt, globally recognized 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

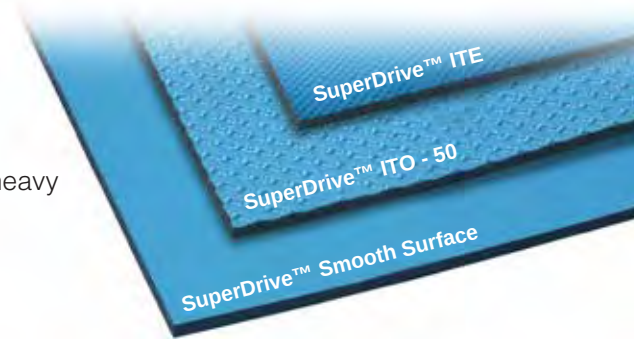
- Smooth homogenous non-porous surfaces prevent bacteria build-up resulting in maximum product shelf-life.
- No plies, edge fraying or modular components or hinges that can break apart and find their way into your final product.
- Non absorbent of water, oils or chemicals.
- Smooth surface prevents product 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 pre-tension reduces strain on the belt and prevents elongation.
- Reduces noise levels to a minimum.
- Easy to install and forms a strong base for quality heat welded HF 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.

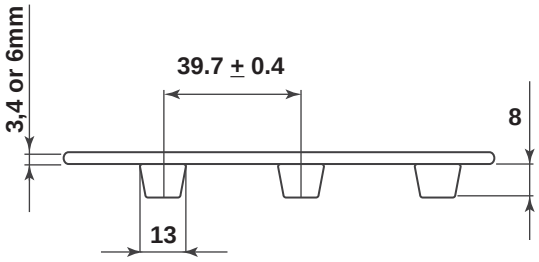
The 4mm and the 6mm are suited to cutting and chopping on the belt

- **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

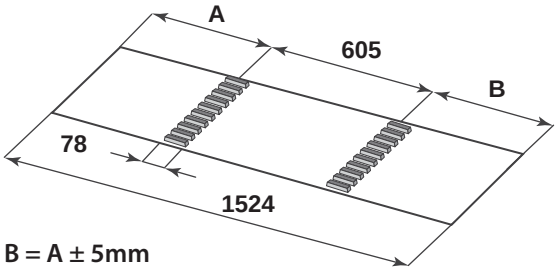
Table 2.1

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)	Temp ≥ 0°C/32°F 126 mm /4.96"	Temp < 0°C/32°F 150 mm/ 5.9"		Temp ≥ 0°C/32°F 176 mm / 6.93"	Temp < 0°C/32°F 210 mm/ 8.27 "		Temp ≥ 0°C/32°F 300 mm/ 11.81"
Minimum pulley diameter (back flex)	Temp ≥ 0°C/32°F 189 mm / 7.44"	Temp < 0°C/32°F 225 mm/ 8.86"		Temp ≥ 0°C/32°F 264 mm / 10.39"	Temp < 0°C/32°F 315 mm/ 12.4"		Temp ≥ 0°C/32°F 340 mm/ 13.38"
Max pull force (kg/ cm width)	7			9			14
Max pull force (lb/ in. width)	39.2			50.4			78.4

Note: *6mm material SuperDrive™ belts are usually used in heavy load applications and therefore we recommend using the largest Drive Pulleys possible to ensure maximum engagement between belt and Drive Pulley teeth.
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



B = A ± 5mm

Standard width (2 rows of teeth) : 1524mm / 60"
Max belt width with one row of teeth : 910mm / 35.8"
Min. belt width with two rows of teeth: 800mm / 31.5"
Distance between teeth rows, center to center : 605 ±2mm / 23.81 ±0.08"
Tooth Length: 78mm / 3.07"

Belt Width

W<800	800<W<910	W>910
1 row	1 row or 2 rows	2 rows

Pulley Guidelines & Fabrication Options

Table 2.2

Belt Type	FHW-3 SD / FHB-3 SD		FHW-4 SD / FHB-4 SD	
Temperature	**Temp ≥ 0°C/32°F**	**Temp < 0°C/32°F**	**Temp ≥ 0°C/32°F**	**Temp < 0°C/32°F**
MPD Base Belt	126mm / 4.96"	150mm / 5.9"	176mm / 6.93"	210mm /8.27"
Minimum Pulley Diameter for V-Flights				
Electrode	158mm / 6.22"	182mm / 7.16"	191mm / 7.52"	225mm / 8.85″
VW / VWB 10	183mm / 7.20"	207mm / 8.15"	211mm / 8.30"	245mm / 9.64″
VW / VWB 13	203mm / 7.99"	227mm / 8.93"	236mm / 9.29"	270mm / 10.62″
VW / VWB 17	243mm / 9.56"	267mm / 10.5"	276mm / 10.86"	310mm / 12.2″
Minimum Pulley Diameter for Electrode Welded Flat Flights				
Single Electrode 7	183mm / 7.20"	207mm / 8.15″	216mm / 8.50"	250mm / 9.84″
Single Electrode 9	203mm / 7.99"	227mm / 8.93″	236mm / 9.29"	270mm / 10.62″
Double Electrode 7	218mm / 8.58"	242mm / 9.52″	251mm / 9.88"	285mm / 11.22″
Double Electrode 9	NR		NR	

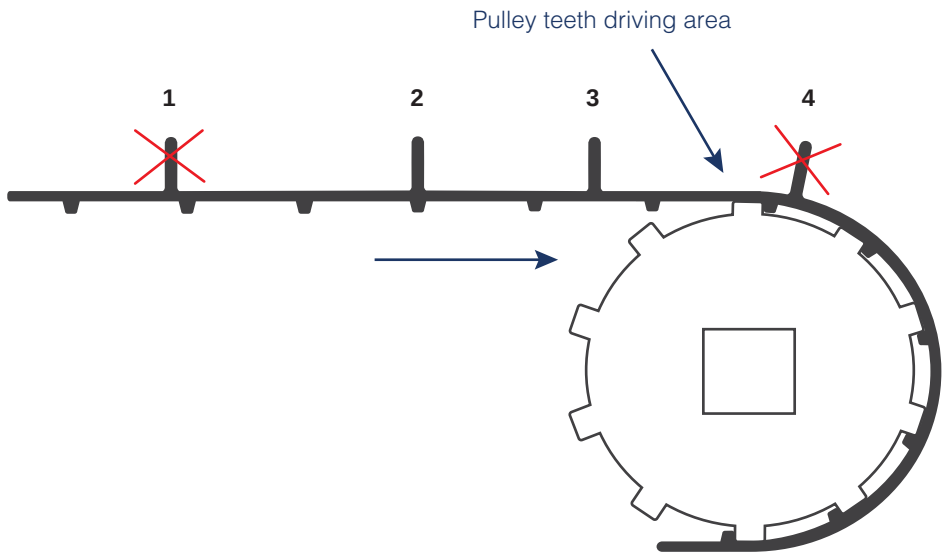
Note: NR - Not Recommended.
Contact your local distributor for further details regarding the 6mm thick SuperDrive™ belt.

Pulleys: must be equal to, or larger than the minimum pulley specification.

Flights: should be welded between the teeth as indicated in the sketch. Can be welded over the teeth if they do not exceed the tooth width. Must not be welded next to the teeth as indicated in the sketch.

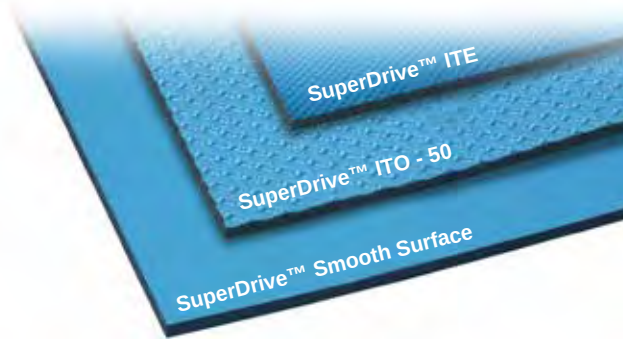
Recommended Flights Welding Location

* Locations 1&4 are not recommended because the flight is in line with the tooth engagement area.
* Locations 2&3 are recommended.



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

Volta 'M' Material SuperDrive™ Belts



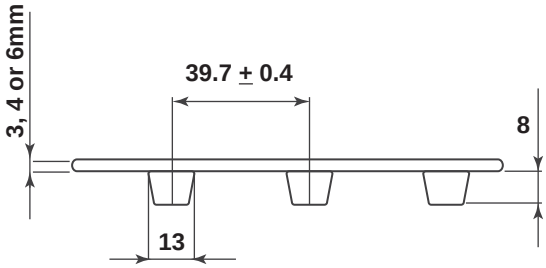
FMW-SD and FMB-SD are designed for conveyors where fabrications or sidewalls are needed.

- **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

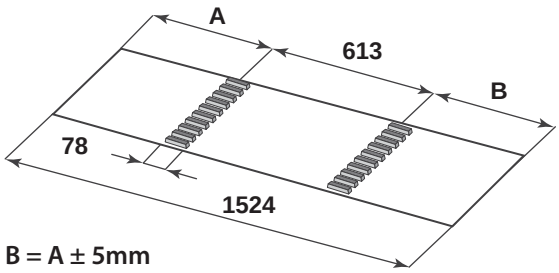
Table 2.3

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: *6mm material SuperDrive™ belts are usually used in heavy load applications and therefore we recommend using the largest Drive Pulleys possible to ensure maximum engagement between belt and Drive Pulley teeth.
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 belt width with one row of teeth : 910mm / 35.8"
Min. belt width with two rows of teeth: 800mm / 31.5"
Distance between teeth rows, center to center : 613 ±2mm / 24.13 ±0.08"
Tooth Length: 78mm / 3.07"

Belt Width

W<800	800<W<910	W>910
1 row	1 row or 2 rows	2 rows

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-Flights									
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 Electrode Welded Flat 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 High Frequency Welded Flat 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		105mm		4 ⅛″		120		4 ¾″	
SW-30		105mm		4 ⅛″		120		4 ¾″	
SW-40		115mm		4 ½″		130		5 ⅛″	
SW-50		125mm		5 ″		130		5 ⅛″	
SW-60		130mm		5 ⅛″		135		5 ⅜″	
SW-80		150mm		6″		150		6″	
SW-100		200mm		8″		200		8″	
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 Two Top Guides: see page 24									

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 Flights:** We recommend welding the flights above the teeth location and flight thickness should not exceed the tooth base width.
- **Sidewalls:** must be positioned with a minimum gap of 100mm from the belt teeth.
- **Flights:** should be welded between the teeth as indicated in the sketch. Can be welded over the teeth if they do not exceed the tooth width. Must not be welded next to the teeth as indicated in the sketch.
- **Pulleys:** must be equal to, or larger than the minimum pulley specification.

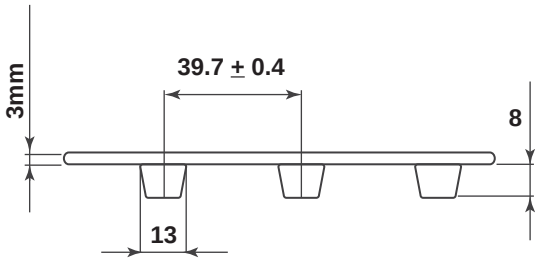
Volta 'MD' Metal Detectable Material SuperDrive™ Belts

- **Material:** Volta MB MD, 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

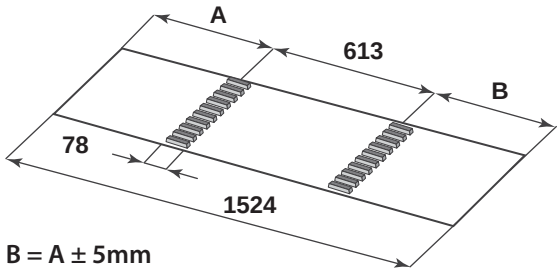
Table 2.5

Product	FMB-3 SD MD
Belt Thickness	3
Belt weight (kg/ m^2) Add for each row of teeth	3.75 kg/ m^2 + 0.1875 kg/ m
Belt weight (lb/ ft^2) Add for each row of teeth	0.77 lb/ ft^2 + 0.126 lb/ ft
Minimum pulley diameter (normal flex)*	100 mm/ 4"
Minimum pulley diameter (back flex)*	110 mm/ 4.33"
Max pull force (kg/ cm width)	6
Max pull force (lb/ in. width)	33.60

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 belt width with one row of teeth : 910mm / 35.8"
Min. belt width with two rows of teeth: 800mm / 31.5"
Distance between teeth rows, center to center : 613 ±2mm / 24.13 ±0.08"
Tooth Length: 78mm / 3.07"

Belt Width

W<800	800<W<910	W>910
1 row	1 row or 2 rows	2 rows

Pulley Guidelines & Fabrication Options

Table 2.6

Belt Type		FMW-3 SD MD			
MPD Base Belt		100mm		4″	
Minimum Pulley Diameter for V-Flights					
Electrode		135mm		5.31″	
VLB 10		145mm		5.70″	
VLB 13		155mm		6.10″	
VLB 17		170mm		6.70″	
Minimum Pulley Diameter for Electrode Welded Flat Flights					
Single Electrode 7		140mm	5.51″	150mm	5.90″
Single Electrode 9		150mm	6.10″	165mm	6.50″
Double Electrode 7		180mm	7.08″	190mm	7.48″
Double Electrode 9		NR		NR	
Minimum Pulley Diameter for High Frequency Welded Flat Flights					
App. Temperature		Temp ≥ 0° C	Temp ≥ 32° F	Temp < 0° C	Temp < 32° F
Flight 3 - 5 mm		116mm	4.56″	165mm	6.50″
Flight 6 - 8 mm		143mm	5.62″	195mm	7.67″
Minimum Pulley Diameter for Based Sidewalls-Normal Flex					
SW-20		105mm		4 1/8″	
SW-30		105mm		4 1/8″	
SW-40		115mm		4 1/2″	
SW-50		125mm		5″	
SW-60		130mm		5 1/8″	
SW-80		150mm		6″	
SW-100		200mm		8″	
Minimum Pulley Diameter for Baseless Sidewalls					
		Normal Flex		Back Flex	
B-SW 30mm/ 1”	1.6mm Thick	110mm	4.33″	120mm	4.72″
B-SW 40 mm/ 1.5”		110mm	4.33″	120mm	4.72″
B-SW 50 mm/ 2”		110mm	4.33″	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 Two Top Guides-Contact your local distributor					

Note: NR - Not Recommended.
All inch sizes have been converted from metric sizes.

Disclaimer: Volta Belting Ltd. recommends testing all the products in your environment to ascertain suitability. The information is supplied in good faith without warranty.

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

- **Electrode Welded Flights:** We recommend welding the flights above the teeth location and flight thickness should not exceed the tooth base width.
- **Sidewalls:** must be positioned with a minimum gap of 100mm from the belt teeth.
- **Flights:** should be welded between the teeth as indicated in the sketch. Can be welded over the teeth if they do not exceed the tooth width. Must not be welded next to the teeth as indicated in the sketch.
- **Pulleys:** must be equal to, or larger than the minimum pulley specification.

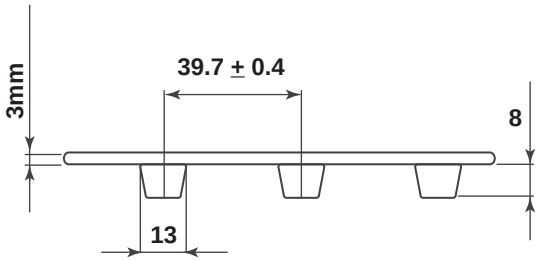
Volta 'LT' Low Temperature Material SuperDrive™ Belts

- **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

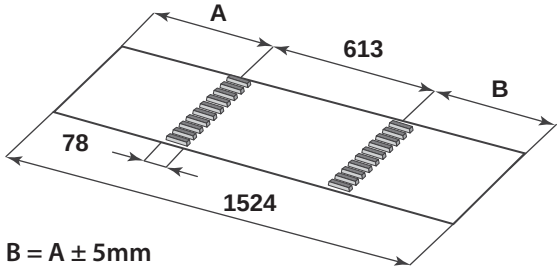
Table 2.7

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 belt width with one row of teeth : 910mm / 35.8"
Min. belt width with two rows of teeth: 800mm / 31.5"
Distance between teeth rows, center to center : 613 ±2mm / 24.13 ±0.08"
Tooth Length: 78mm / 3.07"

Belt Width

W<800	800<W<910	W>910
1 row	1 row or 2 rows	2 rows

Pulley Guidelines & Fabrication Options

Table 2.8

Belt Type		FMB-3 SD LT			
MPD Base Belt		80mm		3¼″	
Minimum Pulley Diameter for V-Flights					
Electrode		120mm		4.72″	
VLSB 10		130mm		5.12″	
VLSB 13		140mm		5.51″	
VLSB 17		155mm		6.10″	
Minimum Pulley Diameter for High Frequency Welded Flat 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		105mm		4 ⅛″	
SW-30		105mm		4 ⅛″	
SW-40		115mm		4 ½″	
SW-50		125mm		5 ″	
SW-60		130mm		5 ⅛″	
SW-80		150mm		6″	
SW-100		200mm		8″	
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 Two Top Guides: see page 24					

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

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. The flights should be welded between the teeth as indicated in the sketch. Can be welded over the teeth if they do not exceed the tooth width. Must not be welded next to the teeth as indicated in the sketch.
- **Electrodes:** We do not recommend using electrodes for welding flights on these belts. The entire belt area around the welded electrode becomes rigid and the belt’s flexibility is lost.
- **HF Welding:** We only approve HF welding of flights on LT belts.
- **Endless Joining:** We recommend joining LT belts with a Butt weld using the FBW Tool.

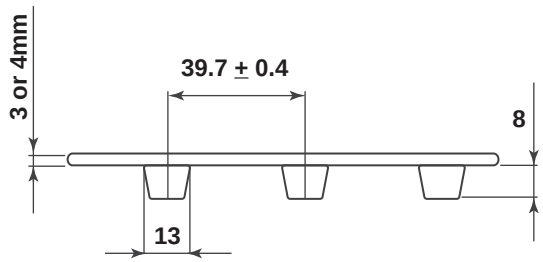
Volta 'Z' Material SuperDrive™ Belts for General Conveying

- **Material:** Volta Z, Dark Green
- **Shore Hardness:** 95A
- **Temperature Range :** -30°C to 60°C/ -20°F to 140°F
- **Coefficient of Friction:** 0.55/ Stainless Steel: 0.55/UHMW:0.3

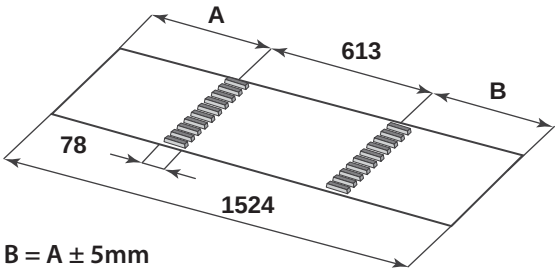
Table 2.9

Product	FZ-3 SD	FZ-4 SD
Belt Thickness	3	4
Belt weight (kg/ m^2) Add for each row of teeth	3.6 kg/ m^2 + 0.180 kg/ m	4.8 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	0.98 lb/ ft^2 + 0.121 lb/ ft
Minimum pulley diameter (normal flex)*	80 mm/ 3¼"	120 mm/ 4¾"
Minimum pulley diameter (back flex)*	100 mm/ 4"	150 mm/ 6"
Max pull force (kg/ cm width)	5	6.6
Max pull force (lb/ in. width)	28	37

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 maximum engagement between belt and Drive Pulley teeth.
***All inch sizes have been converted from metric sizes.



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



B = A ± 5mm

Standard width (2 rows of teeth) : 1524mm / 60"
Max belt width with one row of teeth : 910mm / 35.8"
Min. belt width with two rows of teeth: 800mm / 31.5"
Distance between teeth rows, center to center : 613 ±2mm / 24.13 ±0.08"
Tooth Length: 78mm / 3.07"

Belt Width

W<800	800<W<910	W>910
1 row	1 row or 2 rows	2 rows

Pulley Guidelines & Fabrication Options

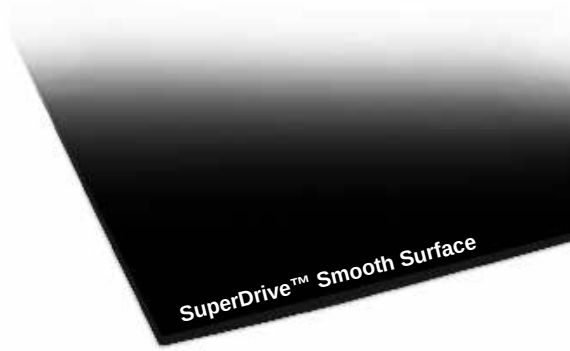
Table 3.0

Belt Type		FZ-3 SD				FZ-4 SD			
MPD Base Belt		80mm		3¼″		120mm		4¾″	
Minimum Pulley Diameter for V-Flights									
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 Electrode Welded Flat 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 High Frequency Welded Flat 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		105mm		4 ⅛″		120		4 ¾″	
SW-30		105mm		4 ⅛″		120		4 ¾″	
SW-40		115mm		4 ½″		130		5 ⅛″	
SW-50		125mm		5 ″		130		5 ⅛″	
SW-60		130mm		5 ⅛″		135		5 ⅜″	
SW-80		150mm		6″		150		6″	
SW-100		200mm		8″		200		8″	
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 Two Top Side Guides: see page 24									

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 Flights:** We recommend welding the flights above the teeth location and flight thickness should not exceed the tooth base width.
- **Sidewalls:** must be positioned with a minimum gap of 100mm from the belt teeth.
- **Flights:** should be welded between the teeth as indicated in the sketch. Can be welded over the teeth if they do not exceed the tooth width. Must not be welded next to the teeth as indicated in the sketch.
- **Pulleys:** must be equal to, or larger than the minimum pulley specification.

Volta 'ZD' Material SuperDrive™ Belts for General Conveying

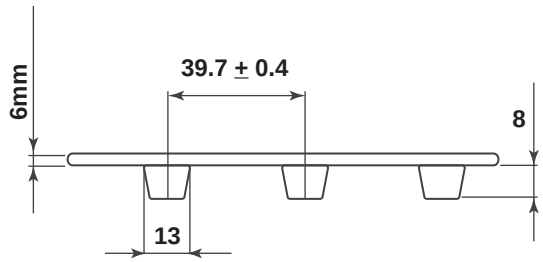


- **Material:** Volta ZD, Black
- **Shore Hardness:** 95A
- **Temperature Range :** -30°C to 60°C/ -20°F to 140°F
- **Coefficient of Friction:** Steel: 0.55/ Stainless Steel: 0.55/UHMW:0.3

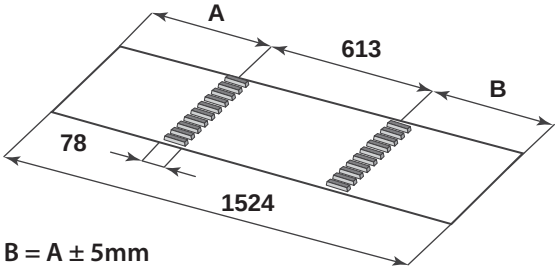
Table 3.1

Product	FZD-6 SD
Belt Thickness	6
Belt weight (kg/ m^2) Add for each row of teeth	7.2 kg/ m^2 + 0.180 kg/ m
Belt weight (lb/ ft^2) Add for each row of teeth	1.48 lb/ ft^2 + 0.121 lb/ ft
Minimum pulley diameter (normal flex)*	230 mm/ 9"
Minimum pulley diameter (back flex)*	250 mm/ 10"
Max pull force (kg/ cm width)	10
Max pull force (lb/ in. width)	56

Note: *6mm material SuperDrive™ belts are usually used in heavy load applications and therefore we recommend using the largest Drive Pulley possible to ensure maximum engagement between belt and Drive Pulley teeth.
***All inch sizes have been converted from metric sizes.



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



B = A ± 5mm

Standard width (2 rows of teeth) : 1524mm / 60"
Max belt width with one row of teeth : 910mm / 35.8"
Min. belt width with two rows of teeth: 800mm / 31.5"
Distance between teeth rows, center to center : 613 ±2mm / 24.13 ±0.08"
Tooth Length: 78mm / 3.07"

Belt Width

W<800	800<W<910	W>910
1 row	1 row or 2 rows	2 rows

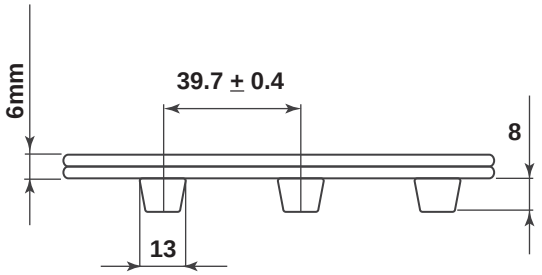
Volta ‘MB/BL’ Material SuperDrive™ Belts for General Conveying

- **Material:** Volta MB,Blue Bottom, BL,Black Top
- **Shore Hardness:** Bottom= 53D , Top = 86A
- **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

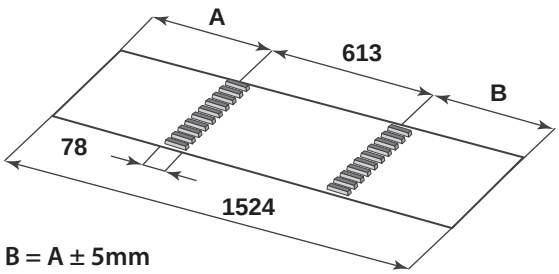
Table 3.2

Product	FMB BL-6 SD
Belt Thickness	6
Belt weight (kg/ m^2) Add for each row of teeth	7.2 kg/ m^2 + 0.180 kg/ m
Belt weight (lb/ ft^2) Add for each row of teeth	1.48 lb/ ft^2 + 0.121 lb/ ft
Minimum pulley diameter (normal flex)*	200 mm/ $7^7/_8$“
Minimum pulley diameter (back flex)*	230 mm/ 9”
Max pull force (kg/ cm width)	8
Max pull force (lb/ in. width)	44.8

Note: *6mm material SuperDrive™ belts are usually used in heavy load applications and therefore we recommend using the largest Drive Pulley possible to ensure maximum engagement between belt and Drive Pulley teeth.
***All inch sizes have been converted from metric sizes.



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



B = A ± 5mm

Standard width (2 rows of teeth) : 1524mm / 60”
Max belt width with one row of teeth : 910mm / 35.8”
Min. belt width with two rows of teeth: 800mm / 31.5”
Distance between teeth rows, center to center : 613 ±2mm / 24.13 ±0.08”
Tooth Length: 78mm / 3.07”

Belt Width

W<800	800<W<910	W>910
1 row	1 row or 2 rows	2 rows

3. Accessories

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

Drive Pulley

SuperDrive™ pulleys are compatible 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.

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

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 on Page 33). The support pulley has a smooth surface and is available in a standard width of 100 mm/4". This pulley is available with the same diameter and bore description as the drive pulley.

Support Pulley

SuperDrive™ Drive Pulley Specifications

Number of Teeth	SuperDrive™ 3mm & 4mm Thick Belts				SuperDrive™ 6mm Thick Belts			
	O.D. Ø		Pulley Pitch Ø		O.D. Ø		Pulley Pitch Ø	
	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	-	-	-	-
14	177.10	6.97	180.10	7.09	-	-	-	-
16	202.90	7.98	205.90	8.10	-	-	-	-
18	228.60	9.0	231.60	9.12	-	-	-	-
20	254.30	10.01	257.30	10.13	252.6	9.94	258.6	10.18
21	-	-	-	-	265.6	10.45	271.6	10.69
22	-	-	-	-	278.5	10.96	284.5	11.2
23	-	-	-	-	291.4	11.47	297.4	11.7
24	-	-	-	-	304.3	11.98	310.3	12.21

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.

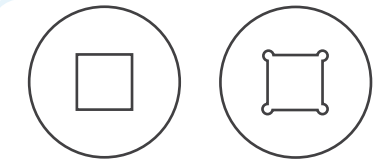
6mm material SuperDrive™ belts are usually used in heavier load applications and therefore we recommend using the largest Drive Pulley available to ensure more engagement between the belt and Drive Pulley teeth.

- 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 1½" and 40 mm. The 1½" 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 wash-down. Pulley bore dimensions should be chosen according to the load on the shaft to avoid shaft deflection and to transmit the required torque.

Pulley bore patterns



Standard bore Round Corner bore

Securing SuperDrive™ Pulleys: Locking Collars

Standard Locking Collar is made of two parts of stainless steel wire with locking bolts. This system can be assembled without dismantling the shaft and can be used with all sprocket types on 1½ (40mm) square shafts.

Square Metal Locking Collar

Square Plastic Locking Collar (UHMW) is made of two plastic parts that locked with two bolts. The collar can be assembled without dismantling the shaft. It can be used with pulleys that have 12 or more teeth and are available in 1½ in/ 40mm. It can be ordered with round corners. Locking Collar face width = 20mm

Square Plastic (UHMW) Locking Collar

Round Plastic Locking Collar (UHMW) is suitable for 8 teeth sprocket and larger. The shaft can be dismantled in order to assemble this locking collar. The collar can be ordered in 1½ in/40mm and also with round corners for 1½ in. shaft.
Locking Collar face width = 20mm

Round Plastic (UHMW) Locking Collar

Additional Options for Securing SuperDrive™ Pulleys

Volta offers three options for 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 materials 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. Machine a groove suitable for the thickness of the "C" ring you are using. 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.

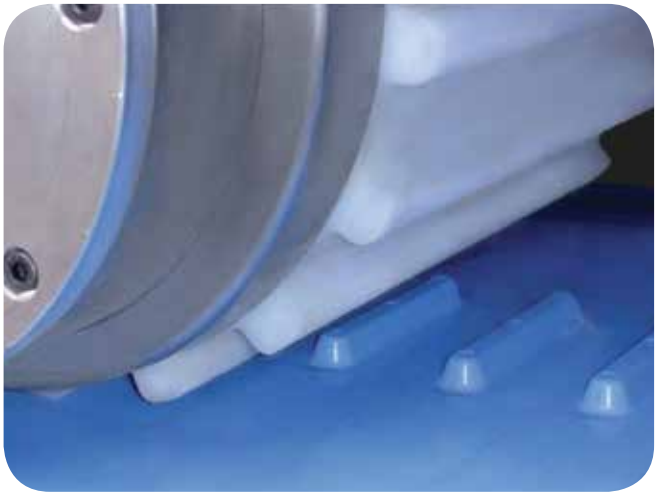
3. Mount a small piece of flat metal on either end of the pulley. Drill and thread a hole in the shaft and mount an Allen screw to secure the metal pieces.

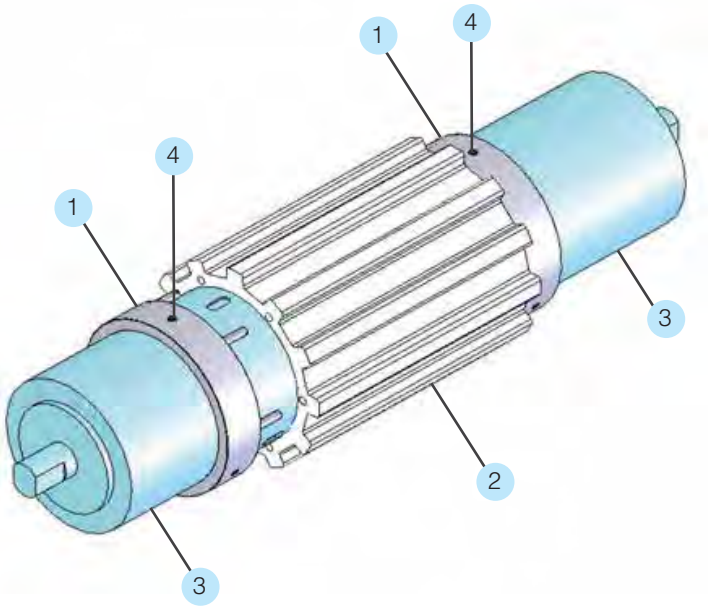
Motorized Pulley

With 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 as well as resistant to liquids from the process itself. An added benefit when using SuperDrive™ is that it creates a complete conveying system that is hygienic and easily cleaned.

Volta cooperates 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.





Drum motors can be fitted with UHMW shells (2) machined to close tolerances to fit over the stainless steel drum motor casing. The shell (2) is toothed to act as a drive sprocket and will have a series of (at least three) holes around its base on either side. Stainless steel rings (1) will fit over the motor casing (3) and corresponding pins fitted to these rings will engage the holes in the UHMW shell base (2). The rings (1) are secured to the motor casing by key way and grub screws (4).

The thickness of the steel rings (1) should not exceed that of the UHMW shell (2). As an alternative to plain rings, they can even be toothed to appear as a continuation of the shell – this gives no inherent technical advantage.

1. Stainless steel ring + pins before engagement.
2. UHMW shell.
3. Motor Casing.
4. Threaded grub screw hole.

4. Conveyor Construction

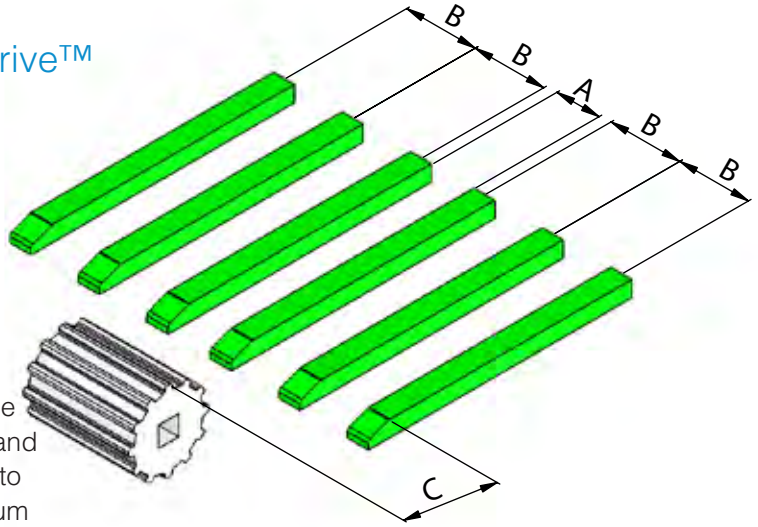
The classic conveyor construction consists of the following parts:

- Volta Drive Pulley
- Slidebed made of UHMW Strips
- Tail Pulley with Take-up Device (Tensioner)
- Additional support pulleys depending on the belt width and the projected load (see Belt Calculations on Page 35)
- Return Rollers
- Snub Rollers when needed

In particularly long conveyors with heavy loads the use of roller slide bed as shown on Page 23 is recommended. Many conveyors have a special construction that allows a complete and quick removal of the belt without using lace.

Suggested Conveyor Slidebed Construction with UHMW Strips

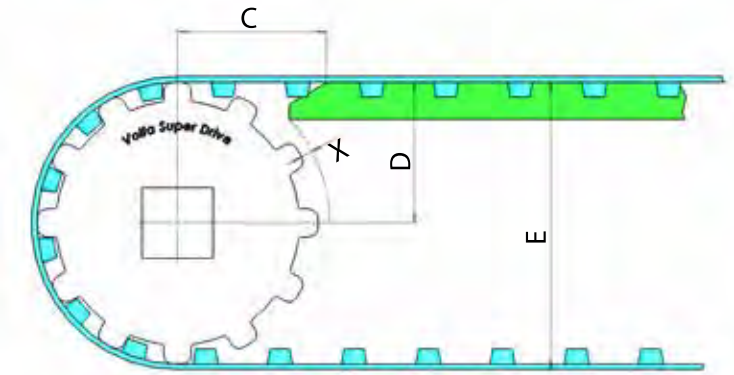
1.Recommended Dimensions for SuperDrive™ Belt with One Row of Teeth:



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

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

C. The 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. Dimension ‘C’ should be kept to a minimum but still leaving dimension ‘X’ with a minimum of 20mm.

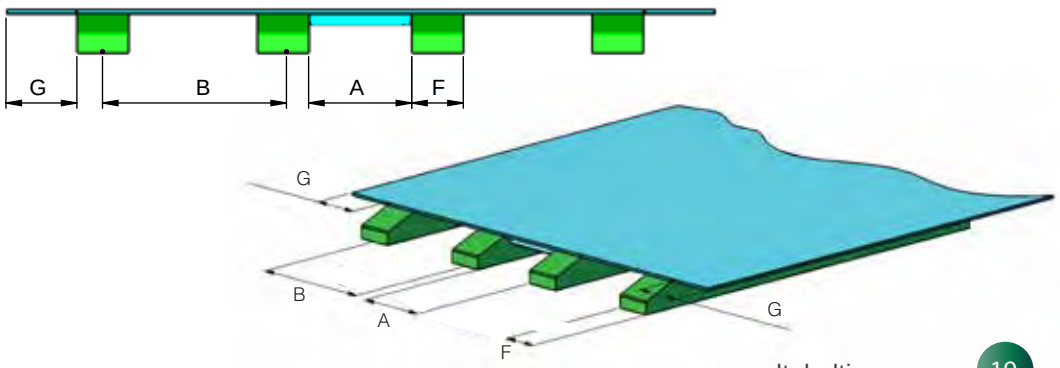


D. Distance between Drive Pulley Centre and Strip Surface: half of the drive pulley diameter.

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. Strip width : is 25-50 mm (1-2”).

G. Maximum distance between the belt edges and strip : 50mm (2").

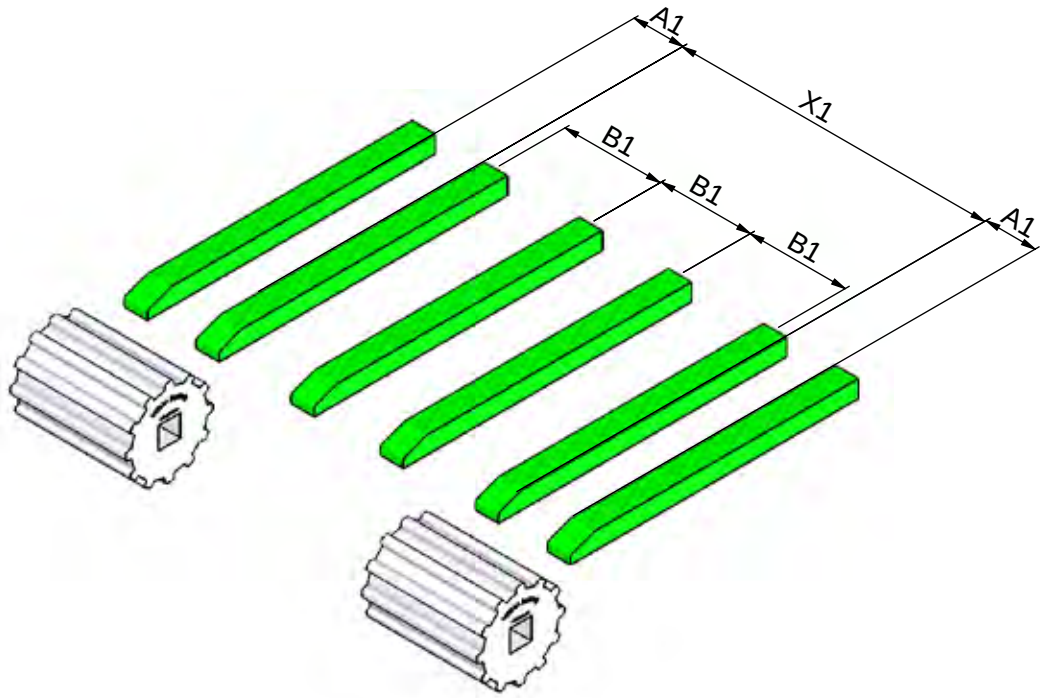


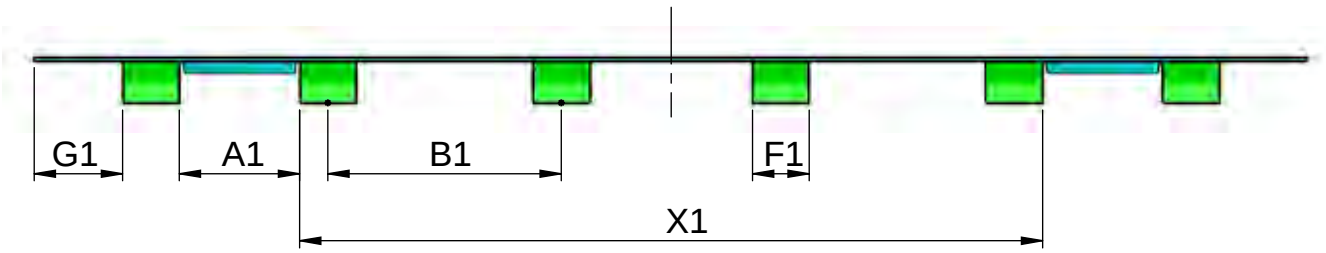
2.Recommended Dimensions for SuperDrive™ Belt with Two Rows of Teeth Suitable for Both M and H Material Belts.

A1. Distance between Guide Strips for the belt teeth:
89mm (3.5”).

B1. Distance between Support Strips: 100-150mm (4-6”).

X1. Total distance of the Support Strips between the two Guide Strips.
X1=520mm / 20.47”



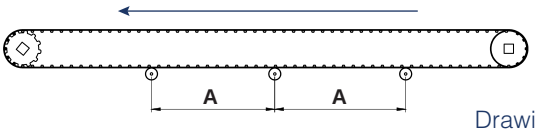


F1. Strip width : is 25-50 mm (1-2”).

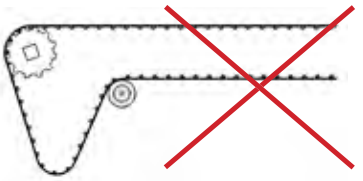
G1. Maximum distance between the belt edges and strip : 50mm (2").

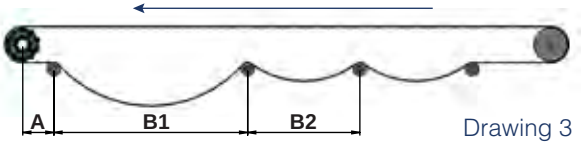
Return Rollers

If the conveyor has a Take-up Device (Tensioner) 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 in order to 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 one can allow 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



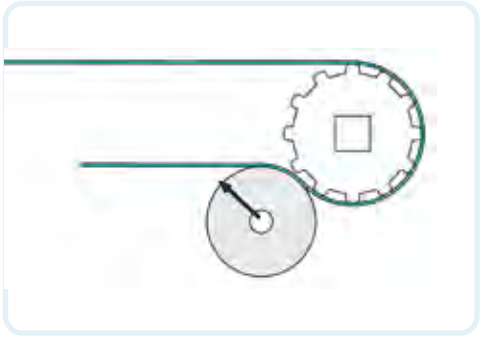
Drawing 3

Standard Belt Take-up Device (Tensioner)

The SuperDrive™ belt requires hardly any pre-tension on most applications. The Take-up Device (Tensioner) has two functions on the conveyor. The first is to facilitate the mounting and splicing of the belt. Secondly, the quick release take-up Device (Tensioner) makes cleaning of belt easier. Opening the quick release Take-up Device (Tensioner) 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 precaution, Volta recommends using a take-up of at least 5-8 inches (130-200 mm).

Quick Release Take-up Device (Tensioner)

The Quick Release Take-up Device (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 take-up (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 Take-up Device (Tensioner) in order to return the belt to its correct pre-tension and alignment without additional adjustments.



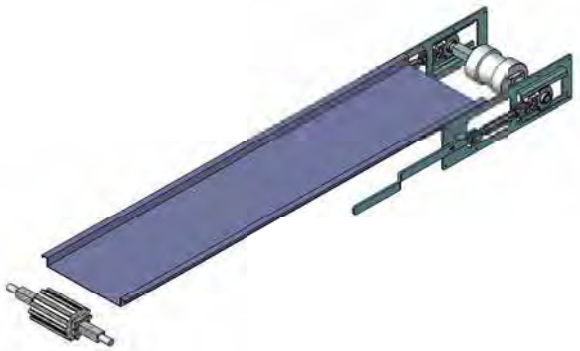
Snub Rollers

Snub Rollers are widely used to increase the arc of contact on the drive pulley and increase belt tension, thereby eliminating slack which can cause the belt to jump. The belt may sag, and return rollers can be positioned at equal distances to carry the sag. Safety precautions must be taken to prevent access to the snub roller working area.

Conveyor Retrofit

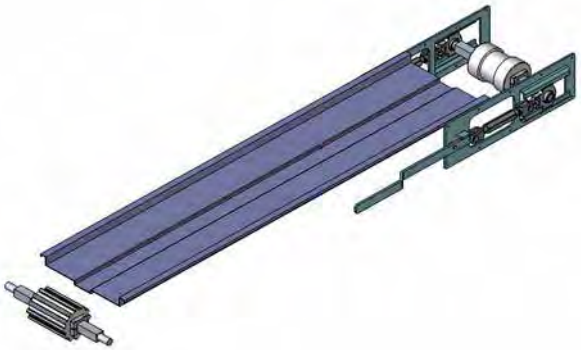
Retrofit of Conveyor with a Flat Slidebed

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

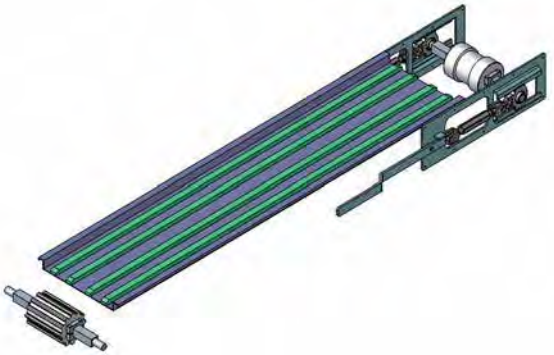
The teeth can ride on the flat slidebed without affecting the belt operation. In this case, because of the SuperDrive™ teeth, the center line of the belt will be slightly higher than the edges of the belt. This construction is not recommended with 'M'/'LT'/'Z' material belts.



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 will be guided by its teeth in the center groove and it should not touch the conveyor bed sidewalls.

This construction is not recommended with 'M'/'LT'/'Z' material belts in applications with heavy loads and long conveyors.



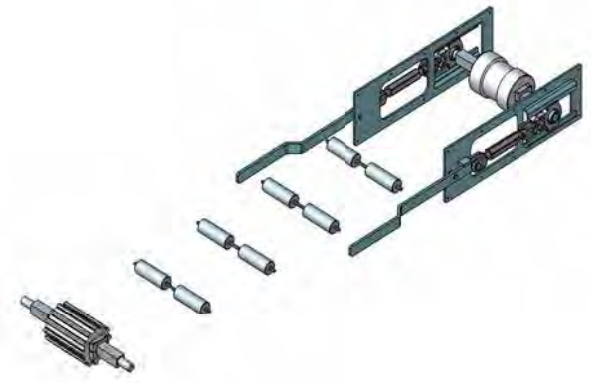
3. Slidebed with UHMW strips

Slidebed as seen in accompanying drawing is the most recommended type, especially for SuperDrive™ 'M'/'LT'/'Z' material belt applications. The UHMW strips reduce the coefficient of friction between the belt and the slidebed. This increases the carrying capacity of the belt . 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'/'LT'/'Z' belts.



“Z” or Swanneck Conveyor Construction

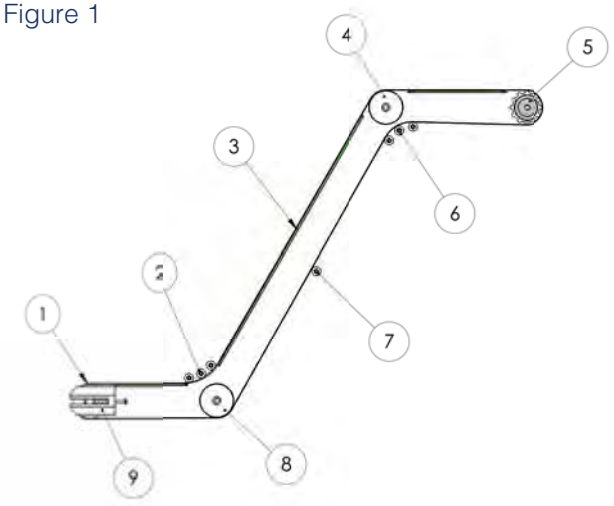
The “Z” or swanneck conveyor is commonly used for lifting products.
The SuperDrive™ is ideally suited for this application for several reasons:

- 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 transition areas (horizontal to elevation and back) can be assisted as for regular belts, by using a single large roller or a set of small rollers (see drawing below).

UHMW Strip Bed Construction

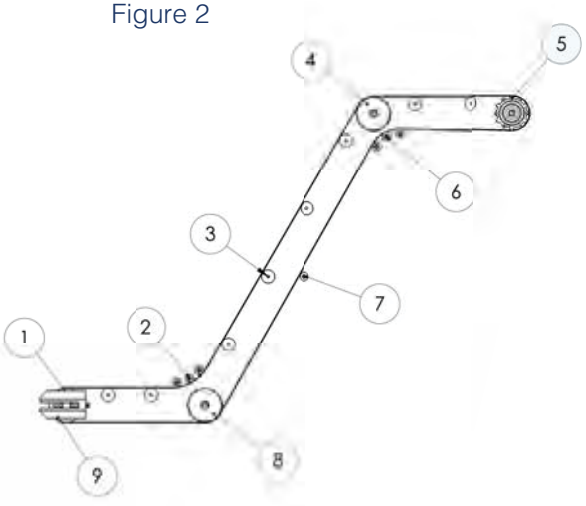
Figure 1



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. Take-up Device (Tensioner) 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. Take-up Device (Tensioner) for tail pulley

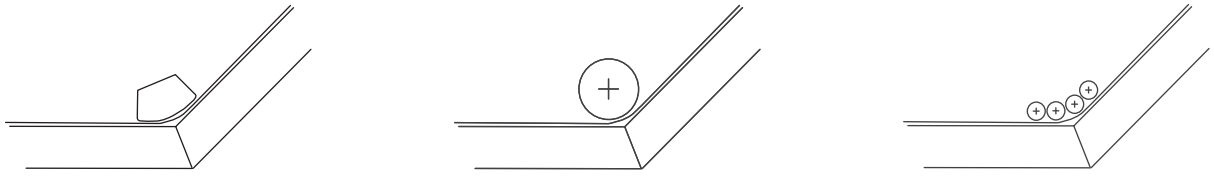
Figure 1 & 2 demonstrate typical Z-elevator conveyor constructions with Fig.1 showing a slide bed made from UHMW and Fig 2 showing a roller slide bed. In applications with heavy loads & long conveyors it is important to use the roller slide bed type (Fig. 2) especially when using ‘M’/’LT’/’Z’ type belts.

In transition areas (2 & 4) – the belt will tend to rub against the conveyors’ curved construction and to create an area of high tension strain and friction. Therefore, it is very important to use rollers at these two transition points to minimize the strain and friction.

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 specific belt with its fabrications. The bigger the curve, the less wear and tear. It is easiest to apply the roller set to larger curves.

- Do not use a shoe system with 'M' material belts, heavy loads or long conveyors. This is the least preferred system.



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 recommended method

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

Minimum Pulley Specifications for SuperDrive™ 'M'/'LT'/'Z' Material Belts with Two Top Guides

Guide Type	SuperDrive™ 3mm Thick Belts		SuperDrive™ 4mm Thick Belts	
	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″

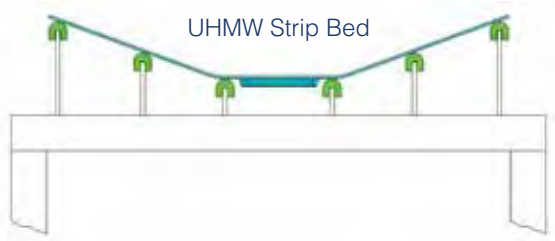
Note: * Back flex location can be seen in positions (2) and (6) on Figure 1 & 2 shown on page 23.
Note: Contact your local distributor for further details regarding the 6mm thick SuperDrive™ belt.

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

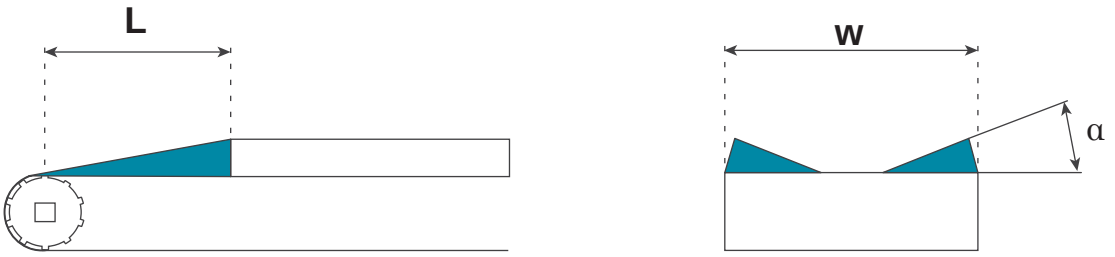
Roller bed construction



Transition Length

There must be a minimum distance between the drive/ tail pulleys and the beginning of the trough since high tension is created on the belt sides and edges. This distance is called the transition length and is measured from the pulley centers at both ends of the conveyor.

Transition length (L)



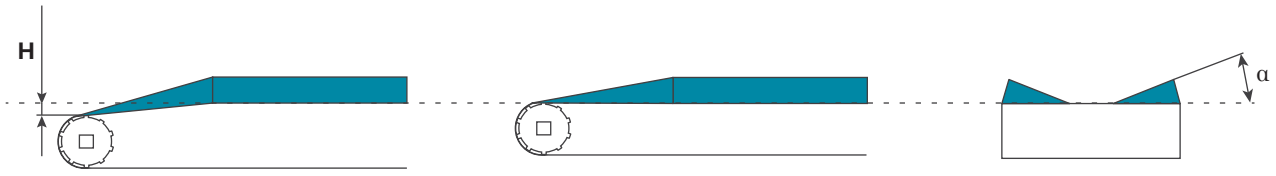
L = C * W **L** - Transition length = **C** - Factor from table* **W** - Belt width

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

The Pulley Construction and Height Location

Due to the strain on the belt sides and edges, it is very important to use support pulleys to hold at least 80% of the belt underside, particularly at the 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 load is low or the belt is relatively narrow or 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 be pre- tensioned to 0.3 - 0.5% so that the belt takes 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.

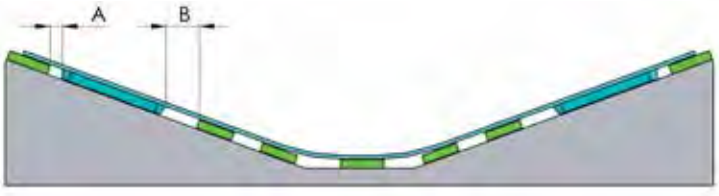
Allowed Belt Trough Angle - FMW- 3 SD and FMB-3 SD

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

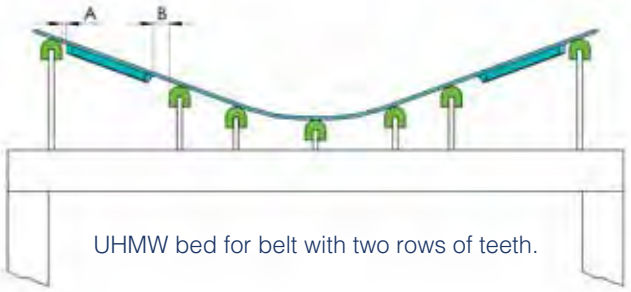
Note: * When loaded, the belt will take the trough shape.
Note: 6mm thick SuperDrive™ belt cannot be used for Trough conveyors.

One method for ensuring a stiff belt takes up the trough form is to restrict it by means of a series of short ‘shoes’ positioned along the conveyor length. Each shoe contains and restricts the outer part of the belt from above and below to prevent buckling or deforming while pressing the belt edge at the same time into the troughing. The shoes should be made from UHMW and the lower part under the belt should be longer than the upper part.

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



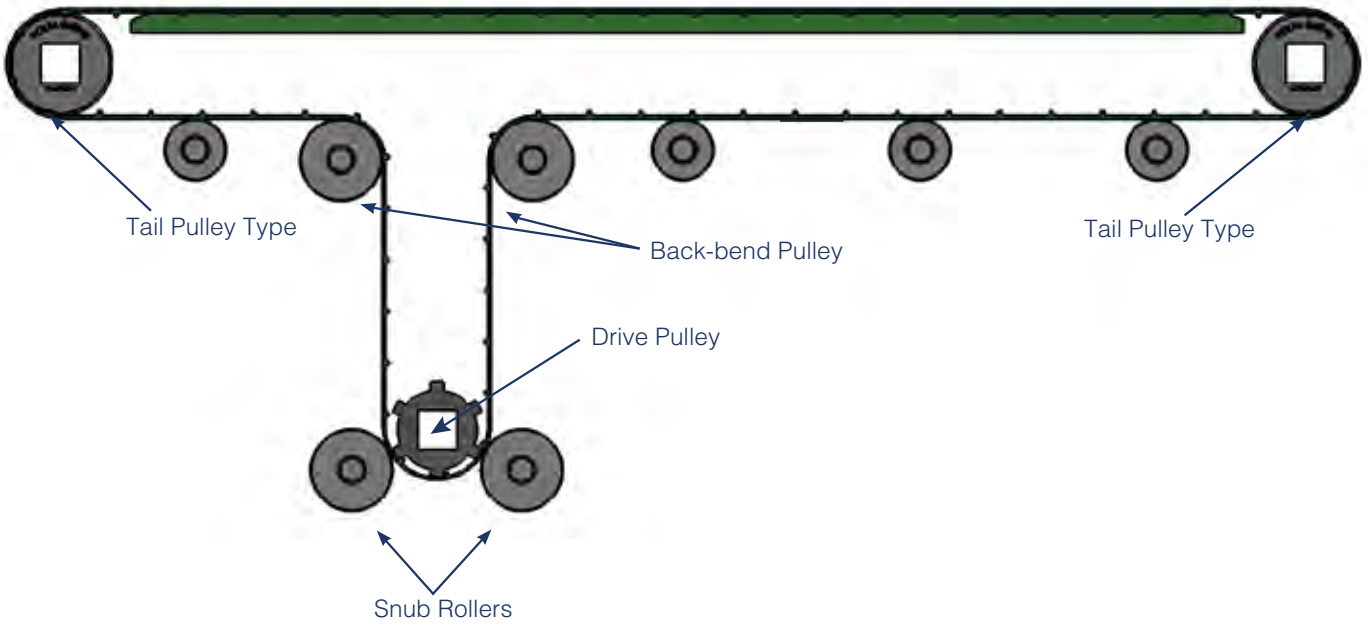
Trough stainless steel bed for belt with two rows of teeth.



UHMW bed for belt with two rows of teeth.

The same principle as for a belt with one row of teeth should be taken into consideration when strips are used to support a belt with two rows of teeth. 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:

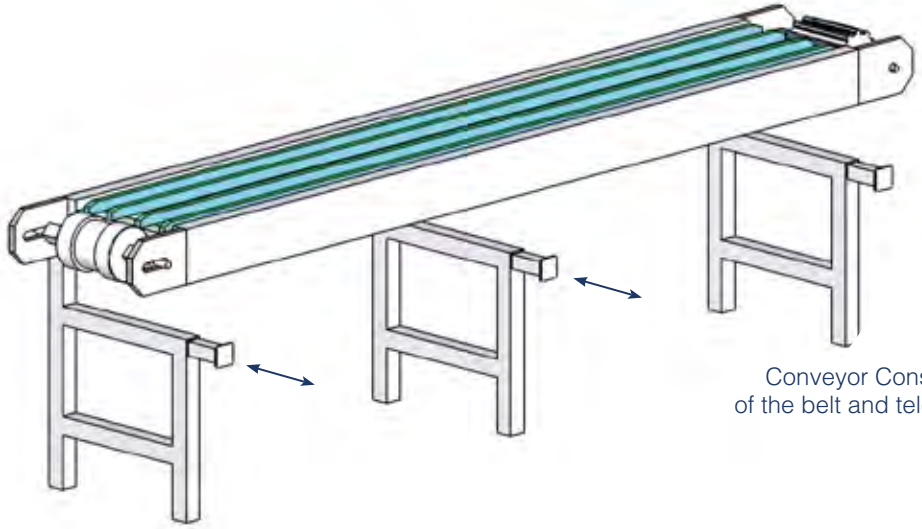
• One option is when the drive sprocket is large, the tail sprocket can be much smaller within the limitations of the minimum sprocket diameter of the base belt making the conveyor most suitable for tight transition of products. Only the drive shaft should be fitted with sprocket and all other shafts should have smooth rollers.

• Another option is when the conveyor works in two directions. In this case you would need two snub rollers to ensure smooth operation. 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 Take-up Device (Tensioner) - This device permits the release of belt tension without losing belt alignment (Page 21).In some conveyors telescopic 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 29-30).



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

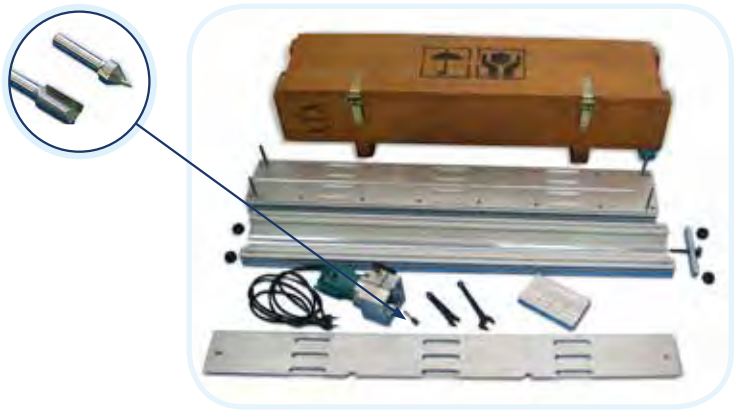
5. Splicing the SuperDrive™

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

For the FT Welding System extruded electrodes are used for endless splicing Volta flat belts and Super-Drive™, 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 range offers maximum splicing width of 1000mm and 1500mm.



FT electrode Welding kit

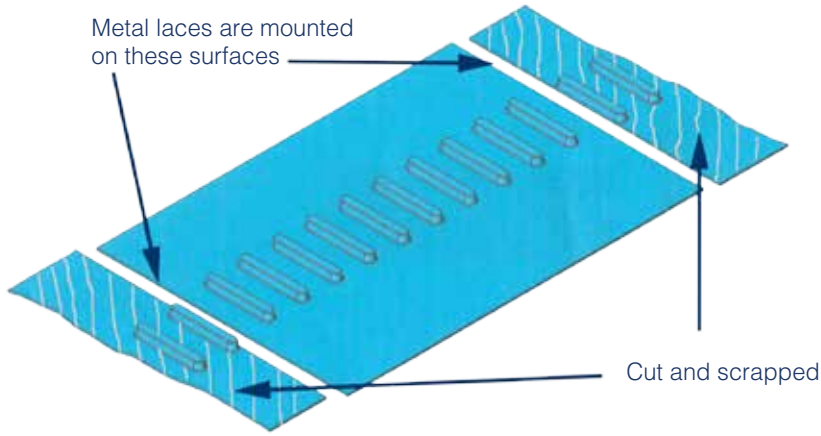
FBW Welding Kit

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 SuperDrive™, DualDrive, DualDrive SP and special textured top flat belts. The FBW tool range offers maximum splicing width up to 2300mm.

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.

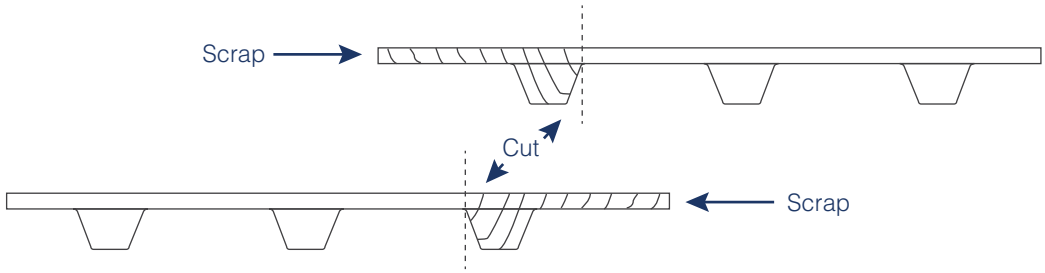


Figure 5a: Tooth pattern after joining the SuperDrive™ belt with lace

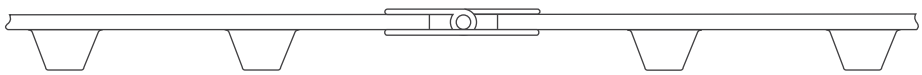


Figure 5b: Shows the correct spacing between teeth with one missing tooth

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 lace, 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

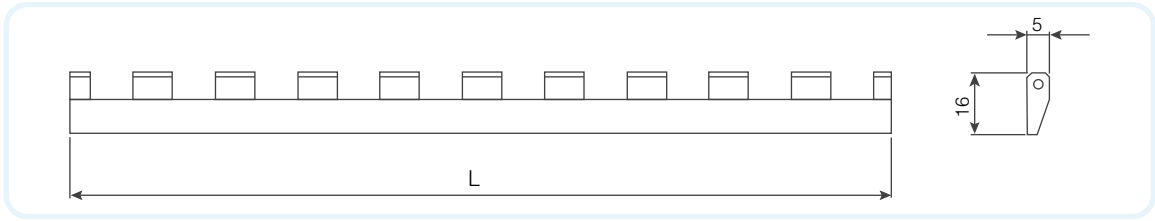
The Plastic Hinge Lace allows you to easily open the belt by taking the hinge pin out, clean or service the conveyor, reinstall the belt and close the lace with a new pin. The Plastic Hinge Lace is made of Volta homogeneous food approved materials and is compatible with Volta M family product belts.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

Closing belt with Universal Lace

Hinge Lace Benefits

Easy Open-Close Technique

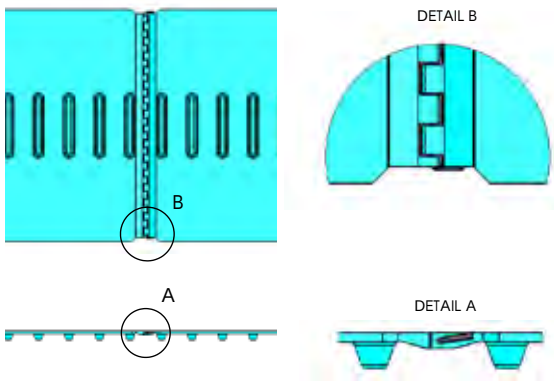
The fastening structure allows you to easily open the Plastic Hinge Lace by removing the hinge pin from the lace. After setting up the belt on the conveyor, fasten the lace and secure it by inserting a new hinge pin into the slit and crimp up the pin ends.



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. This is because the 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 at least 80% of the face length. Note that the maximum allowed pull force for the lace (per cm/ in.) is lower than the allowed pull force of the belt (per cm/ in.). 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

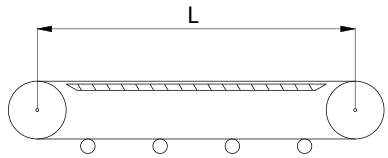
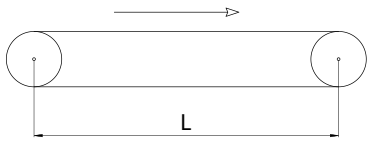
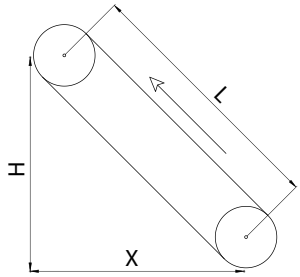
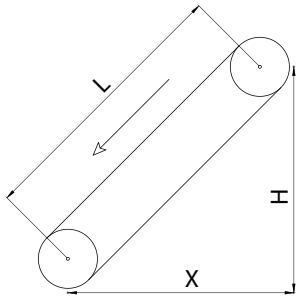
	Volta LMW-U	Volta LMB-U
Description	Flat toothed strip	Flat toothed strip
Material	Volta MW, beige	Volta MB, blue
Hardness	95A	95A
Working Temp Range	-20°C to 60°C/ -5°F to 140°F	-20°C to 60°C/ -5°F to 140°F
Dimensions	5 x 16 mm - 0.2 in x 0.63 in	5 x 16 mm - 0.2 in x 0.63 in
Max Length	3.05 m - 10 ft	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	Nylo - Steel: 1.65mm/ 0.065", 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 sections (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 for 'M' belts or Table 2.3, Page 6 for 'H' belts or Table 2.5 page 8 for 'LT' belts or Table 2.7 page 10 for 'Z' belts or Table 2.9 page 12 for 'ZD' belts or Table 3.0 page 13 for 'MB/BL' belts) 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 of each belt)
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 will 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 Belts with One Row of Teeth

Belt type	Drive pulley only	Drive with 2 support pulleys	Drive with 4 support pulleys	Drive with 6 support pulleys
	20 cm / 8" width	40 cm / 16" width	60 cm / 24" width	80 cm / 32" width
SD-H-3mm	203 kg / 448 lb	343 kg / 756 lb	483 kg / 1065 lb	623 kg / 1374 lb
SD-H-4mm	261 kg / 574 lb	441 kg / 970 lb	621 kg / 1366 lb	801 kg / 1762 lb
SD-H-6mm	406 kg / 893 lb	686 kg / 1509 lb	956 kg / 2103 lb	1246 kg / 2741 lb
SD-M-3mm	138 kg / 304 lb	263 kg / 578 lb	388 kg / 854 lb	513 kg / 1130 lb
SD-M-4mm	176 kg / 387 lb	336 kg / 739 lb	496 kg / 1091 lb	656 kg / 1443 lb
SD-M-6mm	275 kg / 605 lb	525 kg / 1155 lb	775 kg / 1705 lb	1025 kg / 2255 lb
SD-MB/BL-6mm	176 kg / 387 lb	336 kg / 739 lb	496 kg / 1091 lb	656 kg / 1443 lb
SD-LT-3mm	66 kg / 145 lb	126 kg / 277 lb	186 kg / 409 lb	246 kg / 541 lb
SD-Z-3mm	110 kg / 242 lb	210 kg / 462 lb	310 kg / 682 lb	410 kg / 902 lb
SD-Z-4mm	145 kg / 319 lb	277 kg / 609 lb	409 kg / 8998 lb	541 kg / 1190.20lb
SD-Z-6mm	220 kg / 484 lb	420 kg / 924 lb	620 kg / 1364 lb	820 kg / 1804 lb
SD-ZD-6mm	220 kg / 484 lb	420 kg / 924 lb	620 kg / 1364 lb	820 kg / 1804 lb

Table 6c: Selection of Support Pulleys for Belts with Two Rows of Teeth

Belt type	Pull force (PF) for 2 Drive pulleys	Pull Force (PF) for each additional Support pulley
SD-H-3mm	406 kg / 896 lb	70 kg / 154 lb
SD-H-4mm	522 kg / 1148 lb	90 kg / 198 lb
SD-H-6mm	812 kg / 1786 lb	140 kg / 308 lb
SD-M-3mm	276 kg / 608 lb	62 kg / 136 lb
SD-M-4mm	352 kg / 774 lb	80 kg / 176 lb
SD-M-6mm	550 kg / 1210 lb	125 kg / 275 lb
SD-MB/BL-6mm	352 kg / 774 lb	80 kg / 176 lb
SD-LT-3mm	132 kg / 290 lb	30 kg / 66 lb
SD-Z-3mm	220 kg / 484 lb	50 kg / 110 lb
SD-Z-4mm	290 kg / 638 lb	66 kg / 145 lb
SD-Z-6mm	440 kg / 968 lb	100 kg /220 lb
SD-ZD-6mm	440 kg / 968 lb	100 kg /220 lb

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 or Table 6c 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 using 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 or Table 6c.

5.2.1. Subtract the value in Table 6b or 6c from the calculated Pull Force (For example, for "M" material we subtract 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	English Calculation
(320 - 276) /62 = 0.7 and round up to 1	(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.

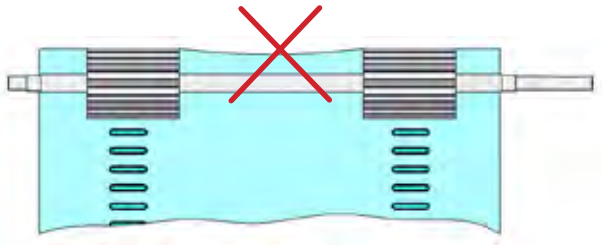
After selecting the number of Support Pulleys required, add the lengths of all the Pulleys (Drive and Support or Tail and Support) together and make sure that the total length of the pulleys is not larger than the width of the belt.

Installation and Positioning of Support Pulleys

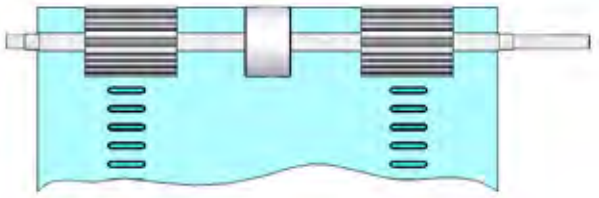
- Volta recommends using support pulleys for any belt 600 mm/ 24” or wider regardless of the load.
- For belts with two rows of teeth, we recommend including at least one support pulley between the two drive pulleys.
- For a belt wider than 1200mm we recommend using at least 3 support pulleys regardless of the 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 bellow show how to arrange the support pulleys in the correct position.

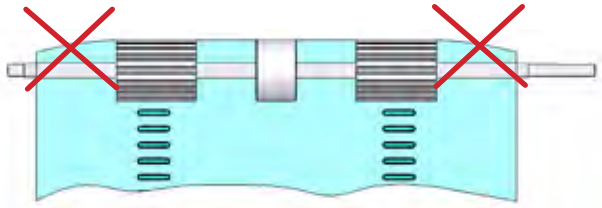
6.2a



6.2b



6.2c



6.2d

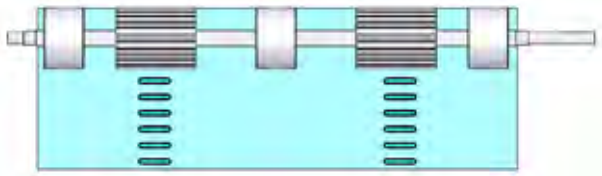


Figure 6.2a shows a depression between the two drive pulleys. In this situation, install at least one support pulley between the two drive pulleys as shown in **Figure 6.2b**.

Figure 6.2c shows the belt with a 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") FMB-3-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	20	20
Conveyor Length (L)	15.2 m	50 ft.
Conveying Height (H)	3 m	9.84 ft.
Conveyor 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 = 0.5 (stainless steel slidebed)	fs = 0.4 (stainless steel slidebed)
fr = 0.1	fr = 0.1
G1= 20*13.6=272 kg	G1= 20*30=600 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=0.5*(272+27.4)*14.9/15.2+0.1*27.4*14.9/15.2+0.1*27+1*272*3/15.2+0.25*0	F=0.5*(600+61.5)*48.8/50+0.1*61.5*48.8/50+0.1*60+1*600*9.84/50+0.25*0
F=205.8 kg	F=452.7 lbs

2. Calculate the Pull Force Per Unit Width of Belt

205.8/45 = 4.6 kg/cm or 452.7/18 = 25.15 lbs/inch.

3. Determine Allowable Pull Force and Pulley Diameter

Fa=Fmax * K

Fmax = 6.25 kg/cm (35 lb/in.) - see Maximum Pull Force in Technical Data on Page 6
K = 1 (180° arc of contact at standard 150 mm/6 in. pulley)

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

The Pull Force per unit width of belt, 4.6 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^{o} arc of contact.

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

Fa=6.25*0.6=3.75 kg/cm or Fa=35*0.6=21 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 0.28 and therefore, the Calculated Pull Force from Step 1 will be 141.8 kg (312 lbs).
The Pull Force per unit width of belt will be:

141.8/45 = 3.15 kg/cm or 312/18 = 17.33 lbs/inch.

This change brings the Pull Force per unit width below 3.75 kg/cm (21 lbs/ft). So you can use a 100 mm (4") pulley.

5. Determine Support Pulley Requirements

The calculated pull force is 205.8 kg (452.7 lbs) and the Pull Force for a Standard Pulley without supports is 138 kg (304 lbs.) as shown in Table 6b, Page 31. Therefore we must use the standard Drive Pulley with 2 Support Pulleys.

This arrangement can take up to 263 kg (578 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.

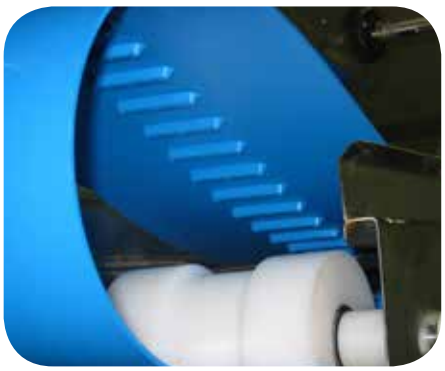
7. Motor Capacity Calculation

Calculation Procedure (for Constant Speed)

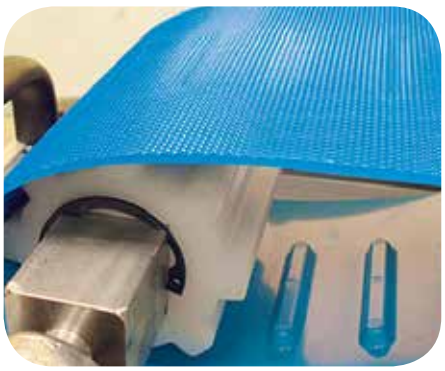
Metric	English
1. Calculation of the required torque for the drive pulley	
$M = \frac{F * 9.81 * Dp}{1000 * 2}$	$M = \frac{F * Dp}{12 * 2}$
M = torque [N∗ m]	M = torque [lb.∗ ft.]
F = calculated pull force [kg] - see section 1, pg. 29	F = calculated pull force [lb.] - see section 1, pg. 29
Dp = pulley pitch diameter [mm] - see page 14	Dp = pulley pitch diameter [in.] - see page 14
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 14	Dp = pulley pitch diameter [in.] - see page14
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	

Notes

Think Positive! Think SuperDrive™!



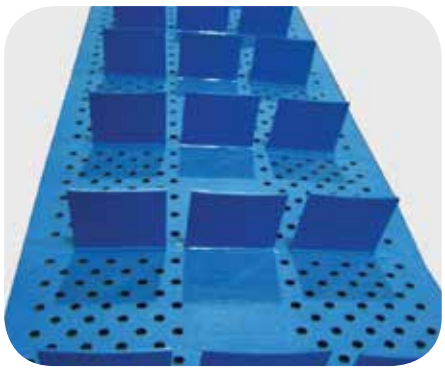
SD™ Tail Pulley



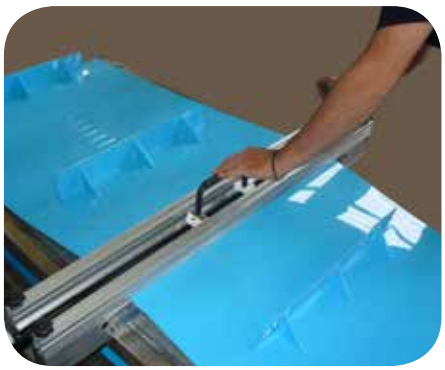
SD™ Drive Pulley

SD™ Drive & Support Pulley

SuperDrive™
Working Under Water

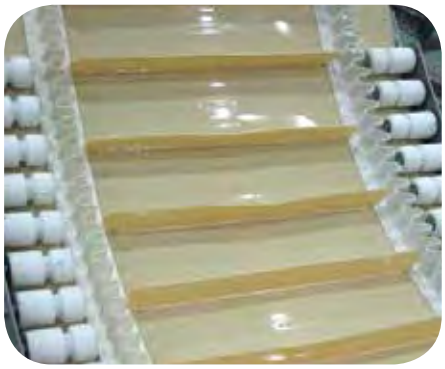


Perforated SD™ Belt
With Cleats



On Site Welding

SD™- LT Low Temperature



"Z" or Swanneck Conveyor

Trough Conveyor

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