



SAFETY CONSIDERATIONS

PRODUCT SAFETY: Products designed and manufactured by Rexnord are capable of being used in a safe manner; but Rexnord cannot warrant their safety under all circumstances.

PURCHASER MUST INSTALL AND USE THE PRODUCTS IN SAFE AND LAWFUL MANNER IN COMPLIANCE WITH APPLICABLE HEALTH AND SAFETY REGULATIONS AND LAWS AND GENERAL STANDARDS OF REASONABLE CARE; AND IF PURCHASER FAILS TO DO SO, PURCHASER SHALL INDEMNIFY REXNORD FROM ANY LOSS, COST OR EXPENSE RESULTING DIRECTLY OR INDIRECTLY FROM SUCH FAILURE.

SAFETY DEVICES: Products are provided with only safety devices identified herein. **IT IS THE RESPONSIBILITY OF PURCHASER TO FURNISH APPROPRIATE GUARDS FOR MACHINERY PARTS** in compliance with **MSHA** or **OSHA** Standards, as well as any other safety devices desired by Purchaser and/or required by law; and **IF PURCHASER FAILS TO DO SO, PURCHASER SHALL INDEMNIFY REXNORD FROM ANY LOSS, COST OR EXPENSE RESULTING DIRECTLY OR INDIRECTLY FROM SUCH FAILURE.**

General Safety Precautions:

- To avoid personal injury, all machinery must be turned off and locked out, prior to chain installation, inspection, maintenance and removal
- Always use safety glasses to protect eyes. Wear protective clothing, gloves and safety shoes
- Support the chain to prevent uncontrolled movement of the chain and parts
- Maintain tools in proper condition and assure their proper use. Use of chain assembly tools is recommended when applicable
- Do not attempt to connect or disconnect chain unless chain construction is clearly known and understood
- Do not reuse any sections of damaged chain because they may have been overloaded and weakened

If any flame cutting, welding, etc. is to occur in the conveyor vicinity, take adequate precautions to insure that no burning of any chain or other components occurs. If adequate protection cannot be provided, remove the chain and other plastic components from the conveyor and store in a safe location. Thermoplastic and similar materials can burn and give off toxic fumes.

DO NOT INSTALL, OPERATE OR PERFORM MAINTENANCE ON THESE PRODUCTS UNTIL YOU READ AND UNDERSTAND THE INSTRUCTIONS CONTAINED IN THIS MANUAL.

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INTRODUCTION

Many beverage and food products are processed inside their containers after filling. The most common method is a wide chain-style tunnel, where the containers are carried through the machine on a wide chain. Within these tunnels, controlled temperature water sprays or showers are used to process the product. In some machines, the containers are lowered into a water bath. These Tunnel Machines can be Pasteurizers, Warmers or Coolers, depending on the product requirements. Higher speed production lines may require two wide conveyors side-by-side or even two decks.

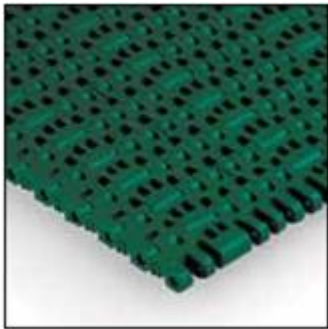
Much of the information contained in this manual can also be found in general Rexnord® FlatTop Product Catalogs and Engineering Manuals. This manual combines all the specific product information and recommendations related directly to the chain selection, construction, installation and maintenance of the conveyor portion of Pasteurizers, Warmers and Coolers.

PASTEURIZERS, WARMERS & COOLERS

Tunnel Pasteurizers, Warmers and Coolers are very demanding product handling applications due to the high temperature range, high load and chemicals used to treat the water and clean these machines. In addition, modern containers can be unstable and production speeds are quite fast.

Rexnord® has developed a number of MatTop® Chain/Transfer Solutions for these tough applications

- Rexnord 2000 and 5997 Thermoplastic Raised Rib MatTop Chains
- Rexnord Fortrex™ 9200 Series Stainless Steel Raised Rib MatTop Chains
- Rexnord 7708 Thermoplastic Open Area MatTop Chains



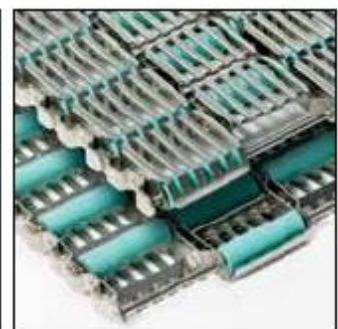
7708



2000



5997



9200 Fortrex

The Rexnord Transfer Methods mentioned above include:

- **Conventional Transfer Combs (2000, 5997 & 9200)** – These combs “rake” the containers on and off of the raised rib MatTop Chains. Various styles are available. While they do provide good transfer and eliminate trip points, they create dead spaces, resulting in stranding containers at the infeed end and discharge end of the tunnel
- **DTS®-C Transfers (2000, 5997 & 9200)** – Using special transfer combs, these are used with raised rib MatTop Chains to combine the features of the transfer combs with our patented DTS transfer chains to provide totally self-clearing transfers
- **DTS® (7708)** – These transfers require no transfer combs or dead plates. The containers convey directly between the tunnel open area Rexnord MatTop Chain and the DTS infeed and discharge chains. However, there are constraints on the size of the tunnels these open area MatTop Chains and DTS transfers may be used on

INTRODUCTION

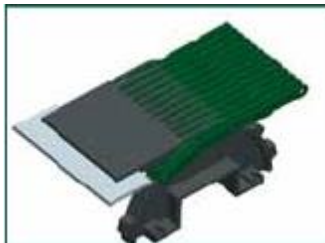
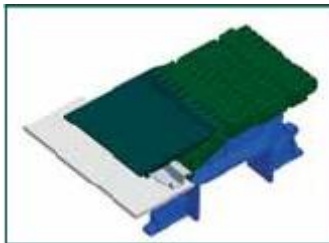
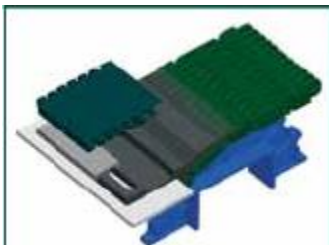
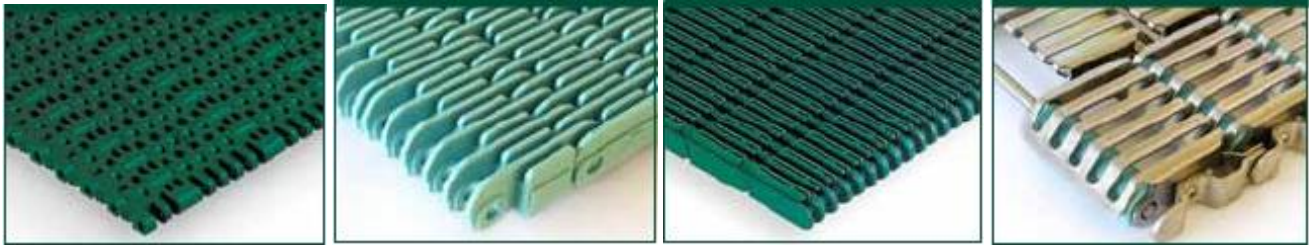
This manual will guide you to the optimal Rexnord® MatTop® Chain and transfer solution for your particular tunnel application. This manual also contains:

- Recommendations for the proper design of the conveyor portion of the tunnel to insure that you get the most productivity, efficiency and life out of your Rexnord solution
 - Detailed installation and maintenance recommendations
- ! Rexnord's expertise is limited to the chains, sprockets, comb transfers and basic conveyor recommendations. For mechanical structural, thermal, hydraulic, electrical requirements, etc. consult with the tunnel equipment manufacturer.

INTRODUCTION

REXNORD® CHAINS FOR THE PASTEURIZER INDUSTRY

Tunnel Chains



INTRODUCTION

Pasteurizer Rexnord Chain Series	Nominal Chain Widths								Positrack™ Tracking Guide Option (see page 17)
	Minimum Chain Width		Maximum Chain Width		Standard (Uncut)		Non-Standard (Cut)		
	in	mm	in	mm	in	mm	in	mm	
7708	36	914	216	5486	3	76.2	0.5	12.7	No
RR2000	9	229	216	5486	3	76.2	1.50	38.1	Yes
RRHD2000	9	229	216	5486	3	76.2	1.50	38.1	Yes
SR2000	9	229	216	5486	3	76.2	1.50	38.1	Yes
5997	36	914	216	5486	3	76.2	0.5	12.7	No
9217, 9227	36	914	216	5486	3	76.2	NA*	NA*	Yes
Infeed / Discharge Rexnord Chain Series	Available Widths								Positrack™ Tracking Guide Option
	in				mm				
1005 DTS PT	3.3				85.0				Yes
7705 DTS PT	4-1/2				114.3				Yes
7705 DTS-R PT	4-1/2				114.3				Yes

* NA = Not Applicable. 9200 Series modules cannot be cut. Actual chain width is 0.75 in (19.0 mm) larger than the nominal width

Chain Information				
Chain Series	7708	2000	5997	9200
Surface Style	Open Area	Raised Rib (RR), Raised Rib Heavy Duty (RRHD) Super Rib (SR)	Raised Rib	Raised Rib
Link Material / Construction	USP Material	USP Material	USP Material	Stainless Steel / Rollers
Chain Pitch	1.00 in (25.4 mm)	2.00 in (50.8 mm)	2.25 in (57.2 mm)	2.25 in (57.2 mm)
Chain Thickness	0.50 in (12.7 mm)	0.95 in (24.1 mm)	0.97 in (24.6 mm)	1.06 in (27.0 mm)
Open Area	20%	27%	22%	50%
Chain Strength	1800 lbs/ft (26262 N/m)	2000 lbs/ft (29781 N/m)	2400 lbs/ft (35016 N/m)	Contact Application Eng.
Pin Retention	Rexnord TwistLock plug	Clips	Blind Eye/Plug	Rivet Clip
PosiTrack™ Tracking Guides Options	No	Yes	No	Yes
Transfer Options				
Static Transfer Combs	No	Yes	Yes	Yes
Hinging Transfer Plates	No	No	No	Yes
DTS-C	No	Yes	Yes	Yes
DTS Only	Yes	No	No	Yes
Applications				
Pasteurizer	No	Yes	Yes	Yes
Warmers / Coolers	Yes	Yes	Yes	Yes

GENERAL CHAIN SELECTION GUIDELINES

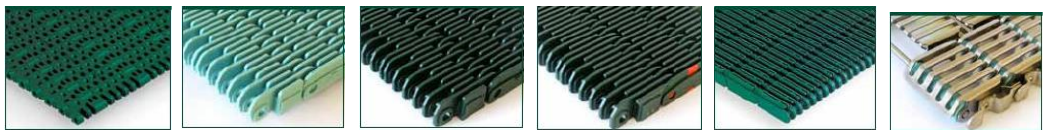
How to use this Chain Selection Guide for Pasteurizer, Warmer, Cooler Applications.

It is important to select the Rexnord® conveying chain most suitable for your specific pasteurizer, warmer, cooler application and container type. To use the chain selection guide provided below:

- First, select the chain series that contains the characteristics required for your specific application such as surface style, link material, chain pitch, chain strength and transfer technologies for each of the four chains available from Rexnord
- Second, find the container type to be processed in the product conveyed selection grid for either beverage or food applications
- Select the chain series that suits your specific application based on the above criteria

! Rexnord 5990 Series MatTop® chain is available in North America.

! Rexnord 2000 Series MatTop chain is available in Europe and countries outside of North America



Rexnord MatTop Chain Options							
Chain Series		USP7708	RR2000	RRHD2000	SR2000	USP5997	9200
Chain Construction		Open Area	Raised Rib	Raised Rib Heavy Duty	Solid Rib Heavy Duty	Raised Rib	Open Rib
Link Material		HT / USP	XP	USP	USP	HT / USP	SS
Beverage Applications - General Guidelines Only							
Container							
Bottle	Petaloid Bottom PET/PEN	●	NR	NR	●	NR	NR
	Returnable Glass	NR	NR	NR	●	NR	●
	Non-Returnable Glass	NR	NR	●	●	●	●
	Ring Bottom PET/PEN	●	●	●	●	●	NR
	Aluminum	●	●	●	●	●	●
Can	Aluminum or Steel	●	●	●	●	●	●
Food Applications - General Guidelines Only							
Glass Jars		NR	NR	●	●	●	●
PET/PEN Jars		●	●	●	●	●	NR
Aluminum or Steel Cans		●	●	●	●	●	●

● = Preferred

● = Second Choice

NR = Generally Not Recommended

CHAIN AND SPROCKET NOMENCLATURE

Chain Nomenclature

HT7708K113

CHAIN MATERIAL:	CHAIN SERIES:	CHAIN WIDTH:
HT	7708	113 IN

USP5997K159

CHAIN MATERIAL:	CHAIN SERIES:	CHAIN WIDTH:
USP	5997	159 IN

RRHDP2000USP 159

CHAIN STYLE:	CHAIN SERIES:	CHAIN MATERIAL:	CHAIN WIDTH:
RAISED RIB HEAVY DUTY WITH POSITRACK™ TRACKING GUIDES	2000	USP	159 IN

FORTREX™ 9227K159 PT

CHAIN SERIES:	CHAIN WIDTH:	WITH POSITRACK™ TRACKING GUIDES
FORTREX 9227	159	
9217 = ROLLERS EVERY LINK 9227 = ROLLERS EVERY OTHER LINK		

Sprocket Nomenclature

KUS5996T14 3-1/2 IN SQUARE BORE

SPROCKET STYLE:	SPROCKET SERIES:	NUMBER OF TEETH:	BORE TYPE:
KUS - MACHINED SPLIT DRIVE SPROCKET	SUITABLE FOR 5990 CHAIN SERIES	14	3-1/2 IN SQUARE BORE
KU - MACHINED SPLIT IDLER SPROCKET			R90 MM - ROUND BORE OF 90 MM
KSXT - MACHINED SPLIT IDLER DRUM			3-7/16 IN OVERBORE WITH DOUBLE KEYWAY - CLEARANCE FIT
NS- MOLDED SPLIT DRIVE SPROCKET			ROUND BORE OF 3-7/16 IN WITH 2 STANDARD KEYWAYS AT 180 DEGREES
SS - MOLDED SPLIT DRIVE SPROCKET			

CONVEYOR DESIGN RECOMMENDATIONS

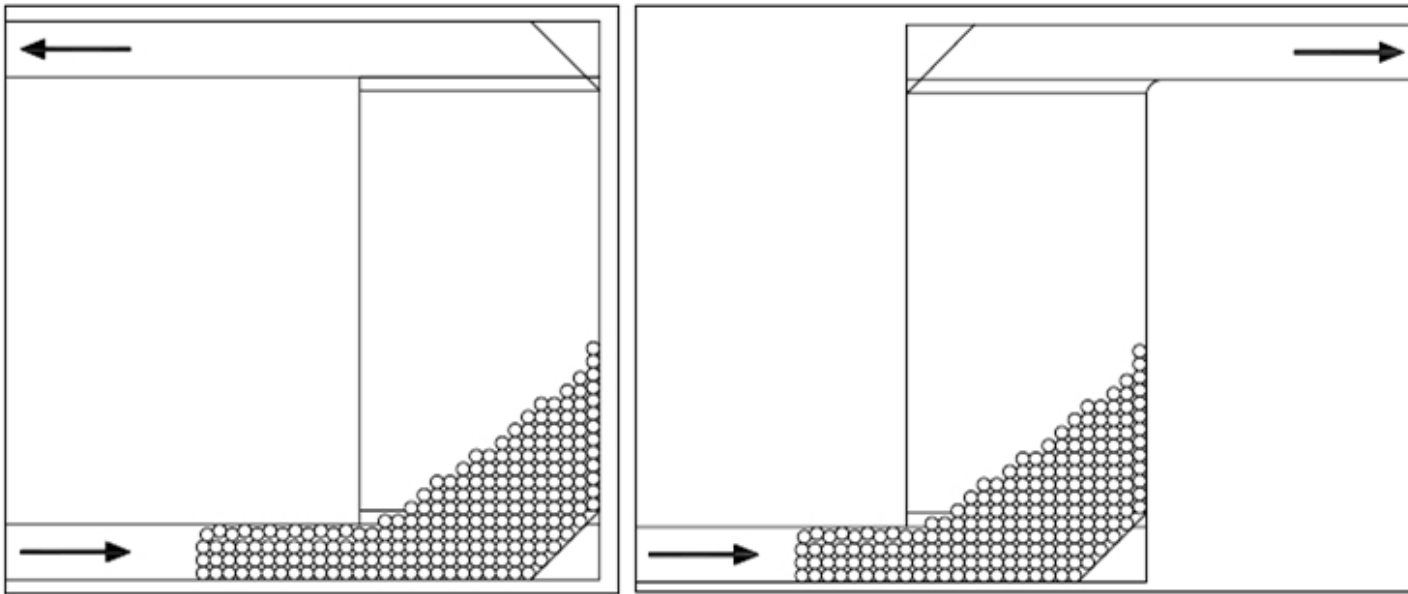
Conveyor Layout

The layout of the Tunnel in the production line and the interfaces with infeed conveyor and discharge conveyor can affect:

- The performance/longevity of the tunnel chain and shafting
- The tunnel container handling efficiency

Tunnel Layout

The position of the tunnel in the production line will dictate either a C-Shaped or a Z-Shaped layout as shown below.



With a C-Shaped layout, the containers must traverse across the end of the chain at the discharge end. If the tunnel is not fully packed, this can cause the containers to tip and jam at the discharge end.

With a Z-Shaped layout, the containers move away from the tunnel in the same direction as they entered, without having to traverse all the way across the discharge end of the chain. Therefore, there is less chance of container tipping in a Z-Shaped layout. Preferred for PET Bottles

Tunnel Chain & Shaft Loading

With either layout, the containers will first fill the “far side” of the tunnel, as shown above. This causes one side of the tunnel chain to be fully loaded while the other side is empty or only partially loaded. This uneven chain loading can cause issues as discussed on page 12.

Container Handling Efficiency

This uneven loading can also lead to container tipping. Other infeed and out feed factors can also affect container handling, such as:

- Conveyor speeds
- Guide rail configurations
- Types of Rexnord® transfer methods include: transfer combs, DTS® or DTS®-C

CONVEYOR DESIGN RECOMMENDATIONS

The three factors; conveyor speed, guiderail configuration and type of transfer method, can be configured and combined in different ways to maximize chain life, shaft life and container handling efficiency.

! CAUTION

Uneven chain loading can lead to premature chain failure and/or drive shaft failure. Several solutions, such as guiderail configurations, to minimize this uneven loading are available. Contact Application Engineering for information.

- ! It is ALWAYS recommended that the intermediate discharge chain run at approximately half the speed of the main take-away conveyor. The best solution is to use a separate variable speed drive that can be adjusted for each style container and line speed. Sometimes this intermediate discharge conveyor does not run during normal production and is only operated at the end of each product run to clear out the machine.

Double Deck Machine Considerations

Enough height between decks must be provided to allow for the necessary chain sag and to prevent the upper return chain from interfering with the containers or spray systems on the bottom deck. Refer to the Catenary Sag section on page 20 for more details. This requires sufficient horizontal length of the infeed and discharge conveyors in order to keep the infeed and decline angles at recommended angles as shown below.

Incline / Decline Considerations

The maximum possible angle is dependent on several factors such as: coefficient of friction between chain and product, speed, product stability, lubrication and dirt or debris. The table below shows a general recommendation of maximum angles determined by chain friction. These values are only general guidelines and if more specific information is required contact Application Engineering.

Chain Type	Maximum Angle (Incline/Decline)	
	Lubricated / Waterbath	Dry Running
Steel Chains	4°	8°
Plastic Chains	2.5°	4.5°

Chain Pin Access

Provide sufficient access openings in the sidewalls of the machine so the pins of the Rexnord® MatTop® Chain in each deck can be inserted and removed. The production line layout must also provide sufficient space on either side of the machine for this purpose.

- ! Rexnord 7708 and 2000 Series MatTop chain pins can be inserted and removed from both sides.
- ! Rexnord HT5997 MatTop chain pins can only be inserted and removed from one side. There is a preferred direction of travel with this chain as shown on page 26. When traveling in this direction, the pins can only be accessed from the right side when looking in the direction of travel.
- ! Rexnord 9200 Fortrex™ pins can be inserted and removed from both sides. The pins are made of stainless steel and are not as flexible as plastic pins; therefore allow extra room for pin access and removal.

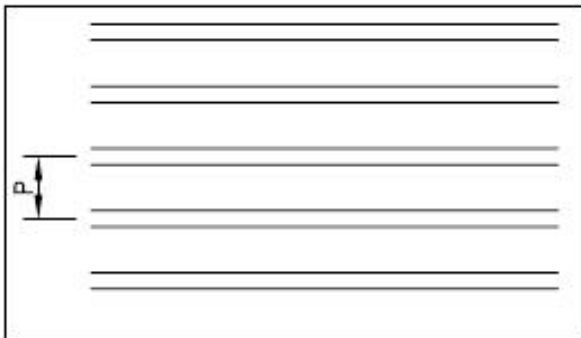
CONVEYOR DESIGN RECOMMENDATIONS

Carry Way

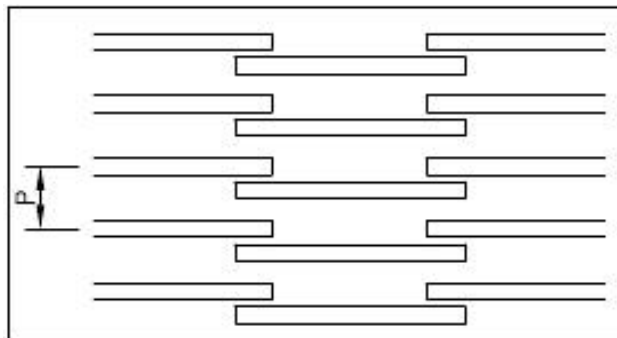
The entire tunnel structure supports and shafting must be strong and rigid enough to handle the high loads. The carry way support structure should be constructed of C-Channel or square tube cross members, spaced approximately 2 to 3 ft. (600 to 900 mm) apart. All supporting members need to be robust, rigid and level. This structure must be able to support the weight of the wear strips, chain and full containers without deflecting or twisting.

The top level of the finished carry way wear strips (including chain) should be level with the top of the infeed and discharge chains. For more detailed information see the Sprocket Location section on pages 25-28.

The chain carry way wear strips should be as shown below:



In-Line Wear Strip Pattern



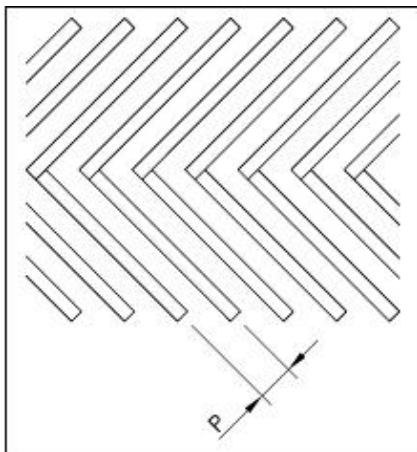
Offset Wear Strip Pattern

Chain	Recommended Wearstrip Spacing					
	Wearstrip Style					
	Parallel				P Dimension / Chevron	
	P Dimension / In-Line		P Dimension / Offset			
	(in)	(mm)	(in)	(mm)	(in)	(mm)
7708	6	152.4	6	152.4	6	152.4
2000	6	152.4	6	152.4	6	152.4
5997	6	152.4	6	152.4	6	152.4
9217	3	76.2	NR	NR	6	152.4
9227	6	152.4	NR	NR	NR	NR

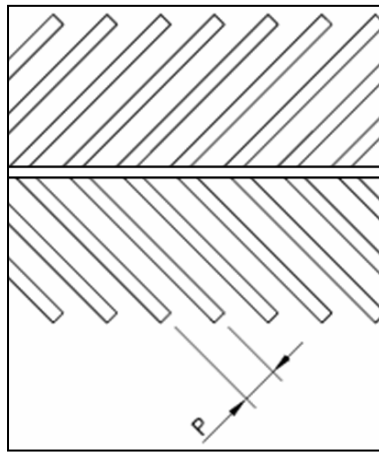
Recommended wear strip width for all = 1.5" to 2.0" (35 to 50 mm)

CONVEYOR DESIGN RECOMMENDATIONS

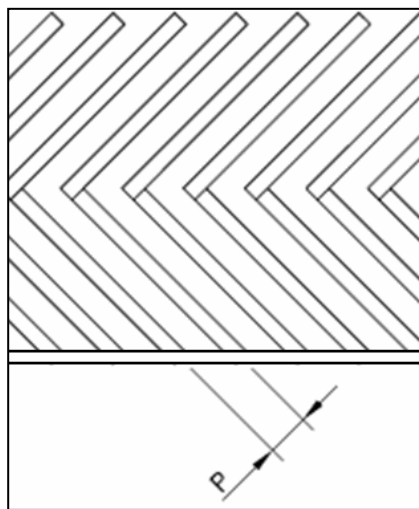
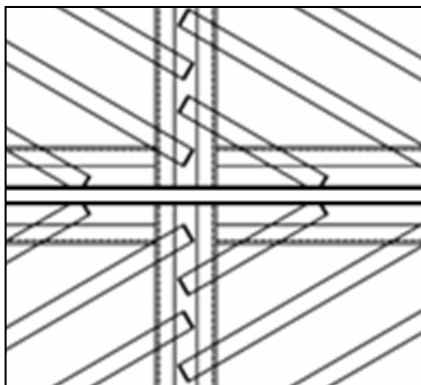
Carry Way (cont.)



Chevron Wear Strip Pattern



with additional center bar

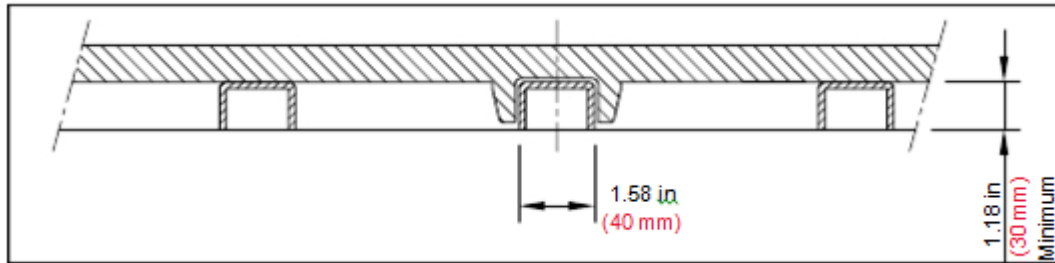


- ! For chevron style, the chevrons should point toward the discharge end in order to help track the chain. The center of the V-pattern should be open and/or staggered, as shown, so debris can pass through at the ends.

CONVEYOR DESIGN RECOMMENDATIONS

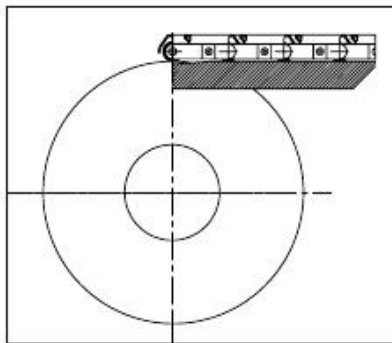
Carry Way (cont.)

If Rexnord® MatTop® chains with PosiTrack™ Tracking Guides are utilized, the carry way wear strip pattern must allow for the guides as shown below. The following chains are available with PosiTrack Tracking Guides: RRP2000, RRHDP2000, SRP2000, 9217PT and 9227PT MatTop chains. The PosiTrack can be located in the center of the chain or 1.50 (38.1 mm) offset depending on the width of the chain. For more detailed information see page 17.

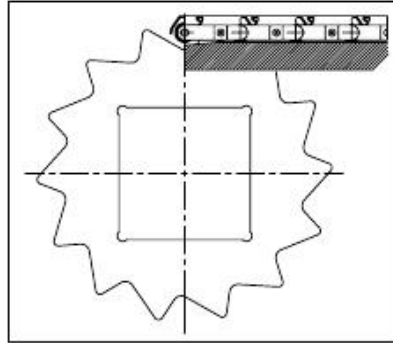


PosiTrack™ Tracking Guide

Rexnord 9217 requires the ends of the wear strips need to be positioned in between the sprockets or idler wheels as shown below. See Sprocket Location section on pages 25-28.

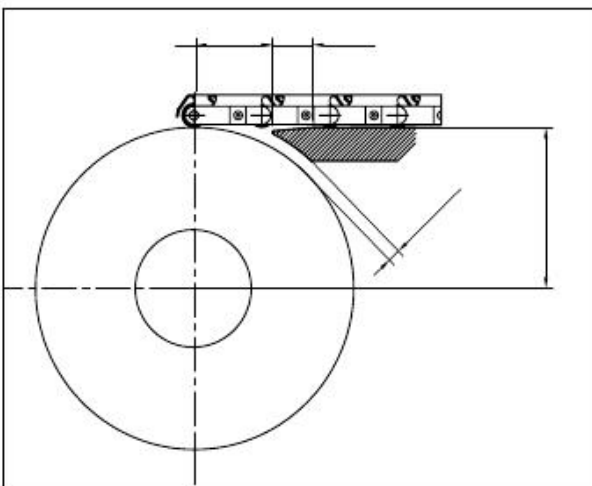


Wear Strip Location - Idler Wheel

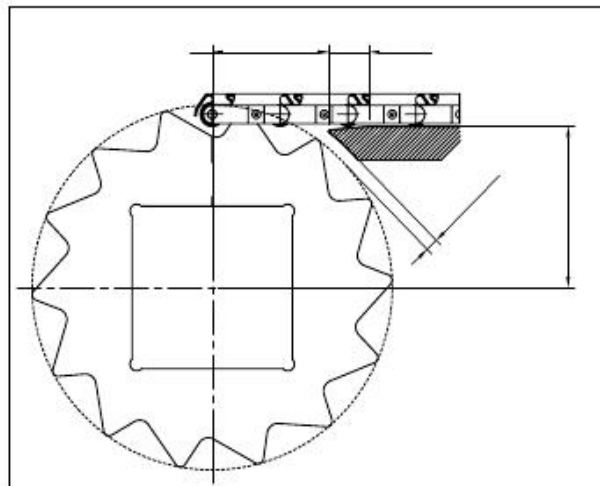


Wear Strip Location - Drive Sprocket

Rexnord 9227 MatTop chains require a special design for wear strip ends at the drive sprocket and idler locations as shown below



Idler Sprocket Wear Strip Location - 9227 Series



Drive Sprocket Wear Strip Location - 9227 Series

CONVEYOR DESIGN RECOMMENDATIONS

Carry Way Wear Strip Materials

Chain	Recommended Wearstrip Materials For Tunnel Applications			
	Container Type			
	One-Way Glass	Returnable Glass	Cans	PET/PEN
7708	SS	SS	UHMWPE or SS	UHMWPE or SS
2000	SS	SS	SS	SS
5997	SS	SS	SS	SS
9200	SS	SS	SS	SS

SS = Stainless Steel UHMWPE = Ultra High Molecular Weight Polyethylene

Stainless Steel Wear Strips

Recommended for corrosive, abrasive or high temperature applications.

Especially critical for handling glass containers in high breakage areas

A cold-rolled austenitic grade is recommended which offers the best corrosion resistant properties; recommended one quarter hard temper (25 to 35Rc)

Softer annealed grades of austenitic stainless steel are NOT RECOMMENDED

Martensitic stainless steel can also be used when heat treated (25 to 35 Rc), however it is not as corrosion resistant as austenitic

Hardness is more critical than grade for better wear resistance

Wear strip surface finish is a critical aspect for overall chain life. A surface finish of 32 μ -in Ra (0.8 μ -m) is recommended

UHMWPE (Ultra High Molecular Weight Polyethylene) Wear Strips

Provide lower coefficient of friction than stainless steel

Not recommended for abrasive conditions where particles may imbed in the surface and wear the chain

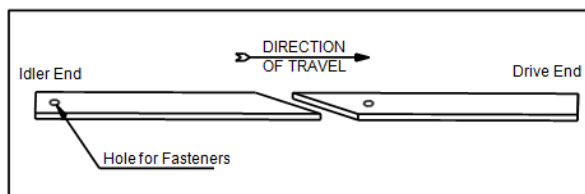
Not affected by moisture and more resistance to chemicals than nylon

UHMWPE wear strips must be solidly supported

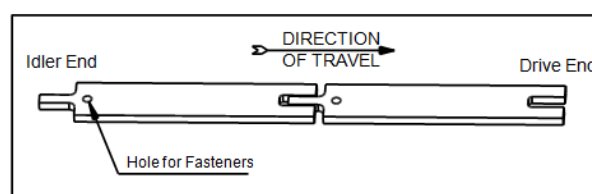
Wear strips will contract and expand due to environmental conditions. Suggested methods to accommodate this are shown below

Wear strip surface finish is a critical aspect for overall chain life. A surface finish of 125 μ -in Ra (3.175 μ -m) is recommended

! Wear strips will contract and expand due to environmental conditions. Suggested methods to accommodate this are shown below.



UHMWPE Thermal Expansion



UHMWPE Thermal Expansion

CONVEYOR DESIGN RECOMMENDATIONS

Guide Clearance

For elevated temperature applications, the actual width increases by an amount that is dependent upon temperature, chain width and the plastic coefficient of thermal expansion. Use the guide clearance formulas below or contact Rexnord® for assistance.

Guide Clearance (GC) =

Chain width at room temperature (W) + expansion due to temperature + standard clearance (A)

If the chain width is known, then $GC = W + (W \times CTE \times \Delta T) + A$

If the guide clearance is known, then $Maximum\ W = (GC - A) / (1 + CTE \times \Delta T)$

GC = Chain guide clearance (or track width) in inches or mm

W = Actual chain width in inches or mm

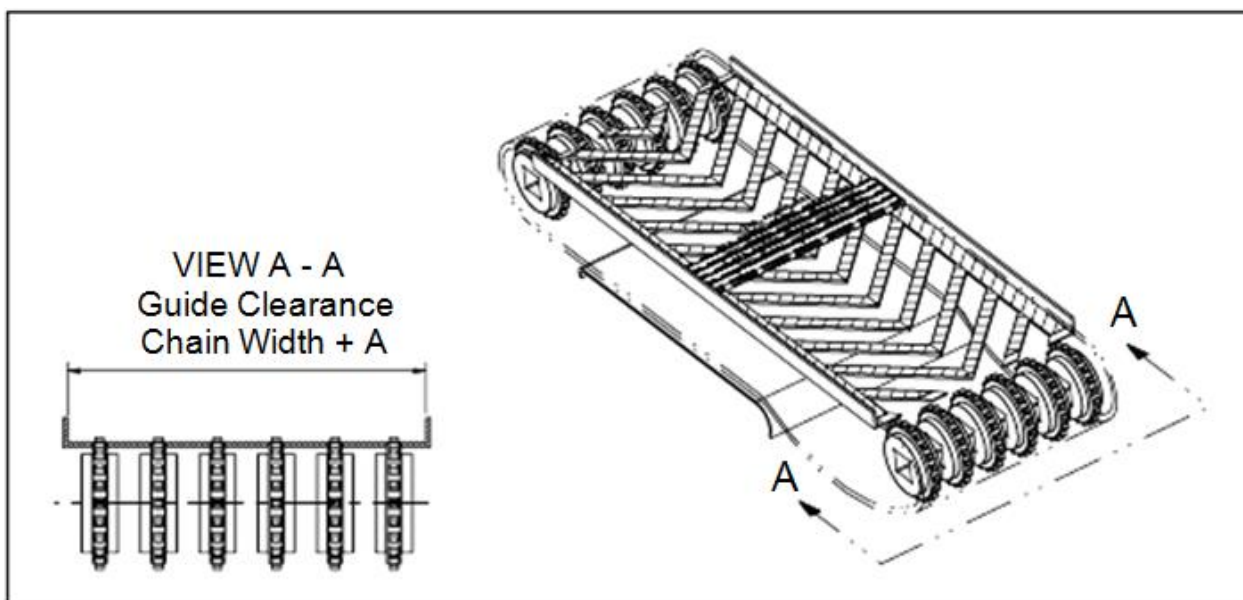
CTE = Chain coefficient of thermal expansion, as shown in table below

ΔT = Temperature range in machine in °F or °C

A = Recommended extra clearance based on machine length, as shown in table below

Coefficients of Thermal Expansion (CTE)		
Link Material	inches / inch / °F	mm / mm / °C
HT / USP	0.00083	0.15

Chain - Edge Guide Clearance			
Conveyor Length		Dimension A	
Feet	Meters	inches	mm
30 to 50	9 to 15	0.63	16
Over 50	Over 15	0.75	19.1



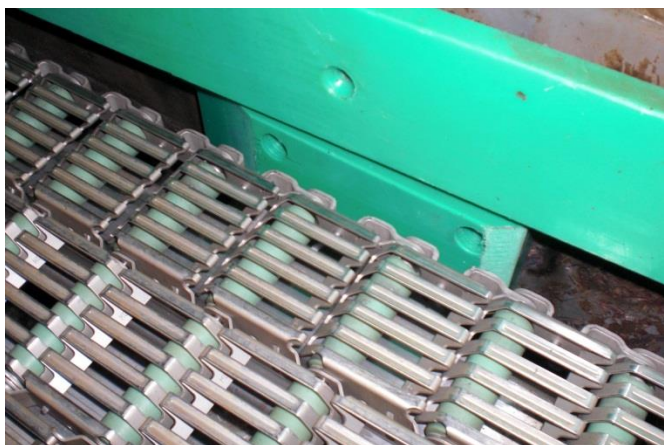
Guide Clearance (GC)

! Fortrex 9200 chain clearance should be 0.25 inch (6.35 mm) on both sides of the chain. Fortrex 9200 PT chain clearance should be 1 inch (25.4 mm) minimum on both sides of the chain. The 9200 actual chain width is 0.75 in (19.0 mm) larger than the nominal width. It is critical to order the correct chain width to fit within the tunnel equipment. Actual Chain Width = Nominal Chain Width + 0.75 in (19.0 mm).

CONVEYOR DESIGN RECOMMENDATIONS

Guide Clearance (cont.)

! These outer chain edge guides help track conventional MatTop® Chains without PosiTrack® through the tunnel. They can be full-length rails along both sides of the chain or short guide blocks spaced every 5 ft. (1.5 m) along the length of the machine. Whatever method is used, it must prevent the chain from interfering with tunnel support members, etc. where it can catch and break.



Example of short guide block

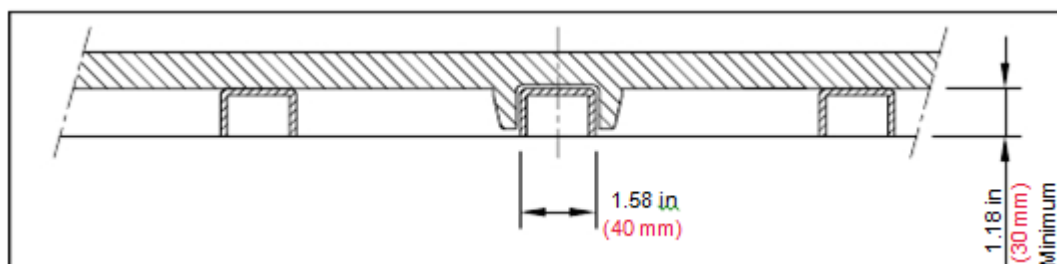


Example of round turning guide

Chain Center Guidance with PosiTrack™ Tracking Guides

The chain within a tunnel can be guided using PosiTrack Tracking Guides in the center part of the chain. The PosiTrack Tracking Guides are located in the center of the chain or offset 1.5 in. (38.1 mm) from the center of the chain, depending on the width. The following chains are available with PosiTrack Tracking Guides: RRP2000, RRHDP2000, SRP2000, 9217PT and 9227PT MatTop® chains.

For cut to width 2000-series Positrack position $\pm 0,75$ inch left or right



PosiTrack™ Tracking Guide

Rexnord® Chains with PosiTrack Tracking Guide	PosiTrack Tracking Guide Locations			
	Chain Width Increments *			
	3 in (76.2 mm) (i.e. 3, 9, 15 in, etc.)		6 in (152.4 mm) (i.e. 6, 12, 18 in, etc.)	
	Dimension from Center of Carry Way Bed			
	(in)	(mm)	(in)	(mm)
RRP2000	0	0	1.5	38.1
RRHDP2000	0	0	1.5	38.1
SRP2000	0	0	1.5	38.1
9217PT *	0	0	1.5	38.1
9227PT *	0	0	1.5	38.1

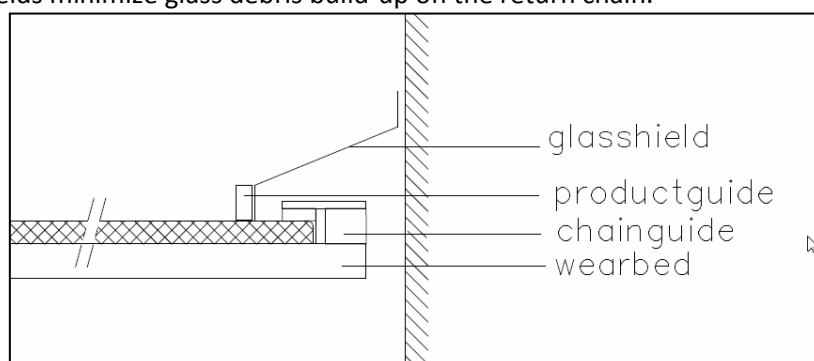
CONVEYOR DESIGN RECOMMENDATIONS

Chain Center Guidance with PosiTrack™ Tracking Guides (cont.)



Example of PosiTrack Guide End

- ! * The 9200 actual chain width is 0.75 in. (19.0 mm) larger than the nominal width. It is critical to order the correct chain width to fit within the tunnel equipment. Actual Chain Width = Nominal Width + 0.75 in. (19.0 mm)
- ! Product guide rail profiles and spacing must prevent containers from falling over the outer edges of the tunnel chain and getting trapped in the return chain. If that happens, containers or broken pieces can get caught in the tail sprockets, causing chain and sprocket breakage.
- ! PosiTrack Tracking Guide should be chamfered at Idler side.
- ! Positrack guide needs to be smooth, straight, welding burrs should be removed.
- ! Positrack guide should be affixed properly as high loads can occur
- ! Additional glass shields minimize glass debris build-up on the return chain.



Return Way

Internal Chain Returns

Internal chain return ways, where the chain is guided back inside the tank, are typical. It is recommended that the height of the water in the tanks be well below the return chain catenary sags or the return chain can float, which can lead to sprocket interaction problems. For double deck units, see notes on page 12.

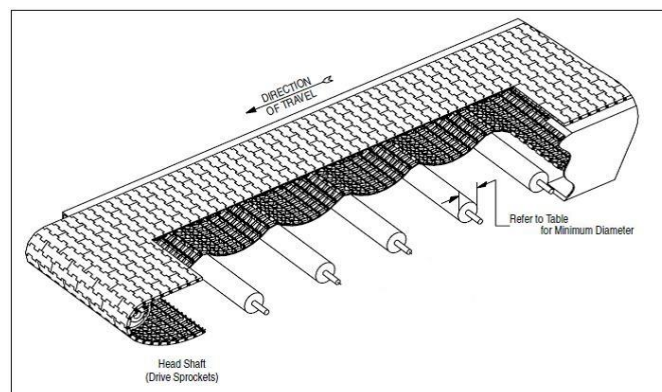
External Chain Returns

External chain returns are less demanding since the chain is not inside the hot, caustic environment for half of the time. However, care must be taken so that the return chain does not drag on the floor or catch on the bottom of the tank. It is recommended to inspect the catenary sag on a regular maintenance schedule as discussed on page 63.

! CAUTION

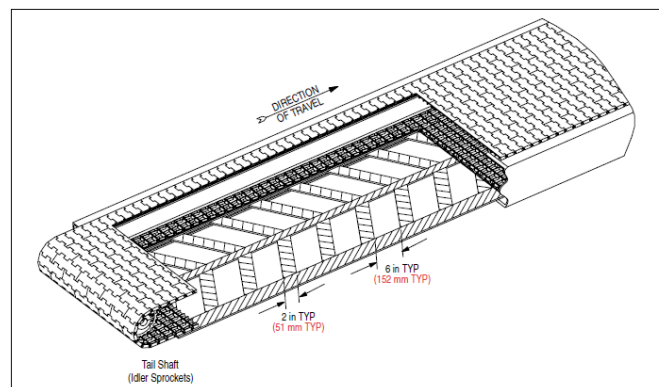
Ensure the proper guide clearance is maintained as shown on page 16. Provide side guide shoes in the return so the return chain cannot catch on side support members.

- Rotating rollers, static tubes or static half-round shoes are typically used for chain returns in tunnel machines
- Rotating rollers result in less drag on the return chain due to rolling friction vs. sliding friction. This can have an equalizing effect on the vertical chain sags
- Static tubes or shoes will cause more chain drag, but do not need any maintenance



Roller Return Pattern

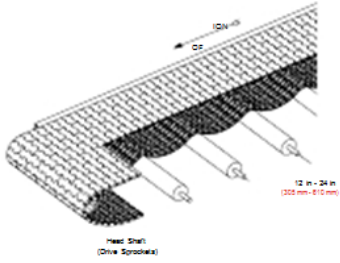
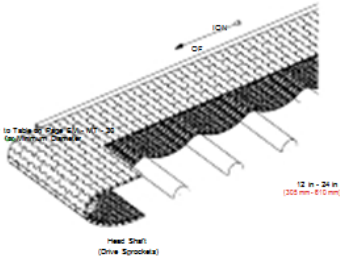
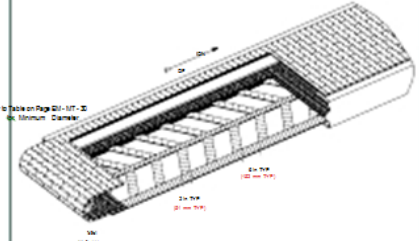
- Chevron style sliding returns are also used
- Some returns use a combination of several return types in order to control the chain sags



Chevron Return Pattern

CONVEYOR DESIGN RECOMMENDATIONS

Return Way (cont.)

RECOMMENDED RETURN TYPES & MINIMUM SIZES						
Rexnord Chain	Rotating Roller or Static Tubes		Static Half-Round Shoes		Sliding	
						
	Diameter		Radius		Wearstrip Width	
Series	(in)	(mm)	(in)	(mm)	(in)	(mm)
7708	2	50	1	25	1.5	35
2000	6	150	3	75	1.5	35
5997	6	150	3	75	1.5	35
9200	6	150	3	75	NR	NR

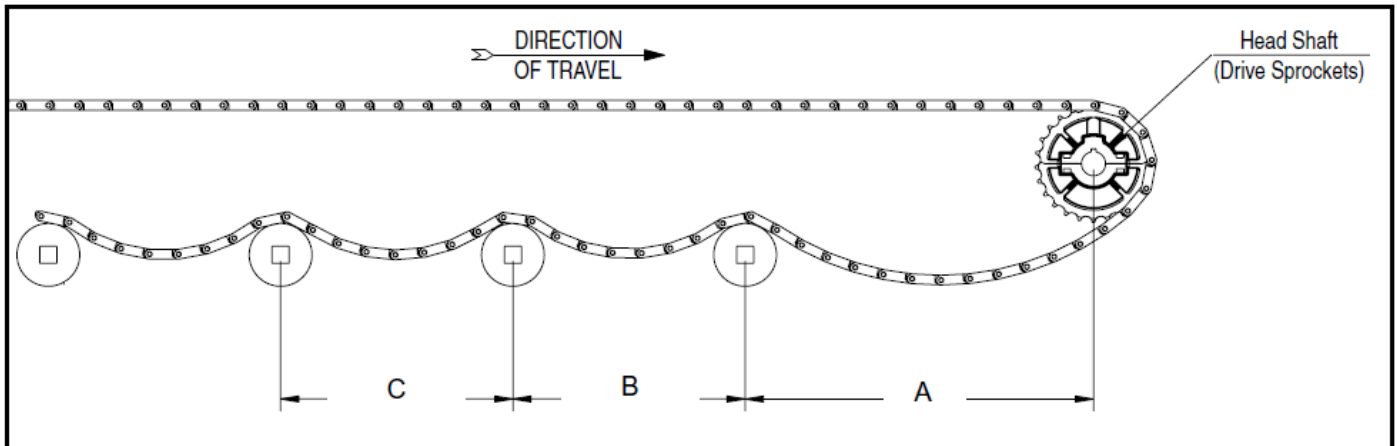
The spacing in the return way is dependent on many factors specific to each tunnel.

- Rexnord is able to investigate the spacing of the Return Roller or Static Tubes of each individual tunnel application. Therefore, contact Application Engineering for recommended spacing between rotating rollers, static tubes or shoes.
- Return rollers require bearings that are free-turning in a wet, caustic environment. The rollers should be straight and true and constructed of cold rolled stainless steel
- Return tubes or shoes should be straight and true as well as constructed of cold rolled stainless steel (32 μ -in Ra finish). UHMWPE or PVC coverings are acceptable in non-abrasive applications, such as can and plastic container machines. UHMWPE or PVC can be applied to reduce sliding friction in the return
- All return rollers and shoes must be level and perpendicular to chain direction of travel
- The tops of return rollers or shoes are usually located at approximately the same height as the bottoms of the sprockets or slightly higher

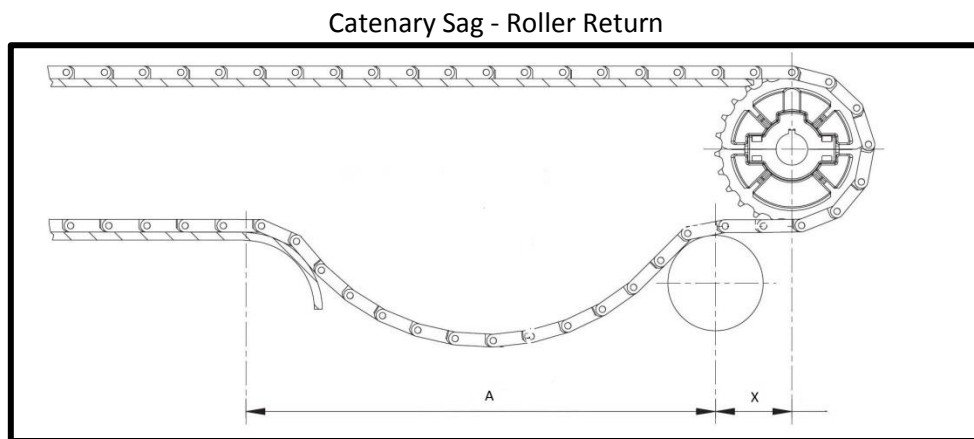
CONVEYOR DESIGN RECOMMENDATIONS

Catenary Sag

The function of the catenary is to allow a place for excess chain to accumulate. This is extremely critical in tunnel machines utilizing plastic chains, where the very long chains can elongate due to a combination of high tension loads and high temperatures. This excess chain length will cause the chain to sag down in between the return rollers, tubes or shoes. The chain elongation and resultant sag is dynamic, changing with changes in loading and temperature. Proper return roller or shoe spacing is critical



Typical dimensions for A is 1200 to 1500 mm. Dimension B and C can be 800 to 1200 mm.



Catenary Sag with Snubber Roller

Snubber rollers may be required to maintain proper wrap around the drive sprockets. Please consider a dimension X from $\frac{1}{2}$ sprocket pitch diameter until 350 mm.

- ! The catenary sag calculations required to determine proper return roller or shoe spacing in tunnel machines are complex and it is recommended to consult with Rexnord® Application Engineer for specific A, B and C dimension recommendations.
- ! CAUTION
Return roller and shoe spacing recommendations must take into account locations of walls between water tanks and any other obstructions.
- ! CAUTION
Provide plenty of clearance above and below the return chain to avoid chain interference. The return chain will sag in between rollers or shoes as described above, but can also pull tight, as load and temperature conditions

CONVEYOR DESIGN RECOMMENDATIONS

Head and Tail Shaft Requirements

The two preferred shaft styles are either square with turned down ends or round with double keyway. Although a square or round shaft is typical for both the head and tail shaft, other options may be chosen for tail shafts. For ease of chain installation and maintenance, consider adding extensions to tail shafts so they can be manually rotated from outside the tunnel. Select proper head and tail shaft sizes using the Rexnord Chain Calculation Program that will fit the available sprocket bore sizes for the chosen chain as listed in the Product Introduction section.

For best performance use cold-rolled solid stainless steel shafting with:

- Suggested Hardness: 25 to 30 Rc
- Suggested Surface Finish: 63 μ -in Ra (1.6 μ m)
- Straightness Tolerance: Within 1/32 in. (0.8 mm) over the shaft length
- Twist Tolerance: Maximum of 1/8 degree/ft (0.4 degree/m) of shaft length
- TIR Tolerance (Total Indicator Run-out): Maximum of 1/32 in. (0.8 mm)
- Corner Chamfer (or corner radius) for Square Shafts: Maximum of 1/8 in. (3.2 mm)
- Standard mill quality steel may not meet these requirements. Therefore, additional straightening and/or machining may be required.

! CAUTION

The shaft sizes calculated by the Rexnord® Chain Calculation Program are for solid round, double-keyed shafts or solid square shafts, made of stainless steel ONLY. These sizes are guidelines only and the final design and sizing are the responsibility of the machinery builder and/or end user, especially if other materials or styles of shaft are used.

! CAUTION

Round shafting with 2 or 4 angles welded on to simulate square shafting is NOT recommended due to dimensional inaccuracy and possible shaft distortion during fabrication.

- If round double-keyed shafting is used, the two full length keys must extend along the full chain width (except at bearing locations), so that all sprockets are engaged. Lock these keys in place on both head and tail shafts.

! CAUTION

If using dual drives, the shafts should be connected in the middle by a rigid coupling (with no back-lash) and both shafts must be in time with each other (square corners or keys in line). The dual drives must be accurately synchronized.

- Another option for the dual shaft/two-drive system is to use two “half-width” chains side-by-side in place of the one wide chain. In this case, it is best if both the drive shafts and the tail shafts are NOT coupled together in the middle.

CONVEYOR DESIGN RECOMMENDATIONS

Head and Tail Shaft Requirements - Bearings

It is recommended to use the proper number of shaft bearings as indicated by the Rexnord® Chain Calculation Program.

The outboard bearings are usually ball bearings, either flange style mounted to the side of the tunnel or pillow blocks mounted to the ends of the tunnel. Pillow blocks are preferred for DTS® and DTS®-C transfers.

The internal bearings are typically split pillow block sleeve type and must be severe wash-down duty. Mount internal bearings to robust structural cross member in order to prevent horizontal shaft bending due to chain loading.

For proper shaft and bearing mounting dimensions refer to the Sprocket Location section on pages 25-28

CONVEYOR DESIGN RECOMMENDATIONS

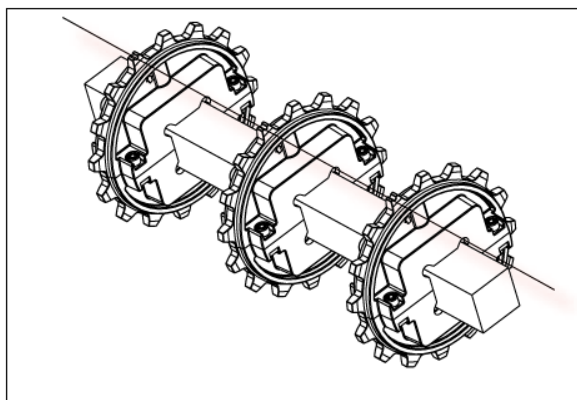
Sprockets

Split sprockets are usually preferred due to ease of installation and maintenance. Select the sprocket style that is available with the selected bore style (i.e. square, round double-keyed, etc.) and large enough to fit the required shaft size, as determined in the Rexnord® Chain Calculation Program.

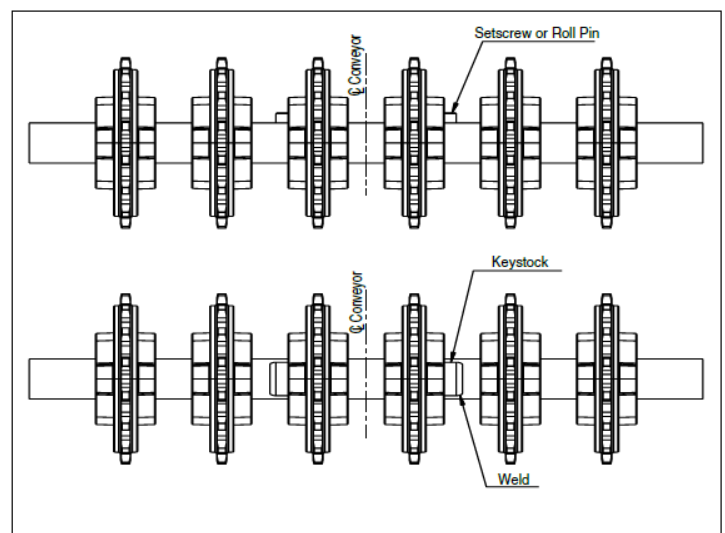
- ! Always specify bore style and size for each selection. For round bore sprockets that must slide axially on shaft, always specify as “Idler Bore”. See Chain and Sprocket Nomenclature section on page 9 for details on ordering.
- ! For tunnel applications, Rexnord recommends using the maximum number of sprockets (i.e. using all available chain sprocket pockets) on both head and tail (drive and idler) ends. This assures optimum product transfer at both ends of the machine. When installing the sprockets, make sure that all sprocket faces are positioned the same way on the shaft as shown below. For more detailed information on sprocket installation see pages 48-49.

Sprockets should be fixed on the shaft or floating depending on the chain series as shown in the table below. Fixed sprockets can be locked in place using set screws, roll pins, welded blocks or shaft collars as shown below. Make sure that the locking method cannot come loose over time. The other sprockets should float axially to allow for thermal expansion and contraction of the tunnel chain and will be held in place by the chain sprocket pockets

Drive and Idler Sprocket Mounting Recommendations			
Rexnord Chains	2 center sprockets are fixed all others float	all float	Fix all
7708	X		
RR2000, RRHD2000, SR2000	X		
RRP2000, RRHDP2000, SRP2000		X	
5997	X		
9217, 9217PT, 9227, 9227PT			X



Square Bore Sprockets Displaying Timing Mark



Two Center Sprockets Fixed on the Shaft

- ! It is critical to never mix sprockets with different materials or different styles (split vs solid) on the same shaft because teeth will not be properly aligned.

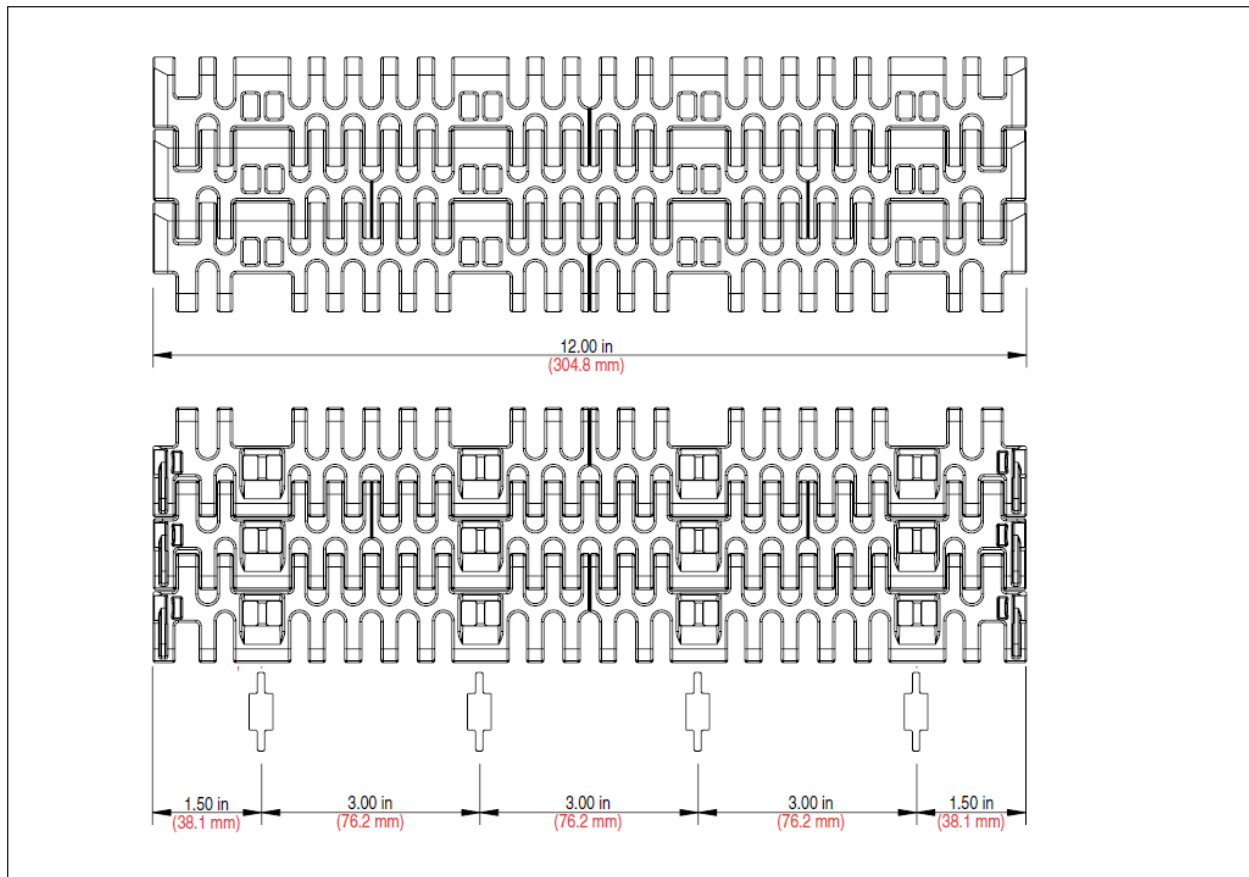
CONVEYOR DESIGN RECOMMENDATIONS

Sprockets (cont.)

- Where internal shaft bearings or shaft couplings are required, they may interfere with the proper sprocket locations. This will usually require that one or more sprockets be left out. In this case, provide other means of supporting chain at this location to keep chain from sagging in-between sprockets. This can be accomplished with an idler sprocket or machined UHWMPE drum
- If dual drives are utilized, it is critical to ensure that each pair is accurately synchronized and in phase
- Sprockets must be positioning axially along shafts so teeth fit into corresponding sprocket pockets in chain.
- For sprocket locations for each MatTop Chain Series see pages 25-28.

CONVEYOR DESIGN RECOMMENDATIONS

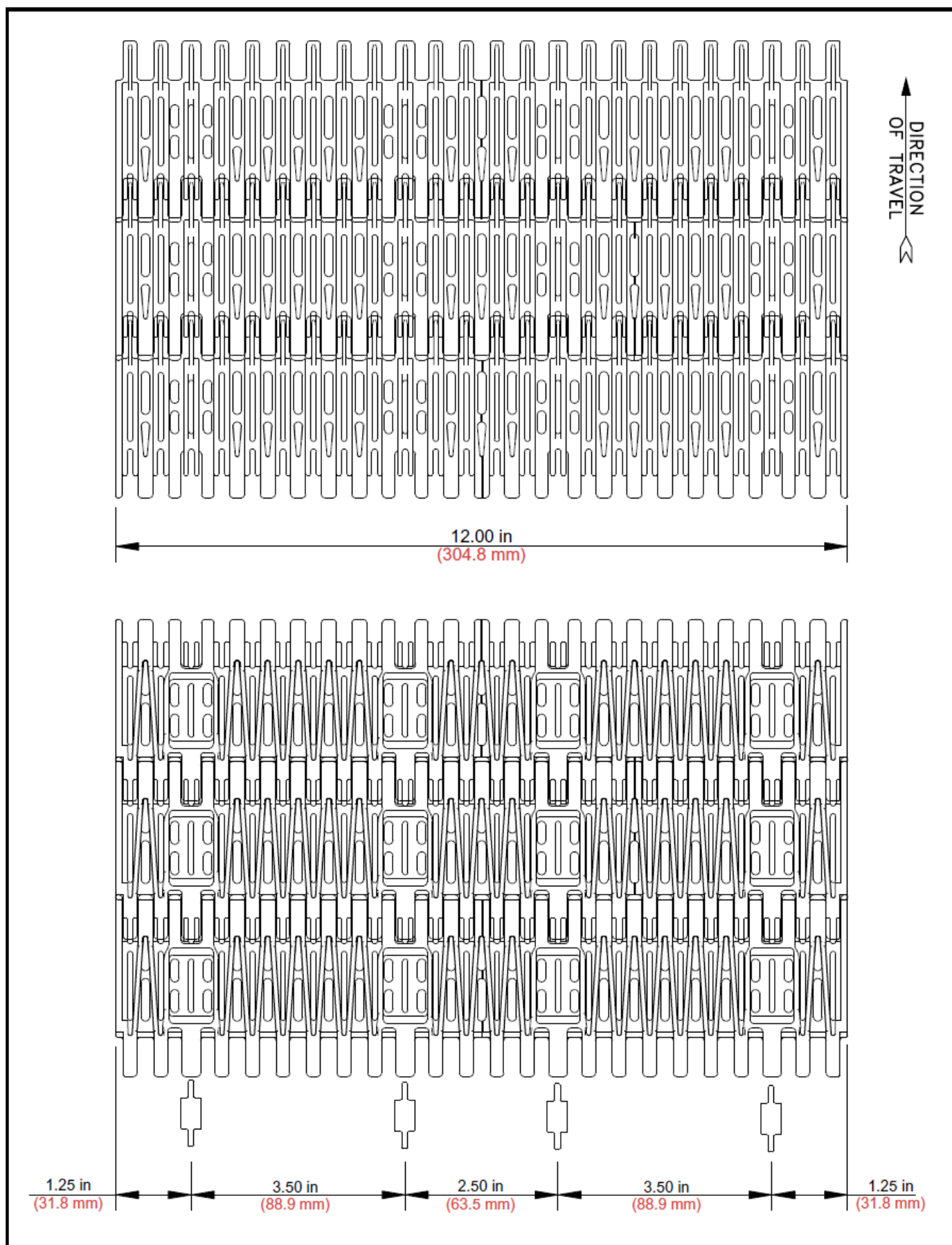
Sprocket Locations - 7708



Sprocket Locations - 7708 MatTop Chain Series

CONVEYOR DESIGN RECOMMENDATIONS

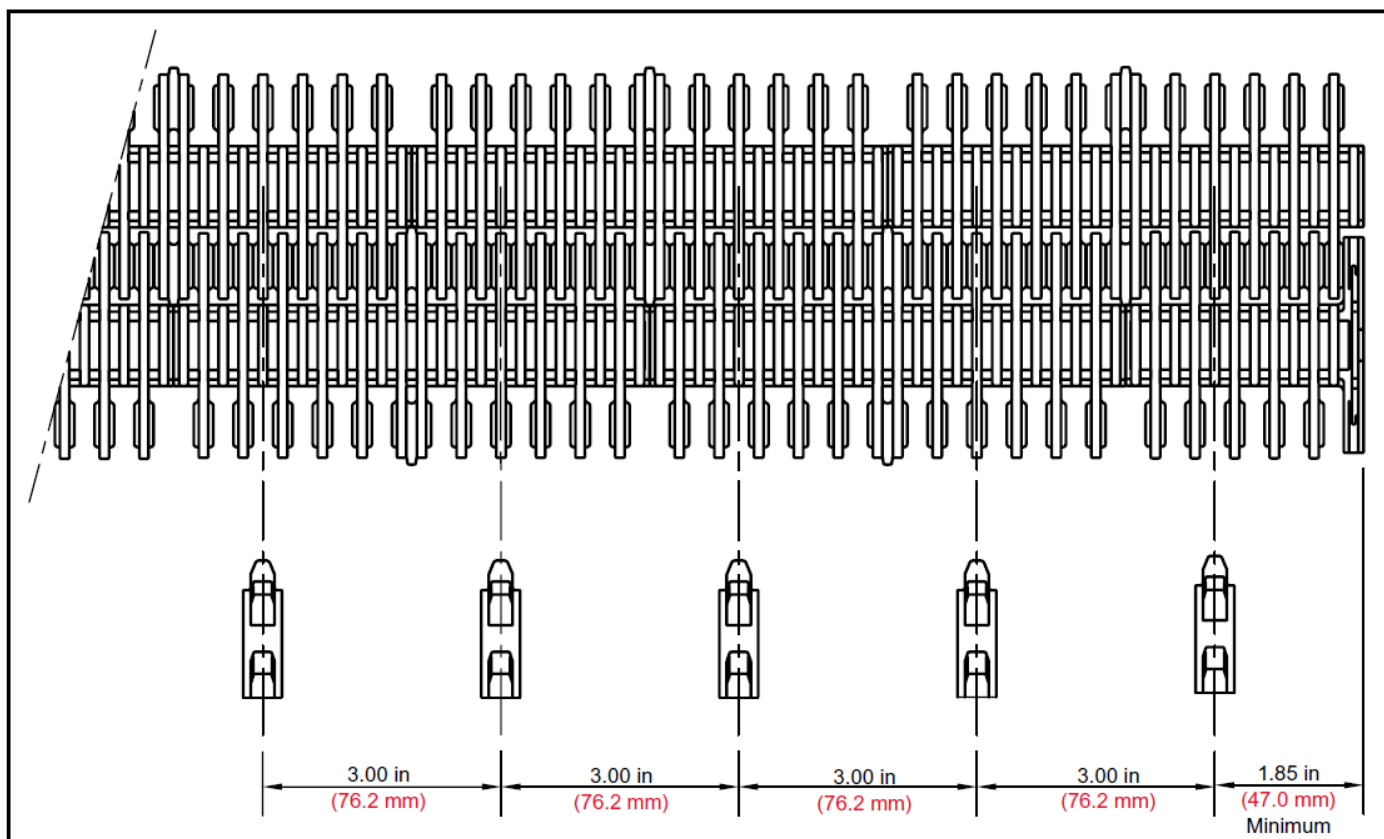
Sprocket Locations - 5997



Sprocket Locations - 5997 MatTop Chain Series

CONVEYOR DESIGN RECOMMENDATIONS

Sprocket Locations - 2000



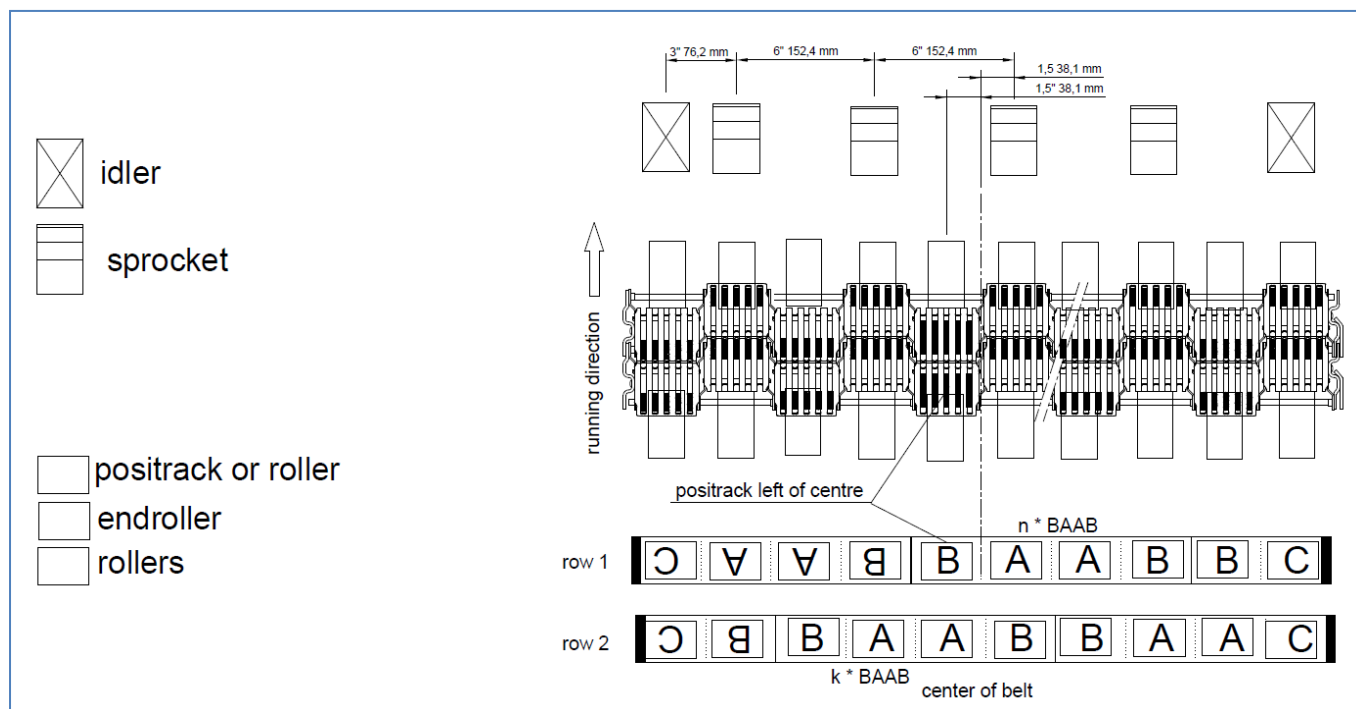
Sprocket Locations - 2000 MatTop Chain Series

- ! CAUTION
Use the same sprocket location for 2000 chain series with PosiTrack™ Tracking Guides, however, the sprocket cannot be placed in the position of the PosiTrack Tracking Guides.
- ! CAUTION
The three outer sprocket pockets should not be used.
- ! CAUTION
The SR 2000 Series is designed to block the first 3 outer locations. Therefore, with the first “visible” pocket can be started with positioning the sprocket.

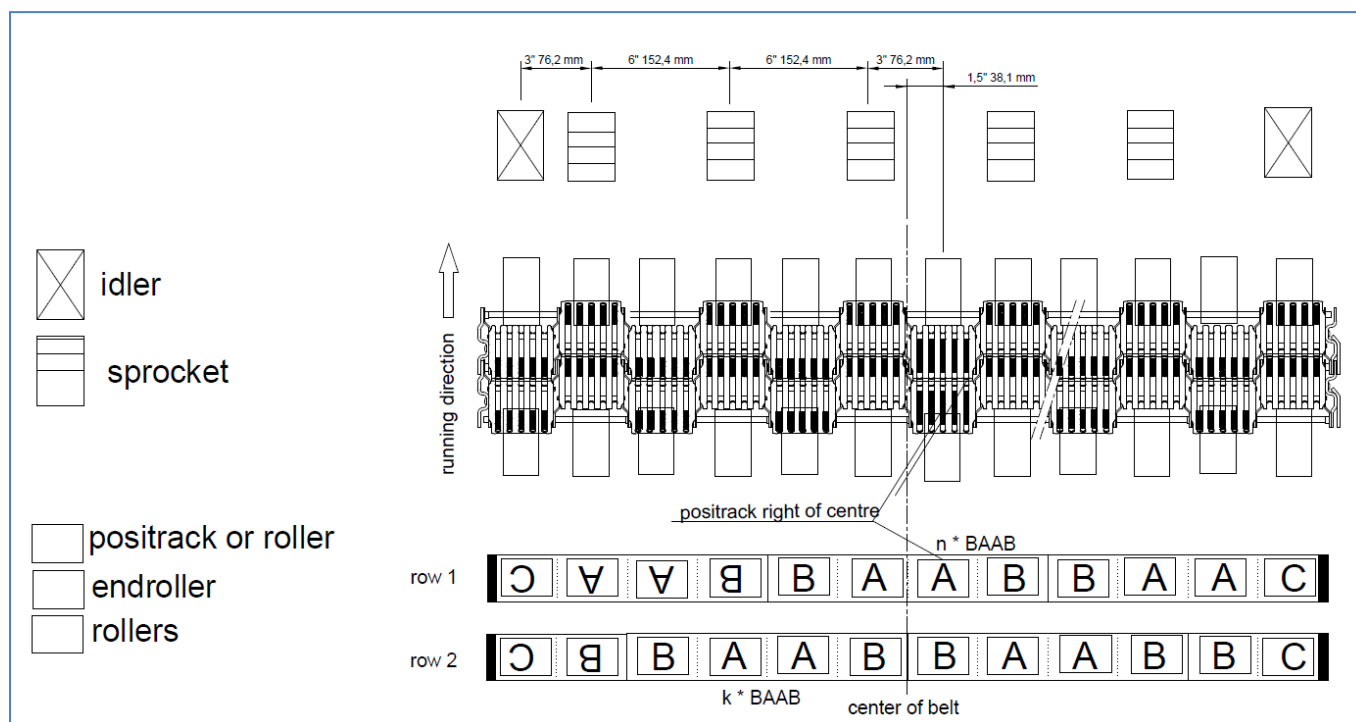
CONVEYOR DESIGN RECOMMENDATIONS

Sprocket Locations - 9200 9217

Even belt width (non-symmetrical), width 18, 30, 42 and 54.



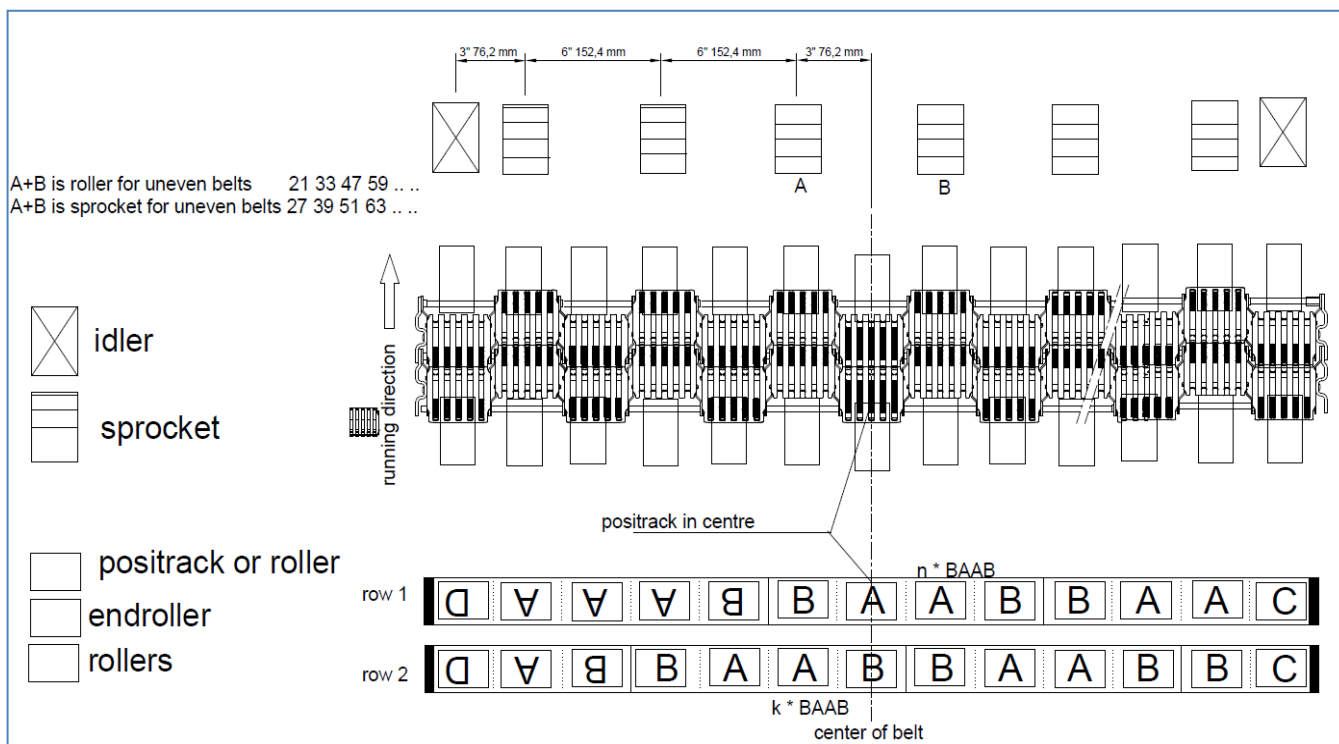
Even belt width (non-symmetrical), width 24, 36, 48 and 54.



CONVEYOR DESIGN RECOMMENDATIONS

Sprocket Locations - 9200 9217

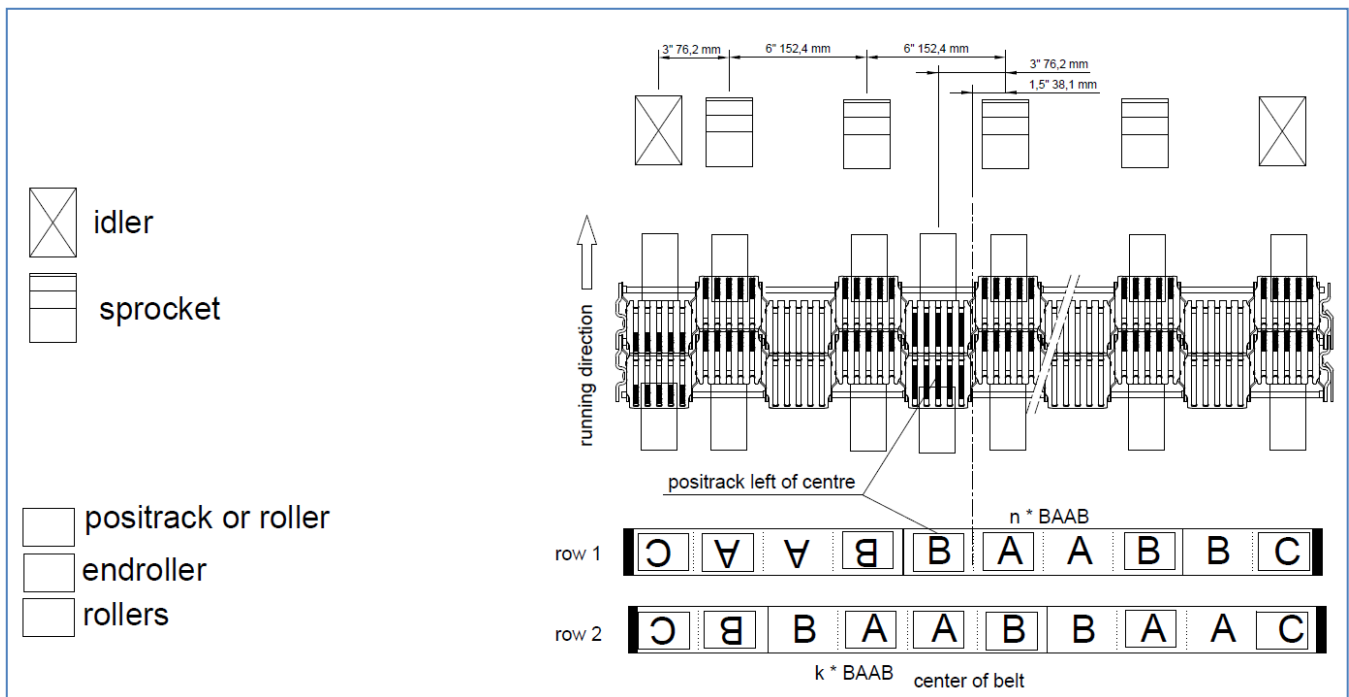
Uneven belt width (symmetrical), width 27, 39, 51 and 63.



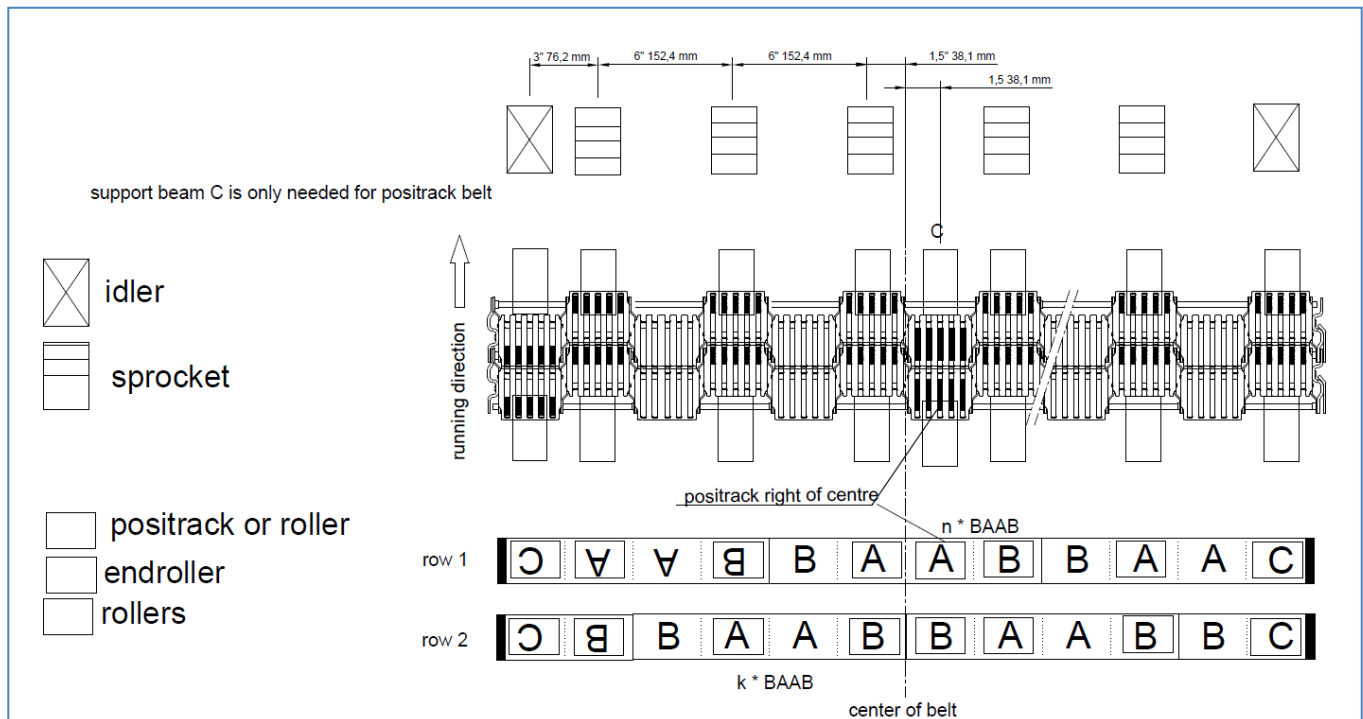
CONVEYOR DESIGN RECOMMENDATIONS

Sprocket Locations - 9200 9227

Even belt width (non-symmetrical), width 18, 30, 42 and 54.



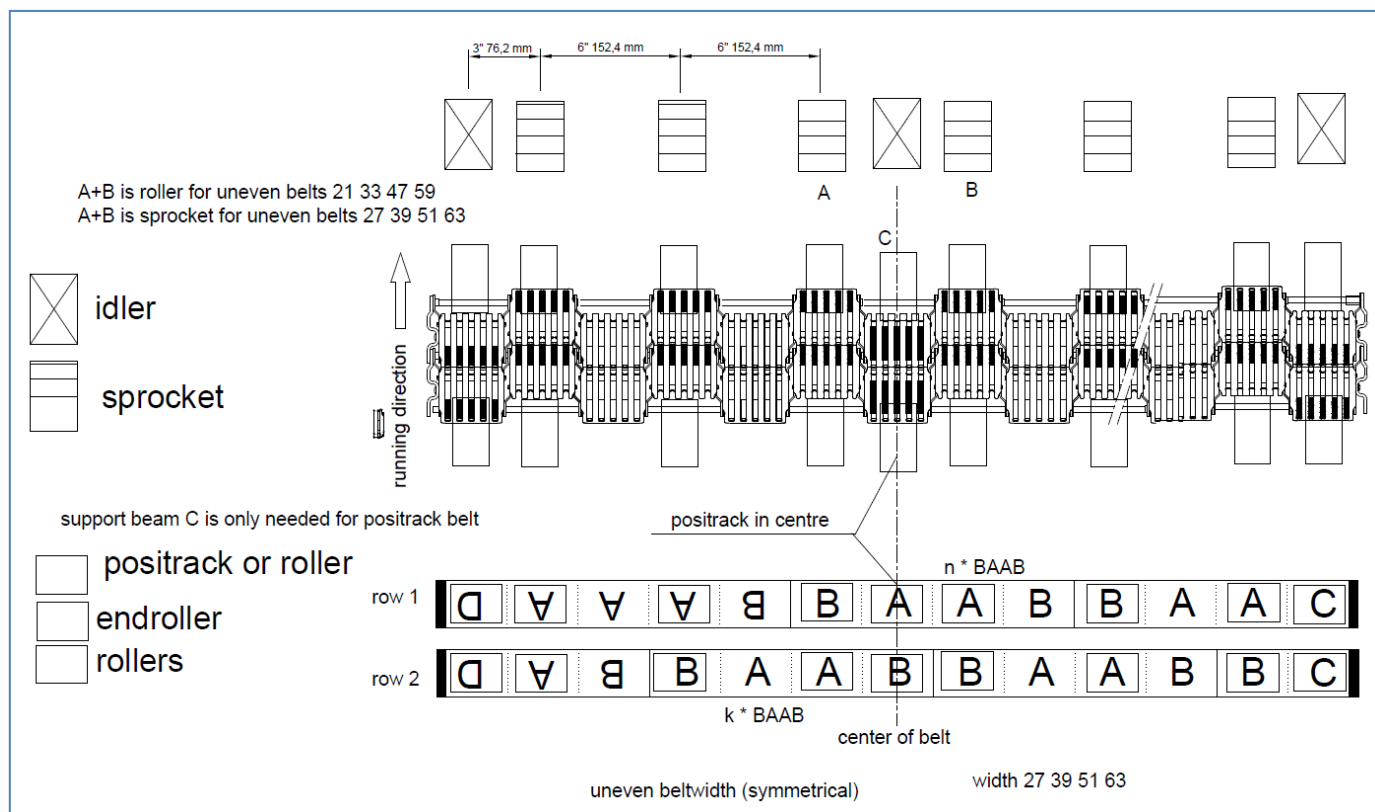
Even belt width (non-symmetrical), width 24, 36, 48 and 54.



CONVEYOR DESIGN RECOMMENDATIONS

Sprocket Locations - 9200 9227

Uneven belt width (symmetrical), width 27, 39, 51 and 63.



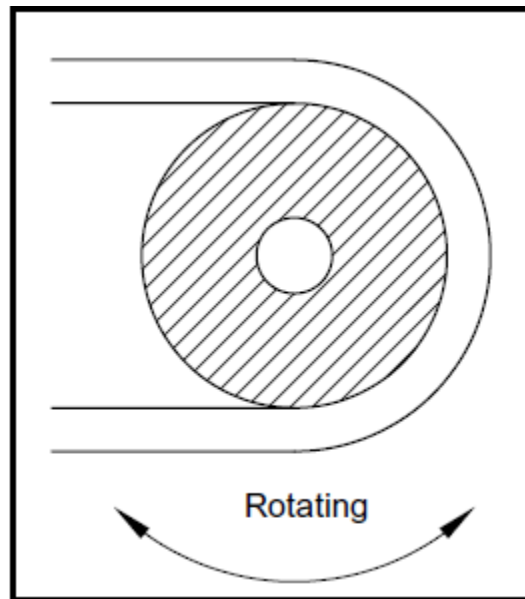
CONVEYOR DESIGN RECOMMENDATIONS

Idler Wheels - 9200 9227

Idler wheels or pulleys are suitable alternatives to sprockets for tunnel tail ends. These methods must turn freely and the chain must be guided so it cannot move laterally.

For chains without PosiTrack™ Tracking Guides, the use of one or two sprockets locked down in the middle of the tail shaft accomplishes both requirements.

Rexnord® 9200 Series MatTop® Chains are recommended to run on rotating idler drums or idler wheels. Locations for the PosiTrack™ Tracking Guide groove position are shown on page 17.



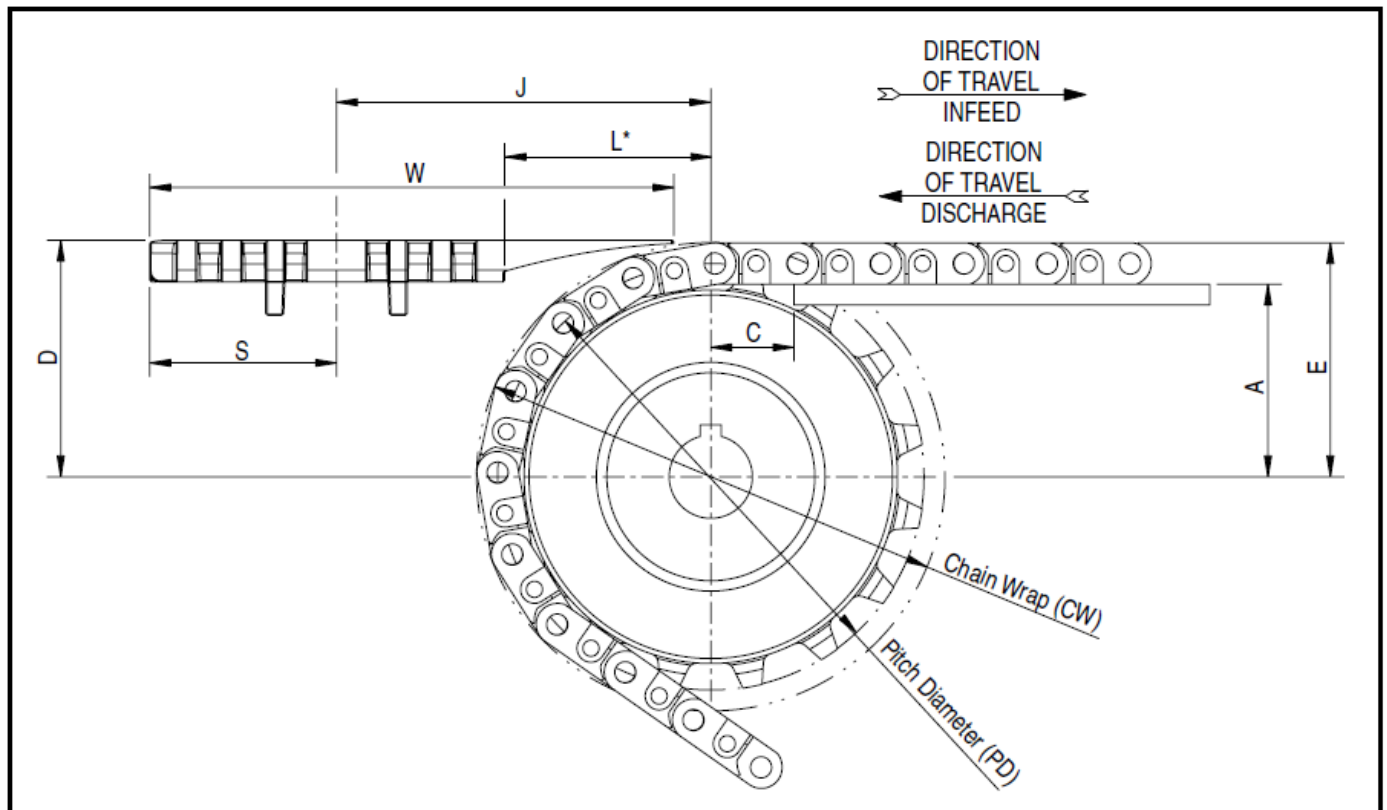
Tail Roller

CONVEYOR DESIGN RECOMMENDATIONS

Sprocket Location - 7708

Proper shaft mounting location, carry wear strip positioning and comb transfer plate dimensions are inter-related and are determined by the type of chain, sprocket size and type of transfer. For sprocket location or shaft drop information for each MatTop Chain Series see pages 30-37.

Rexnord® DTS® (Dynamic Transfer System) – Used with 7708 MatTop® Chain



Shaft Drop with 7705 DTS® 4.50 in. (114.3 mm) and 7708 Chain

7708 MatTop Chain with 7705 DTS 4.50 in													
Chain Number	No. of Spkt. Teeth	Pitch Diameter (PD)	A	C	Chain Wrap (CW)	D		E	J		L	S	W
						Infeed	Discharge		Infeed	Discharge			
		in (mm)											
7708	16T	5.126 (130.2)	2.31 (58.7)	1.00 (25.4)	5.63 (143.0)	2.84 (72.1)	2.78 (70.6)	2.81 (71.4)	4.58 (116.3)	4.84 (122.9)	2.46 (62.5)	2.25 (57.2)	4.50 (114.3)
	18T	5.759 (146.3)	2.63 (66.8)		6.26 (159.0)	3.16 (80.3)	3.10 (78.7)	3.13 (79.5)	4.61 (117.1)	4.88 (124.0)			
	21T	6.710 (170.4)	3.11 (79.0)		7.21 (183.1)	3.64 (92.5)	3.58 (90.9)	3.61 (91.7)	4.65 (118.1)	4.94 (125.5)			
	31T	9.885 (251.1)	4.69 (119.1)		10.39 (263.9)	5.22 (132.6)	5.16 (131.1)	5.19 (131.8)	4.77 (121.2)	5.12 (130.0)			

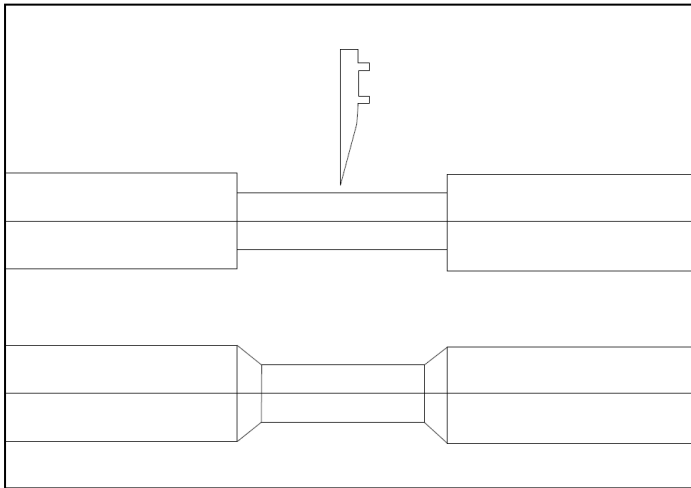
CONVEYOR DESIGN RECOMMENDATIONS

Sprocket Location - 2000

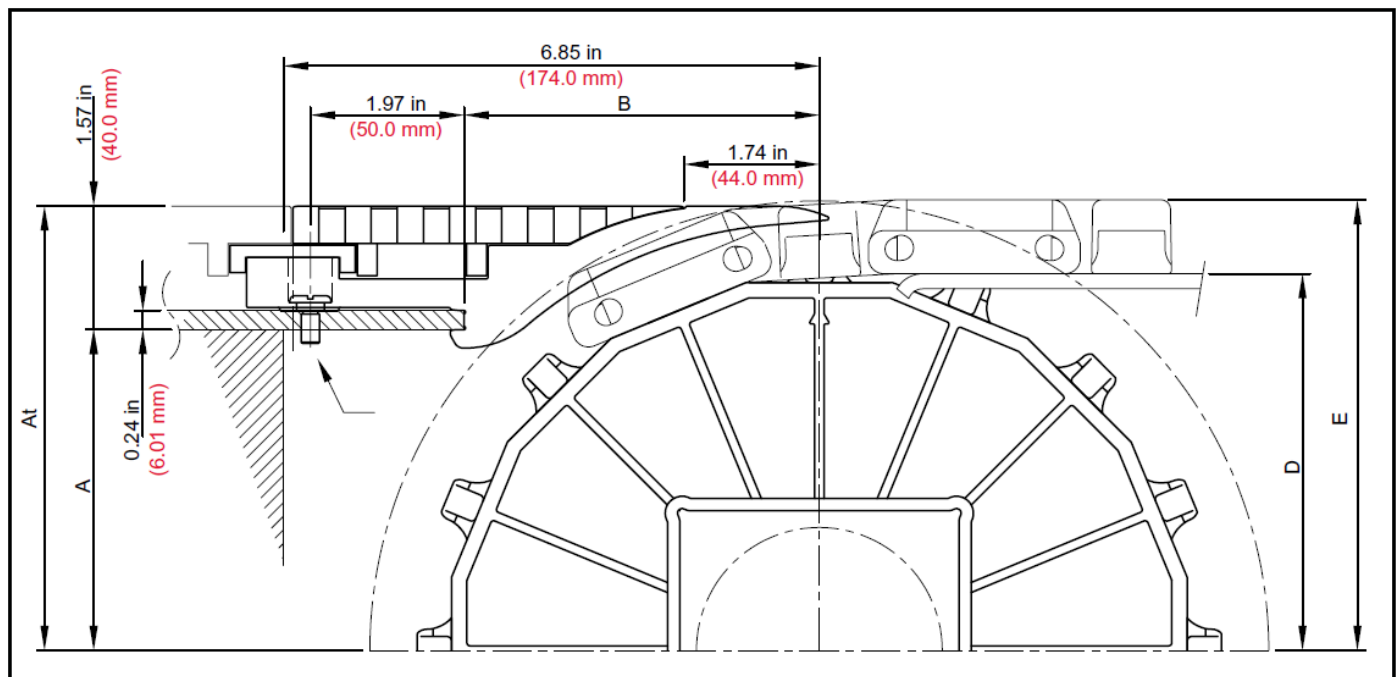
Rexnord® DTS®-C (Dynamic Transfer System) – Used with 2000 MatTop® Chains

Please be aware that for shafts bigger then 3,5" the diameter of the shaft needs to be reduced to ensure proper clearance of the DTS-C chain

We do not recommend using DTS-C2000 system with sprocket sizes under 13T



Shafts larger then 3,5" requiring clearance for DTS-C chain



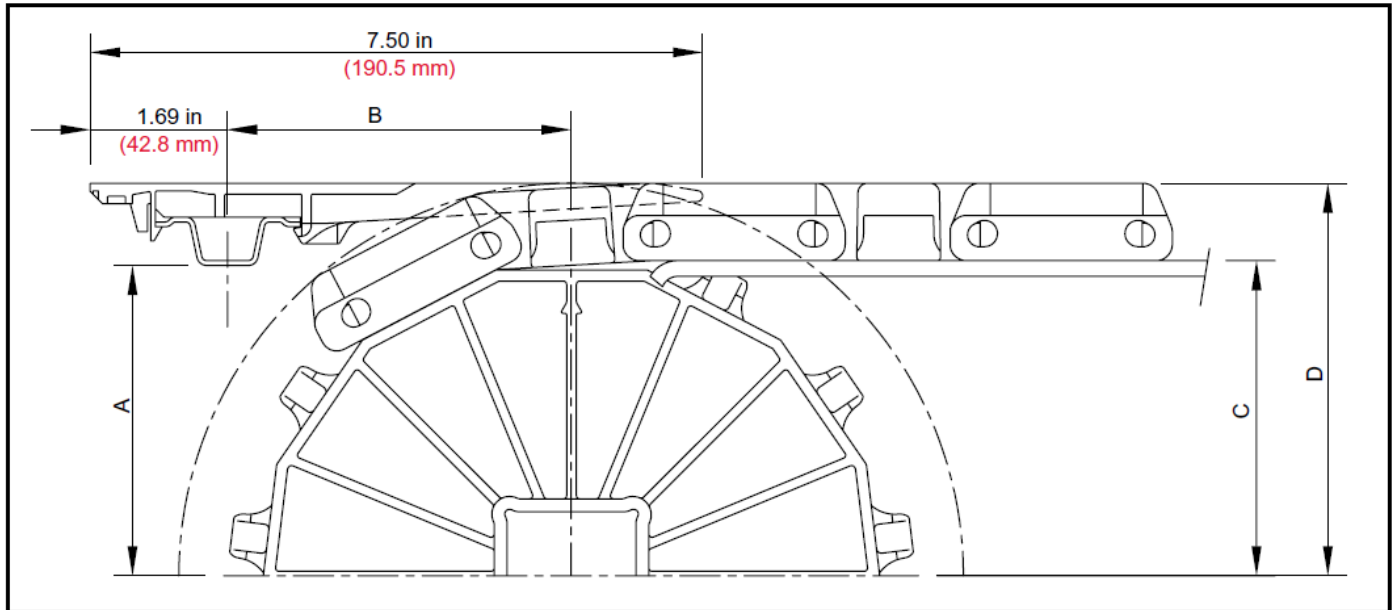
Dimension A and B needs to be adjustable by ± 10 mm for optimal performance

36

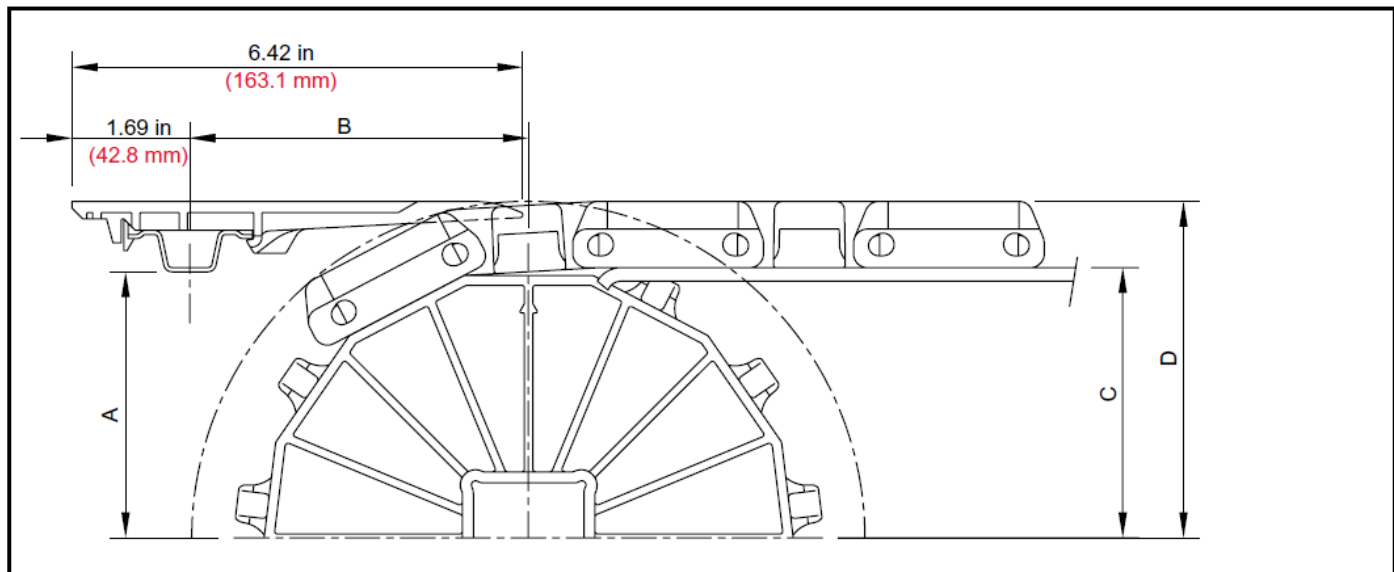
CONVEYOR DESIGN RECOMMENDATIONS

Sprocket Location - 2000

Rexnord® Transfer Combs – Used with 2000 MatTop® Chains



Shaft Drop with 2000 MatTop Chain Series and Transfer Comb



Shaft Drop with 2000 MatTop Chain Series and Transfer Comb (for Glass Handling Applications)

CONVEYOR DESIGN RECOMMENDATIONS

Sprocket Location - 2000

Rexnord® Transfer Combs – Used with 2000 MatTop® Chains

2000 RR & RRHD* Series MatTop Chain General Conveying						
Chain Number	No. of Spkt. Teeth	Pitch Diameter (PD)	A	B	C	D
		in (mm)				
2000 RR & 2000 RRHD	10T	6.47 (164.4)	2.85 (72.3)	4.33 (110.0)	2.90 (73.7)	3.85 (97.7)
	12T	7.73 (196.4)	3.48 (88.4)	4.49 (114.0)	3.54 (89.8)	4.48 (113.8)
	13T	8.35 (212.2)	3.80 (96.5)	4.57 (116.0)	3.85 (97.9)	4.80 (121.9)
	16T	10.25 (260.4)	4.75 (120.6)	4.80 (122.0)	4.80 (122.0)	5.75 (146.0)

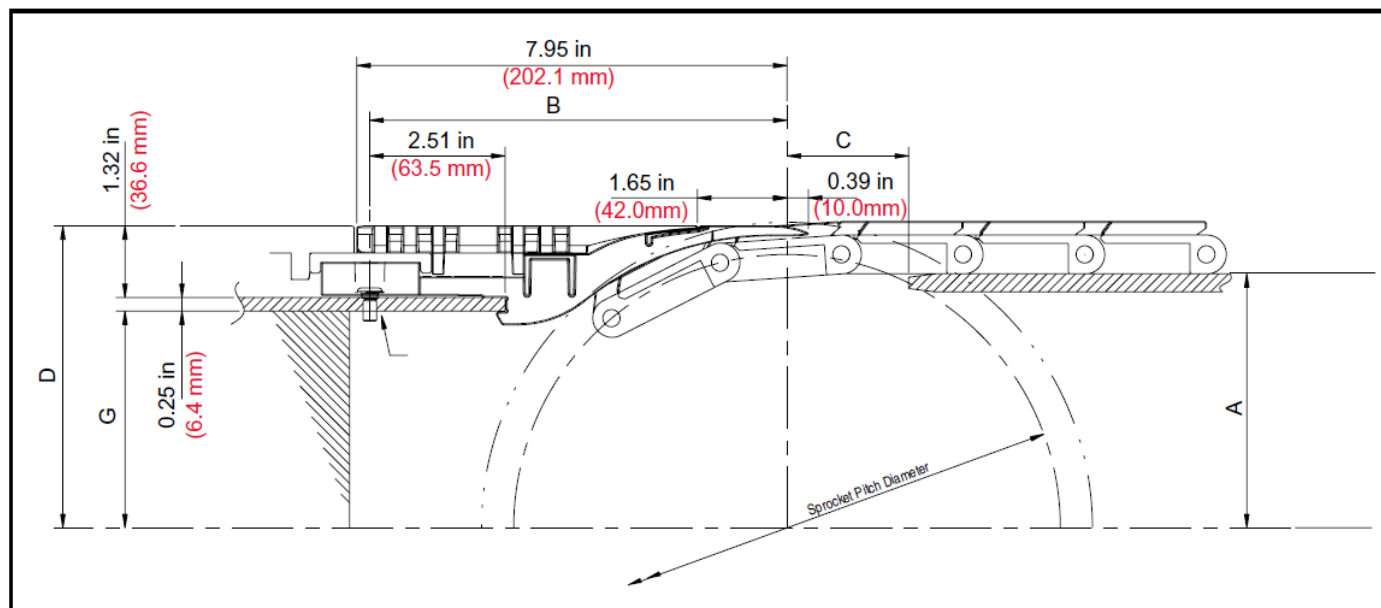
2000 RR & RRHD* Series MatTop Chain Glass Handling Applications						
Chain Number	No. of Spkt. Teeth	Pitch Diameter (PD)	A	B	C	D
		in (mm)				
2000 RR & 2000 RRHD	10T	6.47 (164.4)	2.85 (72.3)	4.80 (122.0)	2.90 (73.7)	3.85 (97.7)
	12T	7.73 (196.4)	3.48 (88.4)		3.54 (89.8)	4.48 (113.8)
	13T	8.35 (212.2)	3.80 (96.5)		3.85 (97.9)	4.80 (121.9)
	16T	10.25 (260.4)	4.75 (120.6)		4.80 (122.0)	5.75 (146.0)

2000 Series MatTop Chain General and Glass Handling Applications						
Chain Number	No. of Spkt. Teeth	Pitch Diameter (PD)	A	B	C	D
		in (mm)				
SR2000	10T	6.47 (164.4)	2.85 (72.3)	4.80 (122.0)	2.90 (73.7)	3.85 (97.7)
	12T	7.73 (196.4)	3.48 (88.4)		3.54 (89.8)	4.48 (113.8)
	13T	8.35 (212.2)	3.80 (96.5)		3.85 (97.9)	4.80 (121.9)
	16T	10.26 (260.4)	4.75 (120.6)		4.80 (122.0)	5.75 (146.0)

CONVEYOR DESIGN RECOMMENDATIONS

Sprocket Location - 5997

Rexnord® DTS®-C (Dynamic Transfer System) – Used with 5997 MatTop® Chains



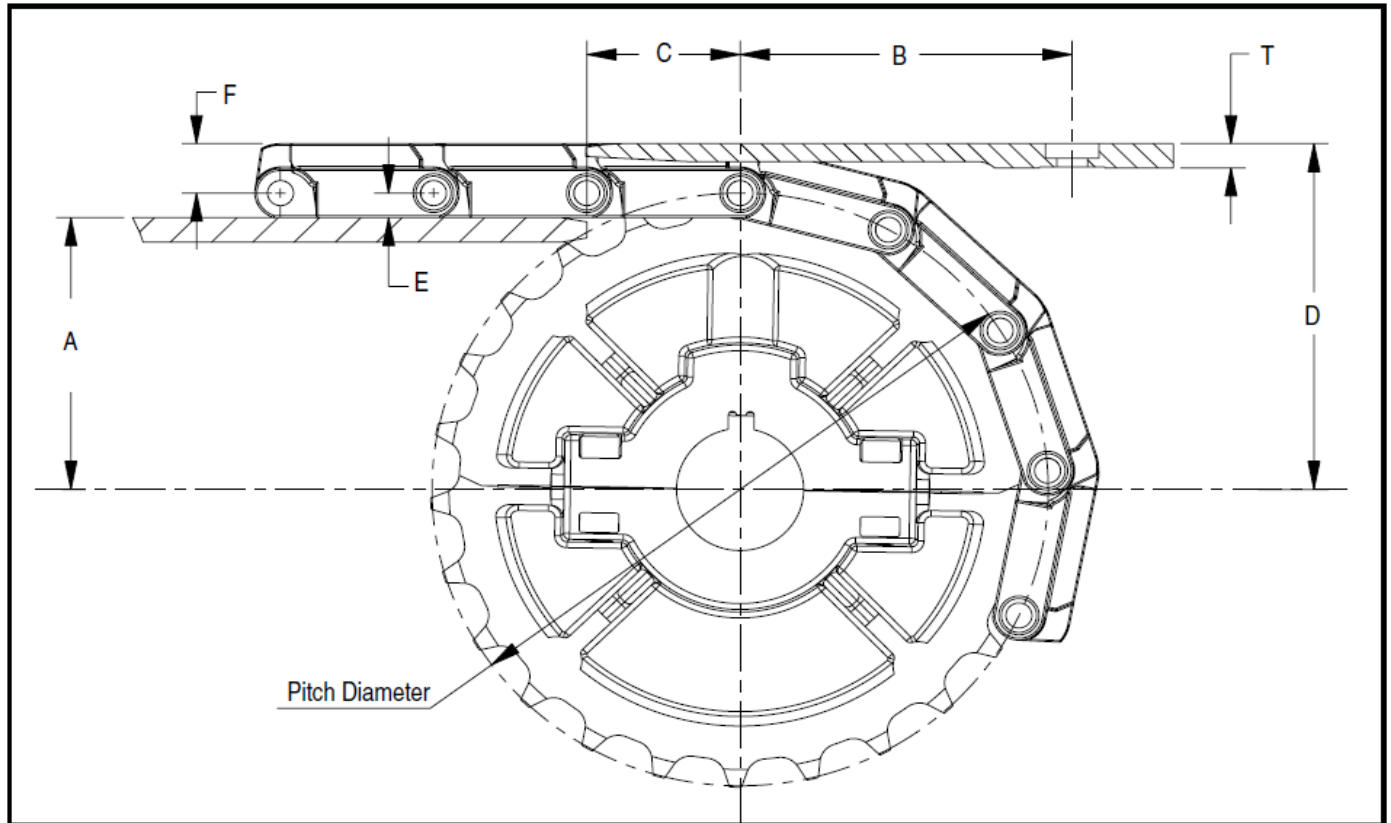
Shaft Drop with 5997 MatTop Chain Series and DTS-C

5997 MatTop Chain with DTS-C														
	Sprocket				Dimension									
Chain Number	No. of Spkt. Teeth	Eff. No. of Teeth	Pitch Diameter (PD)		A		B		C		D		G	
			in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
5997	9	9	6.57	166.9	2.93	74.4	7.717	196.0	2.25	57.2	3.84	97.5	2.26	57.5
	12	12	8.69	220.7	3.99	101.3					4.90	124.3	3.32	84.3
	14	14	10.11	256.8	4.69	119.1					5.60	142.3	4.03	102.3

CONVEYOR DESIGN RECOMMENDATIONS

Sprocket Location - 5997

Rexnord® Transfer Combs – Used with 5997 MatTop® Chains



Shaft Drop with 5997 MatTop Chain Series and Transfer Comb

5997 MatTop Chain with Standard Transfer Comb														
Chain Number	Sprocket			Dimensions										
	No. of Spkt. Teeth	Pitch Diameter (PD)		A		B*				C		D		
						114-222-1		114-683-1* 114-1010-1*						
		in	mm	in	mm	in	mm	in	mm	in	mm			
5997	9	6.57	166.9	2.93	74.4	2.24 - 4.00	56.9 - 101.6	2.50 - 5.75	63.5 - 146.1	2.25	56.7	3.90	99.1	
	12	8.69	220.7	3.99	101.3	2.99 - 4.00	75.9 - 101.6	3.25 - 5.75	82.8 - 146.1			4.96	125.9	
	14	10.11	256.8	4.69	119.1	3.29 - 4.00	83.6 - 101.6	3.55 - 5.75	90.2 - 146.1			5.67	143.9	
	5997 MatTop Chain with Heavy Duty Transfer Comb													
	No. of Spkt. Teeth	Pitch Diameter (PD)		A		B*				C		D		
						I5997/607052		I5997/631183 114-6275-1						
		9	6.57	166.9	2.93	74.4	3.18 - 4.93	80.8 - 125.2	3.18 - 6.20	111.8 - 157.5	2.25	56.7	3.90	99.1
		12	8.69	220.7	3.99	101.3	3.93 - 4.93	99.8 - 125.2	3.93 - 6.20	130.8 - 157.5			4.96	125.9
		14	10.11	256.8	4.69	119.1	4.23 - 4.93	107.4 - 125.2	4.23 - 6.20	138.4 - 157.5			5.67	143.9
	5997 MatTop Chain with Retrofit Transfer Comb													
	No. of Spkt. Teeth	Pitch Diameter (PD)		A		B*				C		D		
						114-5200-1*		114-5201-1*						
		9	6.57	166.9	2.93	74.4	2.57 - 3.62	65.3 - 91.9	2.62 - 4.87	66.5 - 123.7	2.25	56.7	3.90	99.1
		12	8.69	220.7	3.99	101.3	3.32 - 3.62	84.2 - 91.9	3.37 - 4.87	85.6 - 123.7			4.96	125.9
		14	10.11	256.8	4.69	119.1	3.62	91.9	3.67 - 4.87	93.2 - 123.7			5.67	143.9

* The B-Dimension is flexible and contains a range. The comb fingers must extend beyond the sprocket centerline to avoid transfer problems and cannot be too close as to cause interference between the combs and the chain.

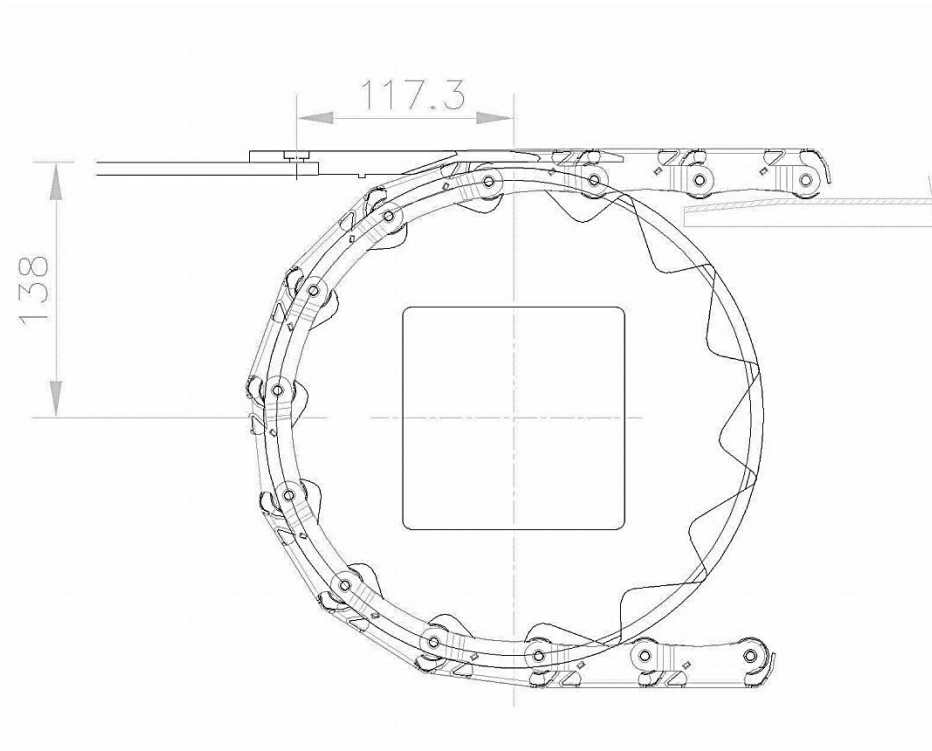
CONVEYOR DESIGN RECOMMENDATIONS

Sprocket Location - 9200

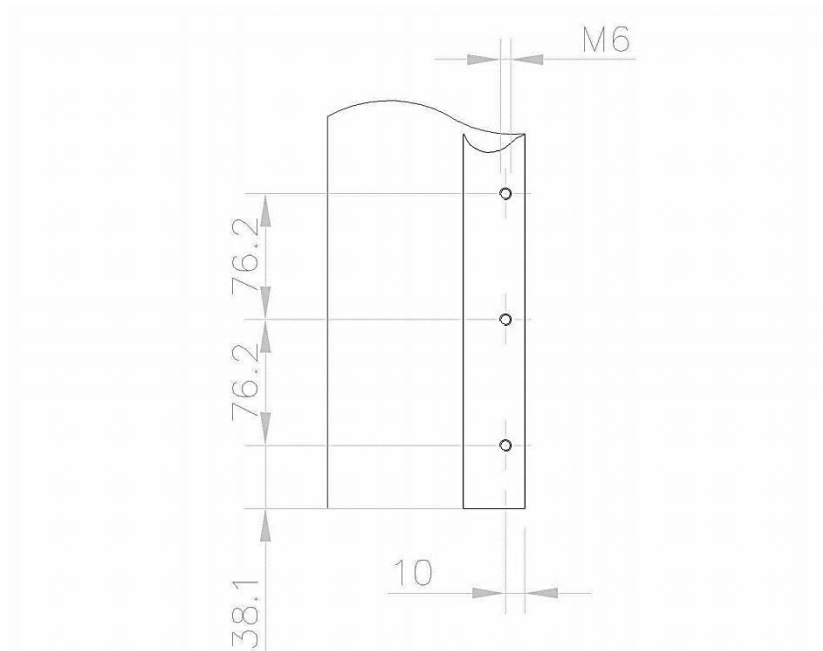
Rexnord® Transfer Combs – Used with 9200 MatTop® Chains

Dimension 138 needs to be adjustable ± 10 mm

Dimension 117,3 needs to be adjustable ± 5 mm



Shaft Drop with 9200 MatTop Chain Series and Transfer Comb



Position of M6 Fixing Threads

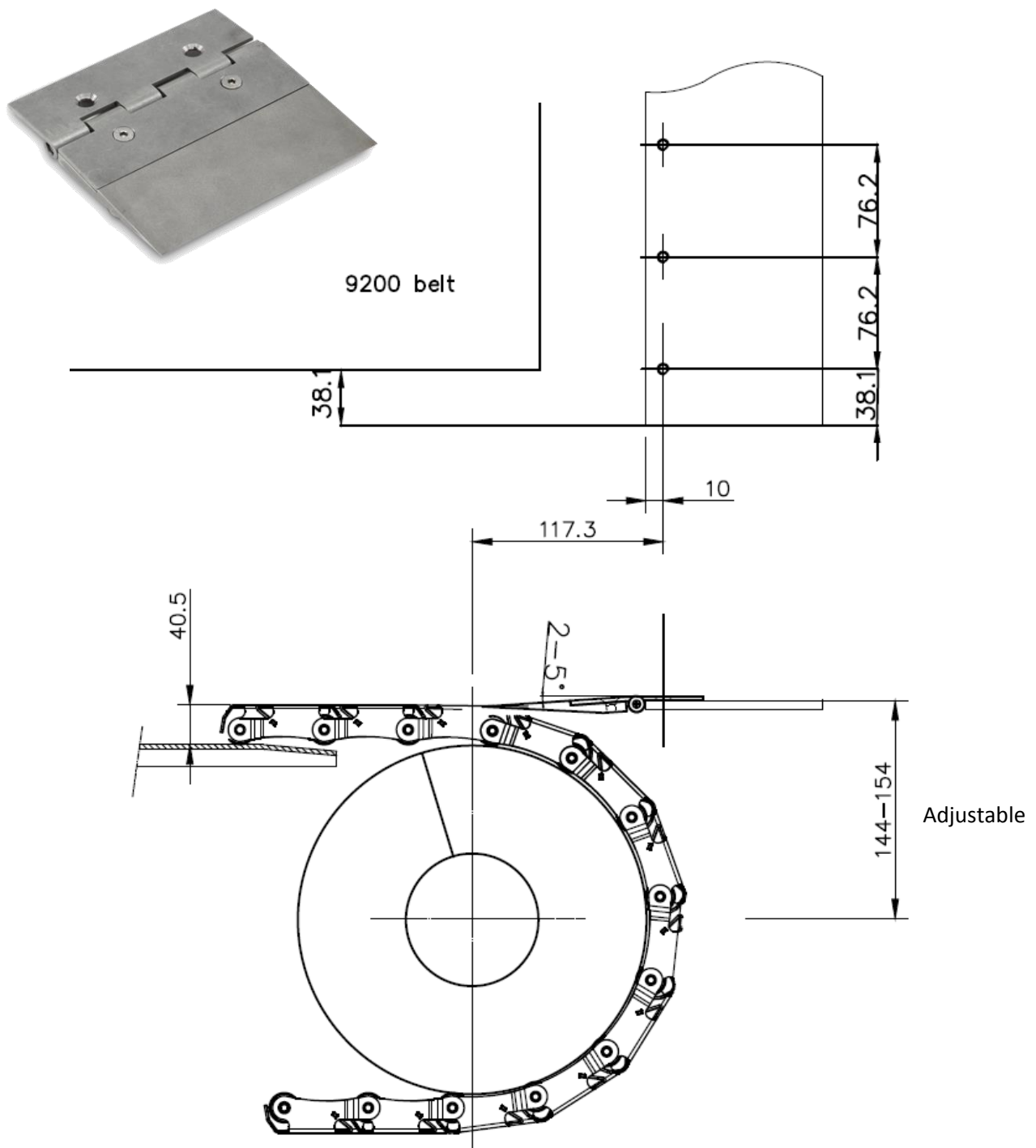
CONVEYOR DESIGN RECOMMENDATIONS

Hinging Steel Transfer System - 9200

The Stainless Steel transfer plate is designed for tunnel pasteurizers, warmers and coolers, where a high percentage of broken glass is present. The wear-resistant transfer plate rests on the Fortrex™ 9200-series MatTop® chain during normal operation, but opens up in case a large piece of broken glass obstructs the flow of glass bottles or containers. This prevents damage to the transfer plate and ensures the other bottles or containers can exit the machine without issues.

The system should be assembled with stainless steel metric M6 bolts (not supplied) with anti-seize onto the support frame

After installation of the combs the outfeed conveyor should be adjusted so all plates are angled at an incline of 2° to 5°



CONVEYOR DESIGN RECOMMENDATIONS

Sprocket Location

- Tunnel Shafts must be level and perpendicular to chain direction of travel.
- The infeed conveyor and discharge conveyor sections should be mounted to the tunnel frame with adjustable mounting brackets for final adjustment in the field (up & down and in & out).
- Wear strip ends must be positioned in between sprockets in order to provide sufficient support as shown on pages 14 and 30-37.
- For mounting of combs, rigid angles (vs. flat plates) are preferred and they should be firmly attached to the sides of the infeed and discharge conveyors. Make sure that tunnel chain can rotate freely on sprockets without interfering with combs and mounting profile.

CONVEYOR DESIGN RECOMMENDATIONS

Comb Mounting

All combs (both conventional style and DTS®-C) are approx. 5.93 in. wide (150 mm) and are mounted on approximately 6 in. (152.4 mm) centers. Each conventional style comb is supplied with two shoulder bolts and two caps. The shoulder bolts allow for thermal expansion and contraction and the caps cover the mounting holes to provide smooth transfer. Rexnord® DTS-C Combs are supplied also with two shoulder bolts. After all of the DTS-C plates are installed, a long UHMWPE wear strip is installed over the mounting area.

- See pages 58-60 for details on transfer comb installation information for each MatTop® Chain Series
- The stainless steel mounting plates or angles (angles preferred) should be level and straight
- The flatness and straightness of the mounting profiles is critical to overall system performance
- All combs must be mounted with the supplied shoulder bolts and be able to float axially to allow for thermal expansion and contraction of the raised rib tunnel chain
- The combs must be positioned so the fingers are located in between the ribs

! CAUTION

All conventional transfer combs and DTS-C Combs should be mounted level

CONVEYOR DESIGN RECOMMENDATIONS

Conveyor Drives

Main Tunnel Drives

- If the machine is a double deck, one drive is required for each level
- If the machine is long and wide, each level may require one drive on each side due to shaft size requirements
- It is common for a long, wide double deck machine to have four separate drives

! CAUTION
Dual drives need to be accurately synchronized together.

! CAUTION
If the transfers are DTS® or DTS®-C, the tunnel structure, tunnel shafts, bearings and drives must be designed so as to prevent interference with the DTS chains in the carry way and return way.

Infeed and Discharge Conveyor Drives

Refer to general discussion/considerations section regarding infeed and discharge conveyor drives and speeds on page 12. For special options, consult Rexnord Application Engineering.

Retrofits

For retrofits from different types of conveyor chains or chains or from other conveying methods, consult Rexnord Application Engineering for specific recommendations on changes required to the:

- Carry and Return Beds
- Shafts & Shaft Mounting
- Transfers and Mounting
- Drives

INSTALLATION

Pre-Installation

It is recommended to review the Conveyor Design section of this manual to ensure that the new or retrofit equipment is properly designed.

Chain Width

The chain width must be ordered to fit into a new or existing equipment. It is recommended to refer to page 16 of the Design Conveyor section to determine the guide clearance required for each chain series.

! CAUTION

Fortrex 9200 chain clearance should be 0.25 in. (6.35 mm) maximum on both sides. Fortrex 9200 PT chain clearance should be 1.50 in. (38.1 mm) minimum on both sides of the chain. The 9200 actual chain width is 0.75 in (19.0 mm) larger than the nominal width. It is critical to order the correct chain width to fit within the tunnel equipment. Actual Chain Width = Nominal Chain Width + 0.75 in. (19.0 mm).

Comb Mounting Plate

Some general preparation is required prior to chain installation. These items are especially critical on retrofit applications.

The following provide general guidelines.

- Determine if the existing hole locations in the mounting plate can be used as discussed on pages 58-60
- For retrofit applications, the combs may have to be modified to fit into the existing hole locations or new holes can be drilled and tapped as required
- If new holes cannot be drilled and tapped a new mounting plate may be required. If a new mounting plate is required it is essential to have it fabricated and on-site prior to installation
- The surface of the mounting plate is preferably polished to allow easier side movement of the combs

INSTALLATION

To ensure optimum performance on any tunnel equipment, it is recommended to follow the proper installation and maintenance procedures. This manual provides general recommendations and guidelines for chain installation and maintenance on a Pasteurizer, Warmer or Cooler tunnel.

Chain Packaging & Initial Inspection

All Rexnord® tunnel equipment chains are delivered in wooden crates. The chains are packaged in layers within the crates in 3 ft. (1 m) wide sections. Although high quality packaging is used, the risk of damage during transportation can never be fully eliminated. Therefore, prior to beginning the installation it is recommended to:

- Inspect the chain, sprockets and transfer combs visually for any damage
- Ensure the correct quantity of chain, sprockets and transfer combs are on-site
- Ensure all the necessary tools and equipment for the installation are on-site as listed on page 45

Working Area Preparation

Each tunnel is unique and poses different installation recommendations depending on the size of the tunnel, space limitations, etc. The following provides general guidelines.

- If space is available, it is recommended to make a temporary working area in front of the pasteurizer to assemble chain
- The working area should be wider than the chain and the length must be longer than two chain sections (approximately 6 ft. or 2 m)
- A fork-lift is recommended to move and raise the wood crates up to the desired level, as required
- The wood crates can be opened on the side so that chain can be pulled out easily, layer by layer
- It is recommended to make a rigid chain pulling fixture that can be connected to the first section of chain. There are several methods of accomplishing this. Two of the methods are listed as follows:
 - Use a chain pin or metal pin within the chain to connect to a rigid pulling fixture
 - Use a rigid metal rod or pipe and interlace wire, ties or links into the leading section of the chain
 - For a retrofit, it is possible to use the existing chain to pull the new chain through the conveyor. One example of how the two chains can be connected is shown on page 44
- Make a temporary return support by using several flat straps draped over the return shoes or rollers and pulled tight as shown on page 44

INSTALLATION

Working Area Preparation



Example of Rigid Chain Pulling Fixture Using Existing Chain



Example of Temporary Return Support



Example of Temporary Return Support

INSTALLATION

Equipment / Material Listing

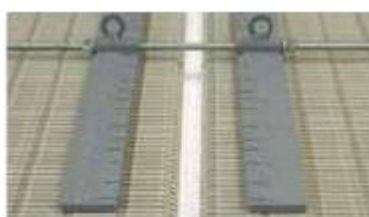
The following is a list of tools required for chain, sprocket and transfer comb installation:

CHAIN ASSEMBLY TOOL	Chain assembly tools are available for the MatTop Chain Series as shown below
SCREWDRIVERS	Flat head screwdriver for chain assembly and disassembly
PIN PULLERS	Contact Rexnord to obtain a pin puller (Part 4004) or use a similar threaded tool
RATCHETS AND SOCKETS	Sized for the chain assembly tool (or utilize an electric impact hammer drill and socket)
ELECTRIC HAND DRILL AND GEARBOX DRILL BIT ADAPTER	Used to drive the motor
EXTENSION CORDS	As required
STRING LEVELS	A transit or laser level can also be utilized to insure the wear strips and shafts are level and aligned
FLAT STRAPS	Long enough to pull the chain through the entire length of the tunnel
ROPE AND WINCH	Used for pulling the chain through the tunnel
SPARE WEARSTRIPS	Only recommended for retrofit applications. Have spare wear strips on-hand during the installation in the event that damaged wear strip sections need to be replaced
WORK GLOVES	Heavy protective gloves are recommended
RIVET TOOL	Only required for Fortrex™ 9200 chain installations (details shown on page 56)
STAINLESS STEEL RIVETS	Only required for Fortrex 9200 chain installations. Supplied by Rexnord (Part Number 820.00.09)



2000 Chain Assembly Tool

Part #800.00.04



I5997 Chain Assembly Tool

Contact Application Engineering
for recommendations



9200 Chain Assembly Tool

Part #820.00.18 (for 9217)
Part #820.10.15 (for 9227)

Rexnord Chains	7708	2000	5997	9200
Amount of Assembly Tools Required	Not available	1 tool for every 3 ft (1.0 m) of chain width	Contact Application Engineering for recommendations	1 tool for every 3 ft (1.0 m) of chain width

INSTALLATION

Handling Instructions

For safety and handling instructions please refer to the CAUTION sheet which is shown below. This CAUTION sheet is also included in the chain shipment (laminated sheet within the crate).

CAUTION

- Be careful when handling MatTop shipping crates and chain sections due to heavy weight. Wide crates & chain sections **must be supported in the middle** to prevent bending and/or breakage.
- When handling belt sections, **be careful to avoid injury** to fingers and hands, such as pinching, cutting or crushing of fingers or hands.



When removing or installing MatTop Chain:

- Always wear protective clothing: safety glasses, work gloves, steel toed safety shoes, ear protection and protective head gear.
- Always lock out/tag out all power switches to equipment and adjacent conveyors and **follow proper safety procedures** before entering or working around equipment.
- Secure and Support the chain to **prevent uncontrolled movement** of chain and parts.
- Tools should be in good condition and used properly.

Do not attempt to connect or disconnect chain until you understand chain construction, including **the correct direction for pin removal/insertion** and **proper Chain Direction of Travel**.

For these and other Installation and Maintenance instructions, refer to Rexnord FlatTop Chain Engineering Manual and Installation /Maintenance Manuals. Or contact the Application Engineering Department.

INSTALLATION

Removal of Existing Chain and Components

If this is a retrofit, first remove the used chain, sprockets, transfer combs and product guiderails. It is recommended to remove all of the existing chain first to allow for inspection of the wear strips, shaft, bearings and couplings. In some situations, the used chain is attached to the new chain and assists to pull the chain through the tunnel (see page 44).

Inspection Prior to Installation

Inspection - Carry Way

Prior to installation inspect the existing carry way and ensure the following:

- Carry way wear strips are level using a string level, transit or laser level in all directions
- Wear strips have rounded lead in edges, are the same height, and contain no sharp edges
- Wear strip surfaces are smooth per recommendations on page 15
- Chain guide clearance are set per recommendations on page 16
- PosiTrack guides are flat on top and sides to ensure proper fit (i.e. no weld lines)

Replace, adjust or repair wear strips as required

The following notes only pertain to the 9200 Fortrex™ chains:

- In-line wear strips are required for 9227 chains
- Chevron or in-line pattern wear strips can be used for 9217 chains

Inspection - Return Way

Prior to installation inspect the existing return way and ensure the following:

- Return shoes or rollers are not damaged
- All return shoes or rollers are level and positioned properly (i.e. parallel and square to the direction of chain travel)
- Return shoes or rollers are smooth per recommendations on page 19
- Chain guide clearance are set per recommendations on page 16
- Return rollers spin freely

Replace, adjust or repair as required

Inspection - Shaft, Bearing and Coupling

Prior to installation inspect the shaft, bearings and couplings and ensure the following:

- Condition of the shafts, bearings and couplings is satisfactory per manufacturer recommendations
- Shafts are level and positioned correctly
- Shafts are aligned correctly
- Center support bearings are aligned and positioned correctly
- If dual shafts are utilized, shaft couplings are used correctly (i.e. couplings should be rigid with no back-lash and both halves of square or keyed shafts are in time with each other)

Replace, adjust or repair as required

INSTALLATION

Sprocket Installation

Step 1:

Install the sprockets onto the shaft making sure that they all face the same way so that all the teeth are in line. Square shaft sprockets contain a timing mark to help ensure proper positioning as shown on page 23

Step 2:

Sprockets should be fixed on the shaft or floating depending on the chain series as shown on page 23. Fixed sprockets can be locked in place using set screws, roll pins, welded blocks or shaft collars as shown on page 23. Make sure that the locking method cannot come loose over time. The other sprockets should float axially to allow for thermal expansion and contraction of the tunnel chain and will be held in place by the chain sprocket pockets

Step 3:

Locate sprockets laterally along shafts to ensure that the sprockets line up with the proper sprocket pocket locations. This is accomplished easily by using a short section of chain laying over the ends of the carry wear strips at the shaft ends

Step 4:

Tighten all the sprocket cap screws and keyway setscrews as recommended below

Capscrews			
	Bolt Size	Hex Size	Recommended Torque
English	1/4 in	3/16 in	50 in-lb
	3/8 in	5/16 in	75 in-lb
Metric	M6	M5	5.7 N-m
	M10	M8	8.5 N-m

Keyway Setscrew	
Hex Size	Recommended Torque
1/8 in	40 in-lb
1/16 in	40 in-lb

INSTALLATION

Sprocket Installation

! CAUTION

It is critical to never mix split and solid sprockets on the same shaft because teeth will not be aligned.

- Where internal shaft bearings or shaft couplings are required, they may interfere with the proper sprocket locations. This will usually require that one or more sprockets be left out. In this case, provide other means of supporting chain at this location to keep chain from sagging in-between sprockets. This can be accomplished with an idler sprocket or machined UHWMPE drum
- If dual drives are utilized, it is critical to ensure that each pair is accurately synchronized and in phase
- For sprocket pocket locations see Sprocket Location section on pages 25-28

INSTALLATION

Sprocket and Wearstrip Location

See pages 30-37 for details on sprocket and wearstrip locations for each MatTop® Chain Series. The following are general guidelines when installing shafts, sprockets, wear strips and combs.

- The distance from the end of the wear strip to the sprocket shaft centerline should equal the “C” Dimension for plastic MatTop Chains. If this is not followed the wear strip will interfere with the free articulation of the chain as it enters the sprocket. However, in applications where temperature fluctuations affect the width of the chain the “C” dimension should be increased so the wear strips do not interfere with the outer diameter of the sprocket.
- The leading edges of the wear strips should be beveled.
- Mounting sprockets in line with wear strips is not recommended for chains using transfer combs.
- The following formula and dimensions used in conjunction with the figure will give the proper shaft and wear strip positioning.

A = Shaft Drop = Distance from centerline of sprocket to top of wear strip = $(\text{Pitch diameter}/2) + E$

B = Distance from centerline of the sprocket to the transfer comb mounting location

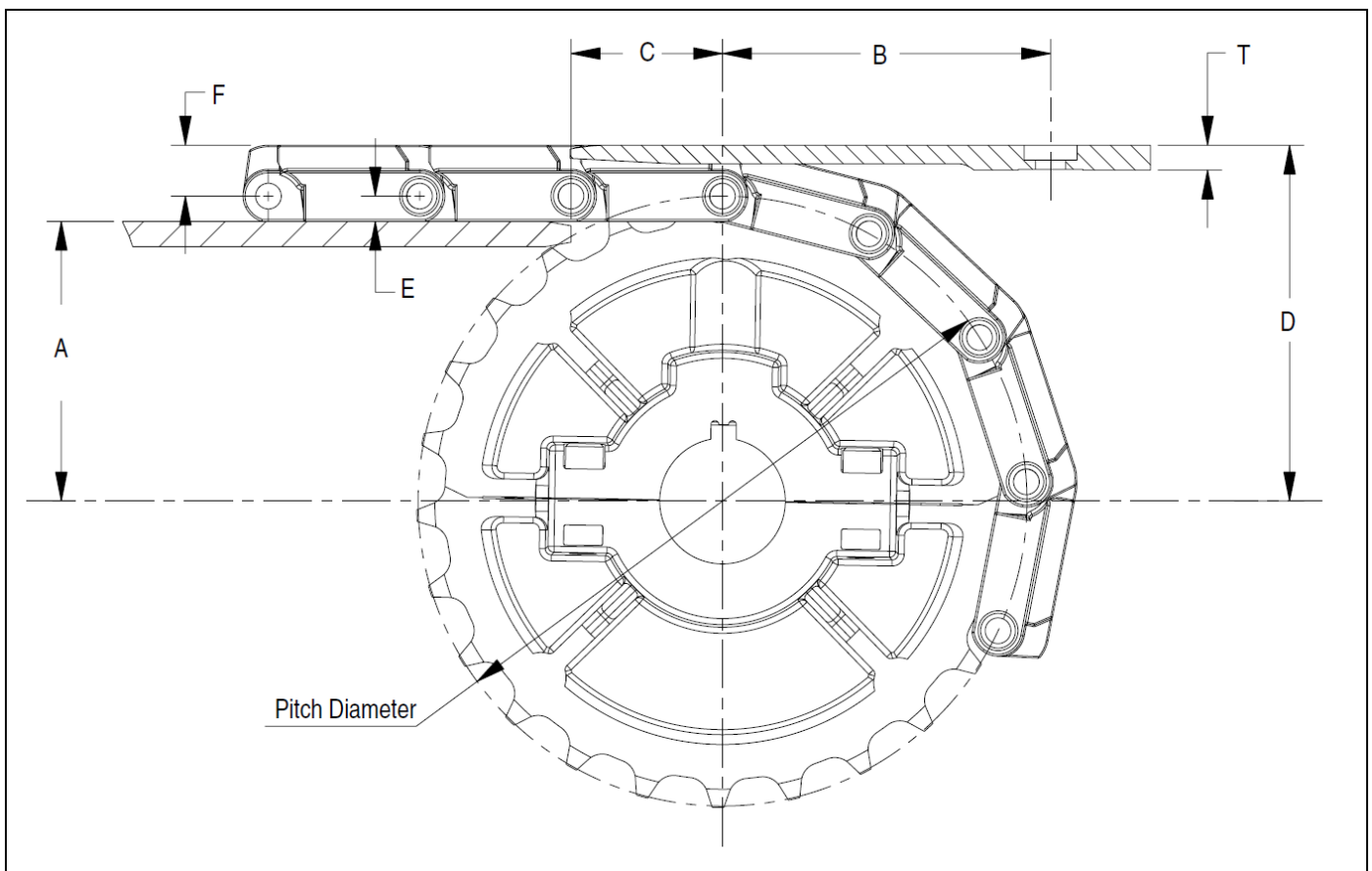
C = One chain pitch (for plastic MatTop Chains)

D = Distance from centerline of sprocket to top of transfer comb = $(\text{Pitch diameter}/2) + F$

E = Distance from centerline of chain pin to top of wear strip

F = Distance from centerline of chain pin to top of chain surface

T = Transfer comb thickness



Shaft Drop Drawing – See pages 30-37 for details and dimensions for each MatTop® Chain Series

INSTALLATION

Chain Installation

All of the chain instructions assume that the chain is installed on the idler end of the conveyor. If the chain is to be installed on the drive end, the opposite tunnel directions should be followed.

Step 1:

Pull flat straps all the way through the tunnel from the idler end to the drive end and attach them in several places across the length of the rigid fixture as shown on page 44

Step 2:

Remove the chain from the shipping crates at the idler end on the temporary working area. The chain is shipped in 3 ft. (1 m) sections with pins inserted in one end of the chain. Extra plugs and pins (7708, 2000 & 5997) and extra pins, clips and rivets (9200) are included in each crate

Step 3:

First pull one section of chain through the machine making sure that the chain can move freely

! CAUTION

Install the chain in the recommended direction of travel as shown in the Product Catalog. 9217 chains are bi-directional, however, the preferred direction of travel depends on the axial drive and idler sprocket locations. 9227 chains are uni-directional.

! CAUTION

If you can not slide the chain directly into the tunnel it is critical to roll the chain in coils. To prevent damage when picking up the chain it must be supported in the center as shown to the right and on page 46.

! CAUTION

Prior to installing the chain, pull one section of chain through the entire tunnel ensuring that there are no tight spots or obstructions. The chain should be able to move freely through the entire machine.

Step 4:

Using the temporary work area, connect two sections of chain together by pulling out the extra pin in the end row and reassembling the two sections using the same pin and insert the plug retention. See pages 52-56 for more details on assembling the chain

Step 5:

Use a winch to index the chain in 3 ft. (1 m) sections all the way through the tunnel to the drive end. Repeat this step with each new 3 ft. (1 m) section of chain

Step 6:

Wrap the chain over the drive sprockets, making sure that the teeth of all the sprockets are properly engaged in the respective sprocket pockets

! CAUTION

Ensure that there is a sprocket engaged in every available sprocket pocket both on the drive and idler end.

! CAUTION

If using 9200 chain with PosiTrack™ ensure that it is properly tracking on the channel.



INSTALLATION

Chain Installation

Step 7:

Pull the chain through the return way section by using the temporary return support. Use a winch or electric hand drill to index the chain in 3 ft. (1 m) sections through the return to the idler end of the tunnel

Step 8:

Wrap the chain over the idler sprockets, making sure that the teeth of all the sprockets are properly engaged in the respective sprocket pockets of the chain

Step 9:

Tighten the chain using the chain assembly tool to pull the two ends together. Remove as many rows of links as possible by tightening the chain assembly tool until there is nearly zero sag in the catenary. Insert the last pin into the chain and assemble the pin retention

NOTE: Preheating the chain is not required prior to tightening the chain

Rexnord Chains	2000	5997	7708	9200
Pin Retention Method	Clip / Clip	Blind / Plug	TwistLock	Rivet clip / Rivet clip
# of Pitches to Remove	2	1	1	1
Pin Access	Both sides	One side (plug side only)	Both sides	Both sides

INSTALLATION

Chain Installation

Rexnord® 7708 MatTop® Chain



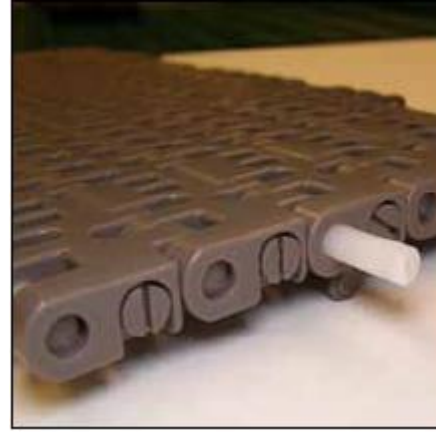
1

Chain with correctly closed pin retention



2

Place flat screwdriver in Rexnord TwistLock® plug and turn counter clockwise to open



3

When TwistLock plug is open, the rod can be pulled or pushed out

INSTALLATION

Chain Installation

Rexnord® RR2000 and RRHD200 MatTop® Chain



1

Chain with correctly closed pin retention



2

Place flat screwdriver in square hole of the clip and move clip upwards to open



3

When clip is removed, the rod can be pulled or pushed out

Rexnord® SR2000 MatTop® Chain



1

Chain with correctly closed pin retention



2

Place flat screwdriver in square hole of the clip and move clip downwards to open



3

When clip is removed, the rod can be pulled or pushed out

INSTALLATION

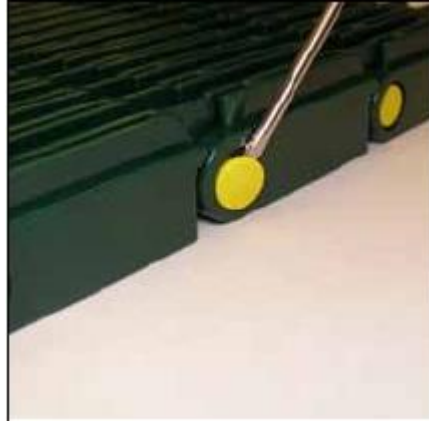
Chain Installation

Rexnord® 5997 MatTop® Chain



1

Chain with correctly closed pin retention



2

Place flat screwdriver in-between chain and plugs and push plug outwards to open



3

When plug is removed, the rod can be pulled out

INSTALLATION

Chain Installation

Rexnord® Fortrex™ 9200 MatTop® Chain



1

Chain without pin retention. To remove the pin retention drill the pin rivets out



2

Pin retention should slide over the rod and be pop-riveted in place. Make sure stainless steel rivets are used and the pin retention clips are tightly fitted to the module



3

Chain with correctly closed pin retention

- The 9200 chain uses a special stainless steel clip that is pop-riveted to the chain on both sides using a hand or powered pop rivet gun as shown below. The pins can be accessed from either side of the chain.

! CAUTION

Stainless steel rivets 0.1575 in. (4.0 mm) must be used (Part 820.00.09)



9200 Chain Rivet Tool, Clip and Stainless Steel Rivet

INSTALLATION

Catenary Adjustment

Rexnord® MatTop® chains are designed to run with a catenary and therefore no take-ups or tensioning devices are required. The chains should be connected in ambient temperature.

The size of the catenary is critical and the following general guidelines should be followed. For more details on the catenary arrangement refer to page 20.

Rexnord Chains	2000	5997	7708	9200
Vertical sag when running	4 to 12 in (100 to 300 mm)	4 to 6 in (100 to 150 mm)		4 to 10 in (100 to 250 mm)
Horizontal span	40 to 80 in (1000 to 2000 mm)	48 to 60 in (1219 to 1524 mm)		40 to 80 in (1000 to 2000 mm)

- After initial chain installation run the chain until the equipment reaches operating temperature conditions for the catenary sag to settle in the correct position. After this time period it is recommended to check the catenary to insure the proper sag is obtained. Adjust by adding or removing links as required.

! CAUTION

Check the water temperature first to avoid injury when inspection the chain in a hot zone.

- The mechanical and thermal properties may differ depending on the MatTop chain series and material resulting in different chain sag characteristics. In some retrofit situations, this may require moving or adding return shoes or rollers to minimize the amount of vertical sag.

! CAUTION

For double deck units, it is critical to ensure that the catenary sag of the top unit does not affect product handling

in the bottom unit (i.e. the catenary should not contact the product).

! CAUTION

It is critical to ensure that the catenary sag does not get caught into the tanks of the tunnel equipment.

DTS ® Chain or DTS ®-C Installation (not available for 7708 MatTop Chain Series)

All of the Rexnord chains can be used in conjunction with either a DTS chain or DTS-C transfer comb. For specific recommendations using these products refer to Rexnord's Engineering manual (8rxEM-en) or the DTS-C design manual (8rxDTS-C-en).

INSTALLATION

Transfer Comb Installation - High Temperature Application (2000)

Rexnord offers two styles of transfer combs for 2000 Series pasteurizer chains. Both are click-fitted on an omega style profile. For more details on the specific product offering refer to the Product Catalog.

Step 1:

Ensure that the omega profile is mounted properly to the pasteurizer support construction

Step 2:

Mount the transfer combs onto the omega profile making sure all the transfer comb fingers are engaged between the chain ribs and along the entire width of the chain

Step 3:

Test the transfers to ensure they are mounted properly so they are allowed to slide from side-to-side

Step 4:

Test the level of the transfer combs with all the products conveyed within the tunnel. Adjust the height and level of the infeed and discharge conveyors and comb support brackets as required to assure smooth container transfer. The tops of the transfer combs should be even with the top of the chain. The transfer combs should be mounted level from front to back

- For DTS®-C combs it is recommended to make the height position of the comb support adjustable to achieve optimum performance of the DTS-C system

INSTALLATION

Transfer Comb Installation - High Temperature Application (5997)

Rexnord offers several different styles of transfer combs for each unique application and mounting arrangement. For more details on the specific product offering refer to the Product Catalog.

Step 1:

Ensure that the mounting holes are located properly per the recommendations shown below. If this is a retrofit application, new holes may need to be drilled and tapped for proper comb positioning or the combs may need to be modified

Step 2:

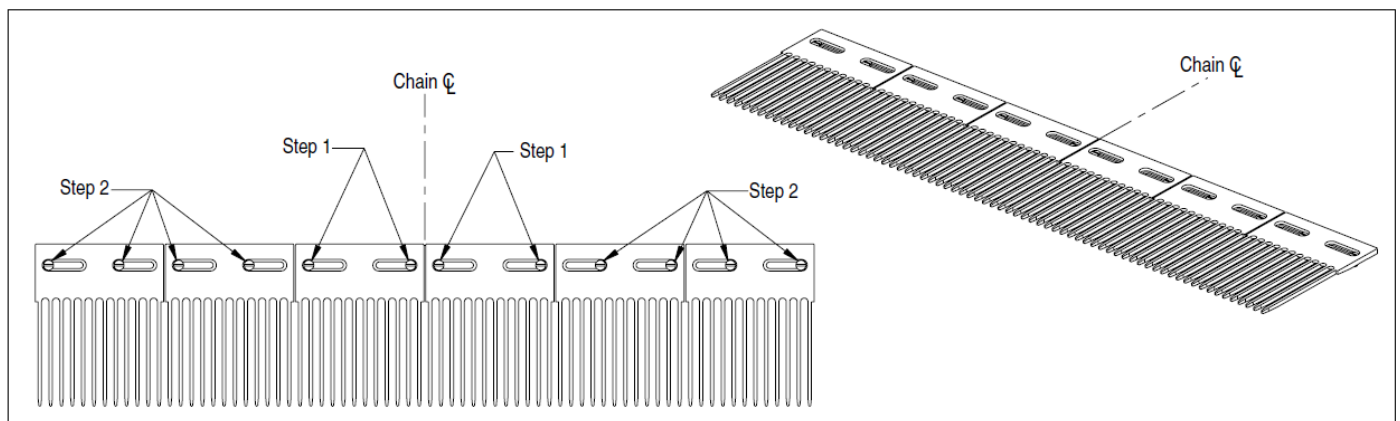
Mount the transfer combs onto the mounting plates making sure that all the transfer comb fingers are engaged between chain ribs and along the entire width of the chain

Step 3:

Secure the two center most transfer plates to track the chain as shown below

Step 4:

Position the fasteners in the remaining transfer plates to the corresponding right side or left side of the slots to allow for expansion at high temperatures as shown below



Screw Locations for High Temperature Application

Step 5:

Test the transfer combs to ensure they are mounted properly so they are allowed to slide slightly from side to side. After mounting there will be approximately 1/16 in. (1.5 mm) gap between the edges of the transfer combs

Step 6 (Critical): Test the level of the transfer combs with all the products conveyed within the tunnel. Adjust height and level of the infeed and discharge conveyors and comb support brackets as required to assure smooth container transfer. The tops of the transfer combs should be even with the top of the chain or approximately 1/16 in. (1.5 mm) above the tops of the chain ribs. The transfer combs should be mounted level from front to back

! CAUTION

It is critical to use the hardware provided in the transfer plate kits. The hardware contains a special shoulder screw that allows the combs to float axially.

- This arrangement will allow these transfer plates to move as required to accommodate changes in the chain width up to 1.50 in. (38.1 mm)

INSTALLATION

Transfer Comb Installation - High Temperature Application (Fortrex™ 9200)

Rexnord® offers one style of classic transfer combs for Fortrex 9200 chain and one style of DTS®-C comb suitable for the Fortrex 9200 chain. For more details on the specific product offering refer to the Product Catalog.

Step 1:

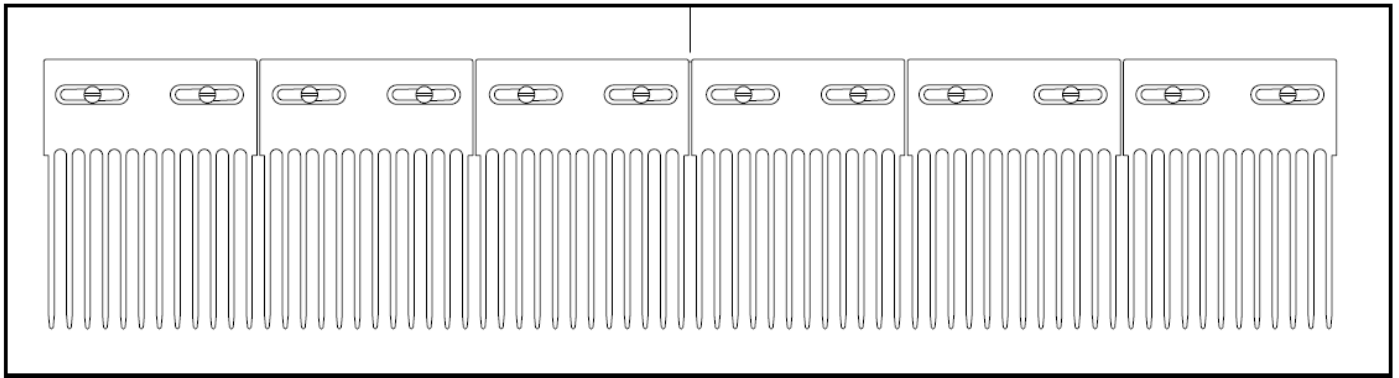
Ensure that the mounting holes are located properly per the recommendations shown below. If this is a retrofit application, new holes may need to be drilled and tapped for proper comb positioning or the combs may need to be modified

Step 2:

Mount the transfer comb onto the mounting plates making sure all the transfer comb fingers are engaged between chain ribs and along the entire width of the chain

Step 3:

Position the fasteners in the center of the slots as shown below



Screw Locations for High Temperature Application for Fortrex 9200 MatTop Chain

Step 4:

Test the transfer combs to ensure they are mounted properly so they are allowed to slide slightly from side to side.

Step 5 (Critical):

Test the level of the transfer combs with all the products conveyed within the tunnel. Adjust height and level of the infeed and discharge conveyors and comb support brackets as required to assure smooth container transfer. The tops of the transfer combs should be even with the top of the chain. The transfer combs should be mounted level from front to back

! CAUTION

It is critical to use the hardware provided in the transfer plate kits. The hardware contains a special shoulder screw that allows the combs to float axially.

INSTALLATION

Guiderail Installation

The guiderails that were removed prior to the chain installation must be reinstalled into the conveyor.

Step 1:

Install the guiderails in the tunnel conveyor. Make sure that the guiderails within the tunnel are positioned properly to prevent containers from falling over the edge of the chain and getting caught in the return way

- A general recommendation is to maintain the guiderail positioning to be narrower on the infeed than the outfeed. As a general rule of thumb the infeed guiderail is more narrow by one product diameter (i.e. Infeed guiderail spacing = Outfeed guiderail spacing - 1 product diameter).

Step 2:

Install the guiderails on both infeed and discharge conveyors. Make sure that the guiderails are positioned properly to ensure smooth and evenly populated container transfer into and out of the tunnel

- It is recommended to position the guiderails even with the chain edge or slightly inward to ensure product does not get caught on the edge of the chain.

INSTALLATION

Start Up

The following are general guidelines to follow prior to production.

Step 1:

Remove all tools, loose hardware and debris from the chain in carry and return ways

Step 2:

Run the chain without product for 2 to 6 hours and check for the following:

! CAUTION

For Fortrex 9200 MatTop Chains it is recommended to run the chain without product for 24 hours.

- Inspect the chains to ensure all of the sections were properly assembled and the chain was not damaged during the installation process (i.e. plugs have been inserted into the chain, end modules are not damaged, etc.)
- Manually test the transfer comb positioning with containers (while chain is running) as noted on pages 58-60
- Check to ensure transfer combs do not contain debris or particles wedged within the fingers
- Inspect the chain to ensure it is running properly, not hitting any obstructions, and tracking straight within the carry and return way
- Inspect the chain to ensure it is properly driven by the sprockets (i.e. sprockets are in correct locations, there are no high spots, chain is not jumping, etc.)

Step 3:

Stop the chain and repair, adjust or correct any problem areas that were found during the inspection process

Step 4:

Run the chain **with product (during production run) making sure that the machine is fully loaded** and check for the following:

- Inspect the chain to ensure it is running properly and tracking straight within the carry and return way while under full load
- Review the product at transfer locations and check for any container tippage or instability issues
- Inspect the catenary under full load

Step 5: Inspect the catenary periodically during the chain break-in period (first 2 to 4 weeks). If the sag becomes excessive, remove links during the first available downtime. The recommended catenary sag dimensions are shown below and on page 57

Rexnord® Chains	2000	5997	7708	9200
Vertical sag when running	4 to 12 in (100 to 300 mm)	4 to 6 in (100 to 150 mm)		4 to 10 in (100 to 250 mm)
Horizontal span	40 to 80 in (1000 to 2000 mm)	48 to 60 in (1219 to 1524 mm)		40 to 80 in (1000 to 2000 mm)

Step 6:

Note any issues that need to be fine-tuned and adjust or correct during the first available downtime

MAINTENANCE

Maintenance Guidelines

Periodic maintenance is essential to ensure chain reliability and increased lifetime. A general recommended maintenance schedule is shown below that applies to all Rexnord® MatTop® chains in any tunnel equipment. It is always recommended to replace or repair damaged product as soon as it is detected.

Maintenance frequency	Component	Maintenance procedure	Additional notes
Every 2 weeks or during routine cleaning schedule	Infeed chain	Check infeed chain for any visual damage or product handling issues	
Every 2 weeks or during product change outs	Transfer combs	Inspect transfer combs at the infeed and discharge for any damage and ensure proper positioning	Ensure product transfers are smooth
Every 6 months	Pin retention clips or plugs	Check if all the pin retention clips or plugs are in place and in the closed position	Missing clips or plugs could allow the pins to walk and cause a chain failure
	Chain* / Catenary sag	Check the catenary sag while the chain is warm or running. Remove links if the sag becomes excessive	General sag dimension guidelines are shown on page 57 and 62. If links are removed inspect the pins
	Chain*	Inspect the chain for visual damage and discoloration	Contact Application Engineering for information on our free chain evaluation service
Every 6 months after the first 2 years	Chain*	Measure the chain elongation. Chain should be replaced when it measures approximately 3%	Use the chain elongation measurement tool for 5997 chains as shown on page 64
Every 12 months	Positrack™ Tracking Guides (lugs)	Inspect Positrack lugs for any visual damage	
	Chain pins	Ensure pins are not protruding from the chain and have not become dam- aged	
	Drive sprockets	Inspect position of the drive sprockets, tooth damage and alignment	
	Idler wheels	Inspect position of the idler wheels and inspect for any damage	

* Rexnord offers Pasteurizer Chain Evaluation service (see page 64)

MAINTENANCE

Chain Elongation Measuring Tool (5997)

The chain pitch measurement tool was designed to make it easier to measure chain elongation in field applications, especially in hard-to-get-at areas such as pasteurizers, coolers and warmers.



5997 Chain Pitch Measurement Tool (Part 614-522-1)

The tool consists of two identical aluminum blocks as shown above. The four location pegs on the bottom of each block fit into slots in the top of the chain. If more details on using this tool is required contact Rexnord® Application Engineering for the instructional sheet.

Pasteurizer Chain Evaluation Service

Rexnord realizes that the unexpected down time for any product is unacceptable and providing information on the life of a chain is a huge benefit. Rexnord provides a chain life analysis for pasteurizer chains so that installation of new chains can be schedule up front and down time can be avoided. Contact Rexnord Application Engineering for more details on this service.

MAINTENANCE

Water Treatment and Cleaning Procedures

A pasteurizer is one of the harshest environments within a beverage filling plant because of the elevated temperature, constant submersion and chemical additives that are present within this process. Many of the biocides used to control biological growth also attack the plastics used in all conveyor chains, and the elevated temperature hastens this degradation (with every 50° F or 10° C the temperature increases, chemical reactions increase by a factor of 2 to 3!). Additional water properties, such as the pH, Alkalinity and Hardness can also further work together to create an environment where plastic chain life is compromised.

Some chemical treatment is necessary to prevent the biology from overrunning the pasteurizer and fouling the process, but the well-being of the chain needs to be considered by keeping the chemical dosing to a minimum and choosing the right chemicals. The guidelines below should be followed to reduce the amount of damage done to the pasteurizer during normal operation and during boilout/cleaning procedures.

Water treatment & cleaning procedure

1. Do not use peroxides (H₂O₂) or Chlorine Dioxide (ClO₂). At normal concentrations the biocidal effects of peroxide are not great enough to destroy the bacteria within a pasteurizer, and chlorine dioxide is too volatile to control. They both are highly detrimental to polypropylene chains at elevated temperatures.
 2. Halogen-based Oxidizing Biocides (such as Chlorine and Bromine) are some of the most commonly used within pasteurizers. However, they could damage polypropylene chains at elevated concentrations. A dosing range between 0.5 – 2.0 ppm is typically sufficient to keep biological growth in check, and reduces the premature aging effect on the chain. The lowest possible concentration that controls the biology should be used (determined through onsite testing), and ideally an online Chlorine Analyzer or Redox Electrode should be used to guarantee the oxidizing agent is properly dosed.
 3. Consider using elevated temperatures and bio dispersants (surfactants) for boil outs, as opposed to elevated temperature and an increased concentration of biocide. Most bacteria cannot survive in an environment greater than 140°F (60°C) for over one hour.
 4. Schedule boil outs as infrequently as possible. Use high-pressure water spray to dislodge large masses of biology once the pasteurizer has been properly sanitized.
 5. Ensure proper coverage of spray nozzles within pasteurizers to reduce “dead spots” in corners or areas where no treatment is possible. These areas oftentimes harbor a perfect environment for biology to flourish and will not be affected by increased chemical dosing – no matter how rigorous – since the biocide never actually reaches the mass.
 6. If white mineral deposits cause wear on the eyes and pins, the cause could be Hard Water as opposed to chemical attack. A water softener may be needed in the pasteurizer to reduce the amount of calcium carbonate scale on the chain. This can lead to premature chain elongation.
- In applications where high chemical dosing is required either by regional regulations or by biological necessity, we recommend considering either our Rexnord® USP material (ultra-stabilized polypropylene) or our Rexnord Fortrex chain to optimize chain life. Contact your local Rexnord Application Engineering representative for additional information.

Rexnord® Pasteurizer, Warmer, Cooler Chain Application Form

• Page 1

Date	
Customer (Name, Location)	
Contact (Name, Phone Number, E-Mail Address)	
End User (Name, Plant Location)	
Line Number or Description	
Rexnord Account Executive	

Fill in all information as completely as possible. For preliminary belt & sprocket selection, fill in page 1. For Detailed Recommendations, also fill in Page 2.

PRODUCTS*

Number	Product	Container	Diameter	Height	Weight	Product Rate	&/OR	Belt Speed
	(Beer, Juice, etc.)	(Can, Glass, PET)	(in)	(in)	(lb)	(Containers / Minute)		(FPM)
1							&/OR	
2								
3								

*If additional space is required, please provide additional product information on separate sheet.

MACHINE DESCRIPTION

Type of Machine (pasteurizer, warmer or cooler)			
Machine Length (Distance between Shaft Centers (ft))			
Single or Double Deck?			
1 or 2 Drives per Deck?		Horsepower Each (HP):	
Outboard Bearing Spacing (in)			
# of Belts per Deck (1 or 2)			
# of Drive Shafts per Deck (1 or 2)			

Belt	Carry Way:		Return Way:	
Conveyor	Wear Strip Material (UHMWP or SS):		Style: Rollers or Shoes:	
Bed			Roller or Shoe Material (UHMWP, PVC or SS):	

TEMPERATURE ZONE

Flow Through Machine	Temperature Zone		
	Zone No.	Length (ft)	Temp. (°F)
Infeed	1		
	2		
	3		
	4		
	5		
	6		
	7		
	8		
	9		
Discharge	10		

Fill in all that apply. If additional space is required, please include on separate sheet.

CHEMICAL USED:

- Provide list of all chemicals used, including material safety data sheet and concentrations
- Provide descriptions of cleaning/boil-out procedure

Belt	(Fill in as much information as possible, especially if for retrofit or replacement**on existing machine)		
	Belt Manufacture (if Known)		Belt Open Area (if known)
	Belt Number (if known)		Belt Pitch (pin to pin) (in)
	Belt Style (Raised Rib or Open Top)		Belt Thickness (in)
	Belt Width		Sprocket Number of Teeth
	Track Width for Belt (in)		OR Sprocket Pitch Diameter (in)

**If retrofit from other than MatTop Chain or Belt (E.G. Walking Beam, Wire Mesh, ect.), Provide any other necessary details.

Rexnord® Pasteurizer, Warmer, Cooler Chain Application Form

• Page 2

Date _____

Customer (Name, Location) _____

Contact (Name, Phone Number, E-Mail Address) _____

End User (Name, Plant Location) _____

Line Number or Description _____

Rexnord Account Executive _____

Fill in all information as completely as possible. For preliminary belt & sprocket selection, fill in page 1. For Detailed Recommendations, also fill in Page 2.

MACHINE DESCRIPTION (Additional details, provide drawings or sketches, if available)

For single deck or lower deck, distance
from bottom of return rollers / shoes to top
of highest water level in tanks _____

If double deck, distance from top of bottom
belt to bottom of upper return rollers or shoes _____

Belt	Carry Way:	Return Way:
Conveyor	Style of track (In-line or Chevron / Roller Shoe)	If return inside or below the machine?
Bed	Spacing between carryway wearstrips (in)	
	If roller or shoe, radius & spacing (in)	

Return Roller or Shoe Details (if know)

Flow through Machine	Position	Type: Roller or Shoe***	Roller or Shoe Radius (in)	Return Roller or Shoe Spacing (ft)
Infeed	NA	NA	NA	NA
	1			
	2			
	3			
	4			
	5			
	6			
	7			
	8			
	9			
	10			
Discharge	NA	NA	NA	NA

NOTES

- In-line = parallel to belt travel
- Roller or shoes are not normally recommended for carryways due to possible container instability.
Review with Rexnord.

Fill in all that apply. If additional space is required, please include on separate sheet.

*** Some returns use a combination of rollers and shoes.

Shafting	Infeed End	Discharge End
	Type (square or round)	Type (square or round)
	If round, 1 or 2 keyways for center sprockets	If round, 1 or 2 keyways
	Tail shaft size (square or diameter) (in)	Drive shaft size (square or diameter) (in)
	Total # of bearings on tail end	Total # of bearings on drive end
		If dual drive shaft, are they coupled together in the middle? (Yes or No)
Transfer	Is machine layout "C" shaped or "Z" shaped?	
	Infeed End	Discharge End
	Conveyor chain (SS or Plastic TT, or MT)	Conveyor chain (SS or Plastic TT, or MT)
	Conveyor Chain Number	Conveyor Chain Number
	Number of lanes of chain	Transfers (Finger plates, DTS or DTS-C)
	Transfers (Finger plates, DTS or DTS-C)	Overhead self-clearing mechanism (Yes or No)

If possible, provide detailed sketches or drawings of infeed and discharge areas.

World Class Customer Service

For more than 100 years, the dedicated people of Rexnord have delivered excellence in quality and service to our customers around the globe. Rexnord is a trusted name when it comes to providing skillfully engineered products that improve productivity and efficiency for industrial applications worldwide. We are committed to exceeding customer expectations in every area of our business: product design, application engineering, operations, and customer service.

Because of our customer focus, we are able to thoroughly understand the needs of your business and have the resources available to work closely with you to reduce maintenance costs, eliminate redundant inventories and prevent equipment down time.

Rexnord represents the most comprehensive portfolio of power transmission and conveying components in the world with the brands you know and trust.

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