CHAIN MATERIALS

For more detailed material information, see page EM - MF - 8 or the Appendix located at the end of this manual.

Materials vary per chain series; see Product Catalog to determine standard versus special materials.

AC (Armour Clad)

⇨Austenitic stainless steel cladding available with a variety of plastic link materials

⇨Excellent for conveying raw castings, rough parts

AS (Anti-Static)

⇨An electrically conductive acetal formulated to reduce or eliminate nuisance static charge

⇨**ALWAYS** contact Rexnord Application Engineering for assistance

BWR (Black Wear Resistant)

⇨BWR may extend chain life up to 5 times in comparison to other plastic materials in applications such as conveying rough machined parts

CR (Extreme Chemical Resistant)

⇨Fluorinated polymer which is chemically resistant to high concentrations of oxidizing agents, acids and bases

D & WD (Acetal)

⇨Plain acetal

DUV (Ultraviolet Resistant)

⇨Specially formulated acetal

⇨Used for outdoor applications with direct exposure to the sun or UV radiation

FR (Flame Retardant)

⇨Flame retardant polyester that meets the requirements of UL Standard 94 V-0 rated combustion

HP™ & WHP (High Performance)

⇨Patented blend of acetal specifically formulated for dry running conveyors due to excellent friction characteristics

LF & WLF (Low Friction)

⇨Patented blend of acetal provides good wear resistance and long service life due to the low coefficient of friction

MR (Melt Resistant)

⇨A nylon material with a high melting point used to prevent hot objects (product temperature up to 375° F (190° C)) from melting the top of the chain

P (Chemical Resistant)

⇨A polyester formulated to reduce or eliminate material degradation in applications where chemicals such as chlorine and phosphorous are present in moderate concentrations

PS™ (Platinum Series™)

⇨Patented blend of acetal specially formulated for high speed conveying applications

WSM & BSM (Cut Resistant)

⇨Tough acetal material formulated for abrasive and impact loading applications

⇨Cut resistant material commonly used in the meat processing industry on cutting, boning and trimming lines

WX (Abrasion Resistant)

⇨A nylon material formulated to be used in abrasive applications where chain is subjected to abrasives such as glass, sand and dirt

CAUTION Since materials vary in strength, refer to the Product Catalog for specific chain / material strengths when changing out materials.

FRICTION TABLE BETWEEN CHAIN AND PRODUCT (Fm)

Chain Material		Product Material						
Chain Material	Lubrication Condition	Plastic (including PET)	Paper	Steel	Aluminum	Glass	Returnable Glass Bottles	Non-Returnable Glass Bottles
AC	Dry	0.30	0.40	0.35	0.35	0.35	0.35	0.35
	Water	0.20	NR	0.25	0.25	0.25	0.25	0.25
	Soap & Water	0.10	NR	0.15	0.15	0.15	0.15	0.15
	Oil	-	NR	0.15	-	-	-	-
AS	Dry	0.25	0.33	0.30	0.25	0.20	0.27	0.20
	Water	0.20	NR	0.22	0.17	0.15	0.18	0.15
	Soap & Water	0.15	NR	0.15	0.12	0.10	0.14	0.10
	Oil	-	NR	0.10	-	-	-	-
BWR	Dry	0.25	0.33	0.30	0.25	0.20	0.27	0.20
	Water	NR	NR	NR	NR	NR	NR	NR
	Soap & Water	NR	NR	NR	NR	NR	NR	NR
	Oil	NR	NR	0.10	NR	NR	NR	NR
CR	Dry	0.25	0.33	0.30	0.25	0.20	0.27	0.20
	Water	0.20	NR	0.22	0.17	0.15	0.18	0.15
	Soap & Water	0.15	NR	0.15	0.12	0.10	0.14	0.10
	Oil	-	NR	0.10	-	-	-	-
D WD	Dry	0.25	0.33	0.30	0.25	0.20	0.27	0.20
	Water	0.20	NR	0.22	0.17	0.15	0.18	0.15
	Soap & Water	0.15	NR	0.15	0.12	0.10	0.14	0.10
	Oil	-	NR	0.10	-	-	-	-
DUV	Dry	0.25	0.33	0.30	0.25	0.20	0.27	0.20
	Water	0.20	NR	0.22	0.17	0.15	0.18	0.15
	Soap & Water	0.15	NR	0.15	0.12	0.10	0.14	0.10
	Oil	-	NR	0.10	-	-	-	-
FR	Dry	0.25	0.33	0.30	0.25	0.20	0.27	0.20
	Water	0.20	NR	0.22	0.17	0.15	0.18	0.15
	Soap & Water	0.15	NR	0.15	0.12	0.10	0.14	0.10
	Oil	-	NR	0.10	-	-	-	-
HP™ WHP	Dry	0.18	0.23	0.18	0.18	0.13	0.16	0.12
	Water	0.16	NR	0.16	0.14	0.12	0.16	0.11
	Soap & Water	0.14	NR	0.13	0.12	0.10	0.14	0.10
	Oil	-	NR	0.10	-	-	-	-
LF WLF	Dry	0.20	0.30	0.25	0.20	0.15	0.20	0.15
	Water	0.18	NR	0.20	0.15	0.13	0.16	0.13
	Soap & Water	0.15	NR	0.15	0.12	0.10	0.14	0.10
	Oil	-	NR	0.10	-	-	-	-
MR	Dry	0.25	0.33	0.30	0.25	0.20	0.27	0.20
	Water	NR	NR	NR	NR	NR	NR	NR
	Soap & Water	NR	NR	NR	NR	NR	NR	NR
	Oil	NR	NR	0.10	NR	NR	NR	NR
P	Dry	0.25	0.33	0.30	0.25	0.20	0.27	0.20
	Water	0.20	NR	0.22	0.17	0.15	0.18	0.15
	Soap & Water	0.15	NR	0.15	0.12	0.10	0.14	0.10
	Oil	-	NR	0.10	-	-	-	-
PS™	Dry	0.16	0.23	0.18	0.18	0.12	0.16	0.16
	Water	0.15	NR	0.16	0.14	0.12	0.16	0.16
	Soap & Water	0.14	NR	0.13	0.12	0.10	0.14	0.14
	Oil	-	NR	0.10	-	-	-	-
WSM BSM	Dry	0.25	0.33	0.30	0.25	0.20	0.27	0.20
	Water	0.20	NR	0.22	0.17	0.15	0.18	0.15
	Soap & Water	0.15	NR	0.15	0.12	0.10	0.14	0.10
	Oil	-	-	-	-	-	-	-
WX	Dry	0.20	0.30	0.25	0.20	0.15	0.20	0.15
	Water	NR	NR	NR	NR	NR	NR	NR
	Soap & Water	NR	NR	NR	NR	NR	NR	NR
	Oil	NR	NR	0.10	NR	NR	0.10	NR

NR denotes “not recommended”

Dash denotes “combination not tested”

All values shown in this table were obtained through product testing.
Actual values may be higher or lower depending on environmental conditions.

Fm for LBP3000 Multiflex chain (typically) = 0.10; Fm for LBP1503 Multiflex chain (typically) = 0.11

FRICTION TABLE BETWEEN CHAIN AND WEARSTRIPS (Fw)

Chain Material		Wearstrip Material		
Chain Material	Lubrication Condition	Steel and Stainless Steel	UHMWPE	Nylatron®
AS	Dry	0.30	0.25	0.25
	Water	0.23	0.21	0.21
	Soap & Water	0.15	0.15	0.15
	Oil	0.10	0.10	0.10
BWR	Dry	0.30	0.25	0.25
	Water	NR	NR	NR
	Soap & Water	NR	NR	NR
	Oil	0.10	0.10	0.10
CR	Dry	NR	NR	NR
	Water	0.23	0.21	0.21
	Soap & Water	0.15	0.15	0.15
	Oil	0.10	0.10	0.10
DUV	Dry	0.30	0.25	0.25
	Water	0.23	0.21	0.21
	Soap & Water	0.15	0.15	0.15
	Oil	0.10	0.10	0.10
D WD	Dry	0.30	0.25	0.25
	Water	0.23	0.21	0.21
	Soap & Water	0.15	0.15	0.15
	Oil	0.10	0.10	0.10
FR	Dry	0.30	0.25	0.25
	Water	0.23	0.21	0.21
	Soap & Water	0.15	0.15	0.15
	Oil	0.10	0.10	0.10
HP™ WHP	Dry	0.22	0.18	0.17
	Water	0.20	0.16	0.16
	Soap & Water	0.15	0.14	0.14
	Oil	0.10	0.10	0.10
LF WLF	Dry	0.25	0.20	0.20
	Water	0.20	0.18	0.18
	Soap & Water	0.15	0.15	0.15
	Oil	0.10	0.10	0.10
MR	Dry	0.30	0.25	0.25
	Water	NR	NR	NR
	Soap & Water	NR	NR	NR
	Oil	0.10	0.10	0.10
P	Dry	0.30	0.25	0.25
	Water	0.23	0.21	0.21
	Soap & Water	0.15	0.15	0.15
	Oil	0.10	0.10	0.10
PS™	Dry	0.18	0.17	0.17
	Water	0.16	0.16	NR
	Soap & Water	0.13	0.14	NR
	Oil	0.10	0.10	0.10
WSM BSM	Dry	0.30	0.25	0.25
	Water	0.23	0.21	0.21
	Soap & Water	0.15	0.15	0.15
	Oil	0.10	0.10	0.10
WX	Dry	0.25	0.20	0.20
	Water	NR	NR	NR
	Soap & Water	NR	NR	NR
	Oil	0.10	0.10	0.10

NR denotes “not recommended”

Friction between chain and wearstrip (Fw) must be adjusted when inclining / declining. See Friction Formulas on page EM - MF - 27 for more information.

All values shown in this table were obtained through product testing. Actual values may be higher or lower depending on environmental conditions.

SPROCKET AND IDLER WHEEL DESIGNATIONS

Rexnord has developed a variety of sprocket and idler materials for various and unique applications. Sprockets are available in plastic and metallic varieties.

Plastic

⇨Acetal

- Good corrosion and wear resistant properties
- One piece sprocket
- Temperature Range: -40° to +180° F (-40° to + 82° C)

⇨LF Acetal

- Available in select idler wheel styles only
- Self-lubricating
- Temperature Range: -40° to +180° F (-40° to + 82° C)

⇨KU and KUS (Machined Plastic)

- KU and KUS do not designate material
- KU designates solid (one piece) design and KUS designates a split (two piece) design
- Sprockets machined in a variety of plastic materials
- Flush side for ease in cleaning
- Sprockets come in a wide variety of pitch diameters and bore sizes

Metallic

⇨Semi-Steel (Cast Iron)

- Used in non-corrosive, abrasive environments such as broken glass, metal chips
- One piece sprocket
- Temperature Range: -40 to +350° F (-40° to +177° C)

NOTES

WEARSTRIP MATERIALS

Proper chain and wearstrip selection will provide optimum life. Since a function of the wearstrip is to lower friction and to reduce wear, it is recommended to give careful consideration when selecting the material.

The following general guidelines will help in selecting the proper material for your application:

Acetal

⇨Not recommended for use with acetal chains; it is best not to run identical plastics together

Aluminum

⇨**NOT RECOMMENDED** due to poor wear resistance

Bronze and Brass

⇨Sometimes used with stainless steel chains

⇨Typically used for non-sparking and anti-static conditions

⇨For bronze - recommended one half hard temper (Rb 58)

⇨For brass - recommended one half hard (Rb 70 Min) to full hard (Rb 82) temper

Nylatron® (Nylon with Moly Filler)

⇨Recommended for dry applications due to low wear and low friction

⇨Especially suited for dry operation on thermoplastic side-flexing chain corners due to its high PV (Pressure-Velocity) rating

⇨Typically not recommended in wet applications because it will absorb moisture and expand (if used in wet applications, allow clearance for expansion and movement of fasteners)

Lubricant Impregnated Wood

⇨Commonly used in dry abrasive applications (i.e. glass, paper)

⇨Not recommended in wet applications

Steel

⇨Recommended for non-corrosive, abrasive or high temperature applications

⇨Abrasive particles are less likely to imbed in metal wearstrips in comparison to plastic

⇨A cold rolled plain carbon steel is recommended

⇨Heat treated grades - hardened to 25 to 30 Rc is recommended

Stainless Steel

⇨Recommended for corrosive, abrasive or high temperature applications

⇨Abrasive particles are less likely to imbed in metal wearstrips in comparison to plastic

⇨A cold rolled austenitic grade is recommended which offers the best corrosion resistant properties

⇨Recommended one quarter hard temper (25 to 35 Rc)

⇨Softer annealed grades of austenitic are **NOT RECOMMENDED.** Adverse interaction between the chain material and the soft stainless steel might develop. When this happens, the resulting wear debris consists almost entirely of finely divided stainless steel particles, nearly black in color, similar to molydisulfide or graphite. The wear of the stainless steel might be rapid while the thermoplastic chain by contrast exhibits only slight wear

⇨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

Teflon®

⇨Recommended only for very low speed - low load applications

UHMWPE (Ultra High Molecular Weight Polyethylene)

⇨Recommended for dry or wet applications on straight or side-flexing conveyors

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

⇨Provide lower coefficient of friction than metals

⇨Not affected by moisture and more resistant to chemicals than nylon

⇨UHMWPE materials can be supplied with various fillers:

- Ceramic / glass
- Conductive
- Oil / wax

CAUTION

Wearstrip surface finish is a critical aspect for overall chain life. A surface finish of 32 µ-in Ra is recommended for metal wearstrips and 125 µ-in Ra

LUBRICATION

Lubrication is recommended whenever the application permits. It not only reduces friction, thereby reducing chain tension; but also, greatly improves the wear life of the chain and wearstrips. Lubrication offers a constant cleaning effect of both chain and wearstrip and can also reduce static.

General Recommendations

⇨Lubrication should contact both the chain and wearstrip

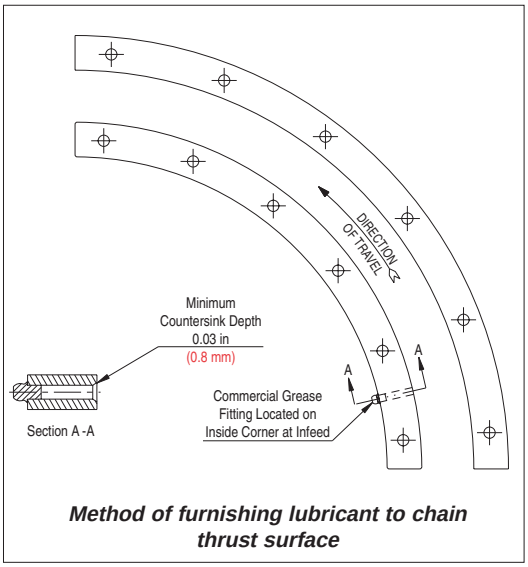
⇨When lubricating Rex® Multiflex chains, the lubricant must be applied at the entrance of the inside corner track

General Types of Lubricants

⇨Water - Only utilize with corrosion resistant materials. Can be used as a general lubricant; however, it is not as effective as other types due to friction and chain cleaning properties

⇨Water soluble lubricants and soaps - Only utilize with corrosion resistant materials. These are excellent lubricants which also help clean the chain

⇨Oil base lubricants - These are vegetable, mineral oils or grease which offer high lubricity. Can be used with plastic or metal materials. Recommended to be used on all metal chains whenever practical. Food grade oils are available



Method of furnishing lubricant to chain thrust surface

Selective Lubrication

⇨In some applications, the presence of a lubricant cannot be tolerated. For these applications, it is recommended to utilize chains made of HP™ or PS™ acetal material with Nylatron® corners, which offers the lowest coefficient of friction

To eliminate or reduce lubrication, contact Rexnord Application Engineering to conduct a run dry survey. 1.262.376.4800

For more information on lubrication types, compatibility, methods,contact a lubricant manufacturer.

NOTES

ENVIRONMENTAL CONSIDERATIONS

Abrasive Applications

⇨Applications with the presence of dirt, sand, glass or metal particles can lead to premature wear of the conveying chain and wearstrips

⇨Recommendations:

- Utilize wearstrips and chains with a hard wear surface
- If possible, use controls to minimize the amount of accumulation
- The use of WX chain material and metal sprockets can extend wear life

Chemical Applications

⇨Make sure any chemicals or cleaners used on conveyors are compatible with chain, wearstrip and sprockets. See table on page EM - MF - 9 for more detailed compatibility information

Dry Applications

⇨Considerations to be taken when running dry:

- Product backline pressure
- Conveyor cleanliness
- Conveyor pulsation
- Increased component wear

Extreme Temperature Applications

⇨The recommended minimum and maximum operating temperatures for Rex® Multiflex chain and wearstrips can vary due to the presence of moisture

Material	Minimum Temperature		Maximum Temperature			
	Dry		Dry		Wet	
	°F	°C	°F	°C	°F	°C
Acetal	-40	-40	180	82	150	66
UHWMPE	-100	-73	180	82	160	71
Nylon	-40	-40	220	104	NR	NR
Stainless Steel	-100	-73	800	427	250	121
Steel	-40	-40	350	177	250	121
Lubricated Impregnated Wood	-50	-46	160	71	160	71

High Speed Applications

⇨In any high speed application, the critical aspect of the conveyor is the corners. The concern with running the chain at high speeds is the PV (Pressure-Velocity) in the corners. If the PV limits are exceeded, the chain or corner track may become damaged due to the heat generated from the high speed and/or load. It is generally recommended to utilize Nylatron® corner tracks in conjunction with PS™ or HP™ materials or selective lubrication for these applications

Long Length Conveyors / Pulsation Applications

⇨Pulsation or "slip stick" of chain results in a jerking chain motion which can occur in long, slow speed and dry conveyors. Pulsation can create product stability problems in extreme cases. It can also result in premature chain elongation or the chain jumping drive sprocket teeth. If corner discs are utilized, it is recommended that conveyor lengths do not exceed 150 ft (46 m) per drive, regardless of loading. Rexnord also recommends a 150° minimum wrap on the head sprocket. If necessary, this can be maintained with the use of a snubber roller

Static Environment Applications

⇨Under certain conditions, thermoplastic can acquire a static nuisance charge. Static environments are classified as:

CAUTION

Class I: Static spark causes explosion - stainless steel chains are recommended.

Class II: Static spark is a nuisance charge - low charge will provide slight shock or possible circuit damage.

⇨All applications utilizing thermoplastic anti-static materials (i.e. AS, ESD) must be approved by Rexnord Application Engineering prior to quoting

Grounding is crucial for the system to reduce static charges.

UV Applications

⇨When conveyor chains are exposed to direct UV (Ultraviolet) or sunlight, DUV stabilized material should be utilized

MATERIAL CHARACTERISTIC TABLE

Material Characteristics	Theoplastic											
	HP™ WHP	LF WLF	D WD	BWR	AS	P	CR	MR	DUV	FR	PS™	WX
Impact Resistant				■			■	■				■
Wear Resistant	■	■		■							■	■
Chemical Resistant*							■	■				
Strength	■	■	■	■			■	■			■	■
Low Frictional Characteristics	■	■	■								■	
Capability to Run Dry in Corners	■	■		■				■			■	■
Suitablity in Wet Enviroments	■	■	■			■	■		■	■	■	
Low Temperature Capability (to 40° F)	■	■	■	■				■			■	■
High Temperature Capabilities (to +180° F)	■	■	■	■	■	■	■	■	■		■	■
Ultra Violet Capabilities				■		■	■	■				■
Suitability for Class II (nuisance static)					■							
Suitability for Class I (exlosive static)												
Non-magnetic Qualities	■	■	■	■	■	■	■	■	■	■	■	■
Flame Retardance										■		
Capability to Convey Hot Products (to +375° F)								■				
FDA Approval	■	■	■			■	■				■	

HP™ = High Performance
WHP = White High Performance
LF = Low Friction
WLF = White Low Friction
D = Acetal
WD = White Acetal
BWR = Black Wear Resistant
AS = Anti-Static
CR = Extreme Chemical Resistant
MR = Melt Resistant
DUV = Ultraviolet Resistant
FR = Flame Retardant
PS™ = Platinum Series™
WX = Abrasion Resistant

*See Corrosion Resistance Guide on Page EM - MF - 9 for more details

CORROSION RESISTANCE GUIDE

Common or Chemical Name	Austenitic	Acetal	Nylon & Nylatron®	Polyester	Chemically Resistant Fluorinated Polymer	Polyethylene	Neoprene	EPDM
	AC SS	AS, BSM, D, DUV, HP™, LF, PS™, WD, WHP, WLF, WSM	BWR, MR, WX	FR, P	CR	UHMWPE		
Acetic Acid (over 5%-up to 50%)	M	U	M	S	S	S	M	S
Acetone	S	S	S	S	U	S	M	S
Alcohol	S	S	S	S	S	S	S	S
Ammonia	S	U	S	S	S	S	S	S
Beer	S	S	S	S	S	S	S	S
Beverages-Soft Drinks	S	S	S	S	S	S	M	S
Benzene	S	S	S	S	S	M	S	U
Brine (pickle)	M	M	M	S	S	S	U	S
Carbon Tetrachloride	M	S	S	S	U	M	U	U
Chlorine	U	U	U	S	S	S	U	M
Citric Acid	S	M	M	S	S	S	S	S
Cyclohexane	—	S	—	—	S	U	S	S
Ethyl Chloride	S	S	S	S	S	M	M	M
Formaldehyde	S	S	S	S	M	S	S	S
Formic Acid	U	U	U	S	S	S	M	M
Fruit Juices	S	S	S	S	S	S	S	S
Gasoline	S	S	S	S	S	M	S	U
Hexane	S	S	—	S	S	U	S	U
Hydrochloric Acid (up to 2%)	U	U	U	S	S	S	M	S
Hydrochloric Acid (up to 37%)	U	U	U	S	S	S	U	M
Hydrogen Peroxide	S	U	U	S	S	S	M	S
Iodine	U	U	U	U	M	M	U	U
Isopropanol (isopropyl alcohol)	S	S	S	S	S	S	S	S
Lactic Acid	S	S	M	S	M	S	S	S
Methylene Chloride	S	S	—	U	M	U	U	U
Milk	S	S	S	S	S	S	S	S
Muriatic Acid	U	U	U	S	S	S	U	M
Nitric Acid (low concentrations)	S	U	U	S	S	S	M	S
Oil (vegetable or mineral)	S	S	S	S	M	S	S	U
Ozonated Water	S	M	U	S	S	S	U	S
Paraffin	S	S	S	S	S	S	S	U
Phosphoric Acid (up to 10%)	S	U	U	S	S	S	S	S
Soap and Water	S	S	S	S	S	S	S	S
Sodium Chloride	M	S	S	S	S	S	S	S
Sodium Hydroxide (up to 25%)	S	S	U	U	M	S	S	S
Sodium Hypochlorite (Bleach)	U	U	U	S	S	S	U	S
Stearic Acid	S	M	S	S	S	S	S	M
Sulphuric Acid (up to 40%)	U	U	U	S	S	S	M	S
Toluene (Toluol)	S	M	S	S	M	U	U	U
Turpentine	S	S	S	S	S	U	S	U
Vegetable Juices	S	S	S	S	S	S	U	S
Vinegar	S	S	S	S	M	S	S	S
Water (fresh)	S	S	S	S	S	S	S	S
Whiskey	S	S	S	S	S	S	S	S
Wine	S	S	S	S	S	S	S	S
Xylene	S	S	S	S	S	M	U	U

Dash = Not Tested **M = Marginal** **U = Unsatisfactory** **S = Satisfactory**

General Rules of Thumb:

With acetal products, do not use cleaning or lubricating agents with a pH below 4 or above 10. This table is based on data available by various material suppliers.

Contact Rexnord Application Engineering for more information 1.262.376.4800

CONVEYOR DESIGN RECOMMENDATIONS

Straight Running Configuration

⇨A long conveyor with a single drive is the simplest and most ideal design. Sometimes several short conveyors are required due to application constraints

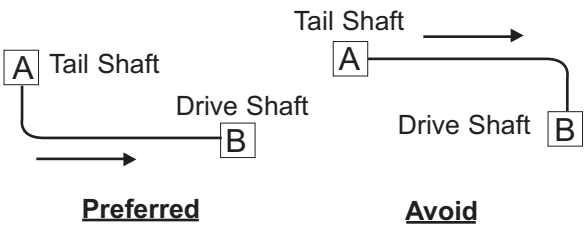
Side-flexing Configuration

In general, the straight section between the corner and the drive shaft must be at least 18 in (457 mm) to allow adequate room for the catenary (see page EM - MF - 22). The tail shaft should be at least 12 in (305 mm).

⇨Depending on chain style, corner discs or corner tracks can be utilized

⇨Corner discs are used to guide the chain without significant increase in chain tension

⇨When conveying from Point A to Point B, design the conveyor so that the drive is positioned furthest from the last corner (see drawing below), resulting in lower chain tension and maximizing chain life



Straight Running and Side-flexing Configuration

⇨The conveyor frame is designed to support the chain on the bottom of the link

⇨For applications where debris is a concern, an open design, such as a serpentine design, is preferred over full width support

⇨The serpentine design prevents the build-up of debris in the track and distributes the wear evenly across the bottom of the link

⇨Abrasive applications should utilize steel or stainless steel wearstrips

⇨Wet abrasive applications should utilize stainless steel wearstrips and pins

⇨Non-abrasive conditions should utilize UHMWPE or Nylatron® wearstrips

CAUTION **Multiflex chains should not be twisted.**

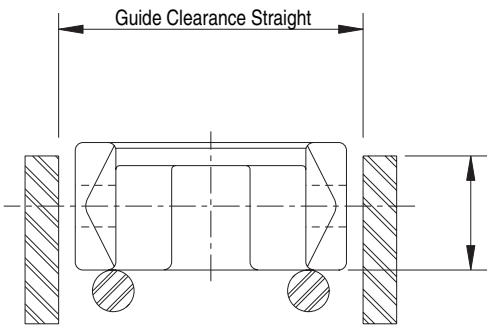
CAUTION **1700, 1702, 1755, 1765 and 2550 chains MUST utilize corner discs.**

Make sure that the entire chain path (carry, return, sprocket and catenary sag areas) has plenty of clearance for free chain travel. Make sure all frame and support members, piping, conduits and mounting hardware are well clear of chain path.

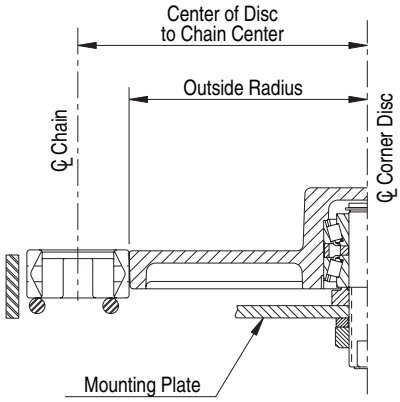
Carry Ways

⇨Guide clearance is critical for Rex® Multiflex chains. For guide clearance dimensions of individual chains, see table on page EM - MF - 15 or Product Catalog (8rxCAT-en)

Side-flexing - Straight Edge Design



Typical Construction - Straight Section



Typical Construction - Corner Section Utilizing Corner Disc

⇨Chain can be lifted out of straight sections for cleaning or inspection

⇨Longer conveyors can be achieved with the use of corner discs

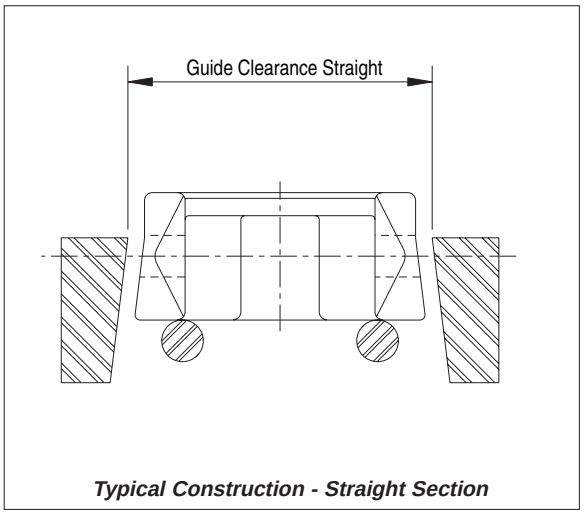
CAUTION **1700, 1702, 1755, 1765 and 2550 chains MUST utilize corner discs.**

CONVEYOR DESIGN RECOMMENDATIONS

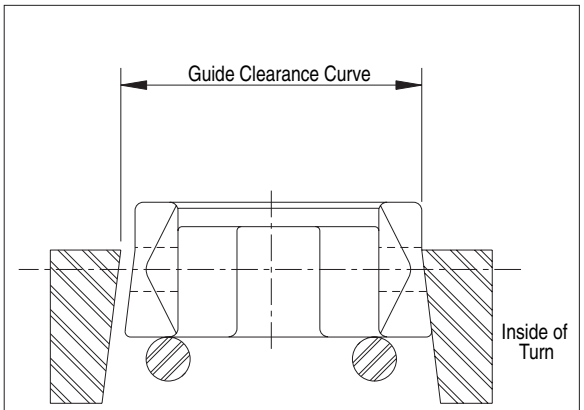
Carry Ways

⇨Guide clearance is critical for Rex® Multiflex chains. For guide clearance dimensions of individual chains, see table on page EM - MF - 15 or Product Catalog (8rxCAT-en)

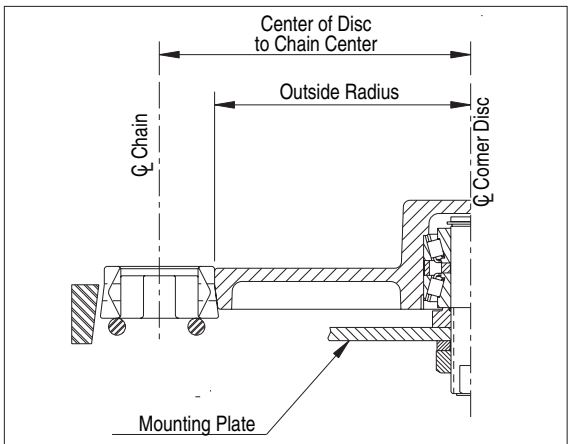
Side-flexing - Bevel Design



Typical Construction - Straight Section



Typical Construction - Corner Section Utilizing Corner Track



Typical Construction - Corner Section Utilizing Corner Disc

⇨Chain can be lifted out of straight sections for cleaning or inspection

⇨Longer conveyors can be achieved with the use of corner discs

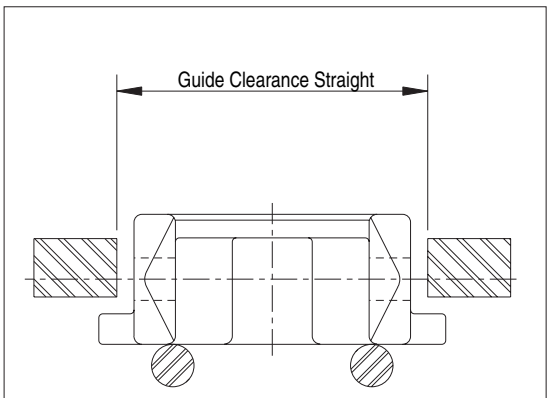
CAUTION **1700, 1702, 1755, 1765 and 2550 chains MUST utilize corner discs.**

CONVEYOR DESIGN RECOMMENDATIONS

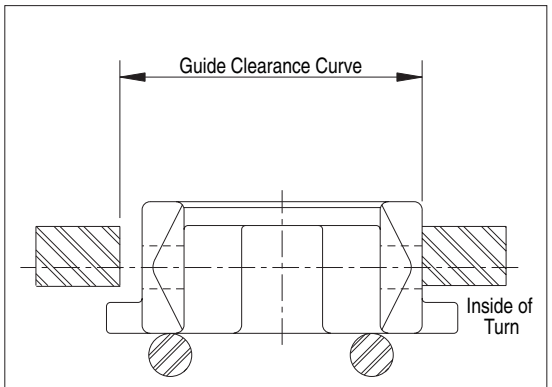
Carry Ways

⇨Guide clearance is critical for Rex® Multiflex chains. For guide clearance dimensions of individual chains, see table on page EM - MF - 15 or Product Catalog (8rxCAT-en)

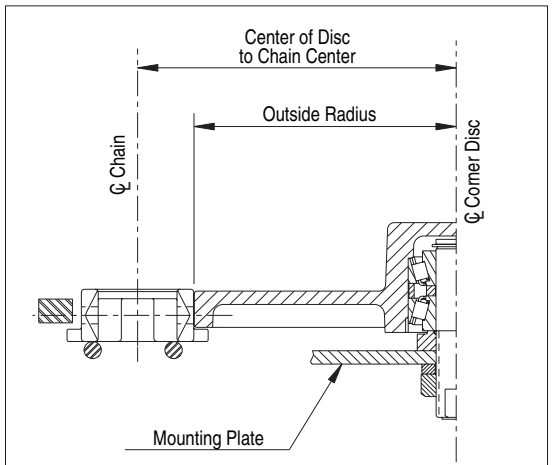
Side-flexing - TAB Design



Typical Construction - Straight Section



Typical Construction - Corner Section Utilizing Corner Track



Typical Construction - Corner Section Utilizing Corner Disc

⇨Positive retention

⇨TABs hold chain down in incline or decline applications

⇨Chain top surface wear is decreased if the TAB return is utilized

⇨Longer conveyors can be achieved with the use of corner discs

⇨Once assembled, the TAB chain cannot be lifted out of the conveyor track

CAUTION **1700, 1702, 1755, 1765 and 2550 chains MUST utilize corner discs.**

SIDE-FLEX RADIUS TABLE

Chain Style	Chain Width		Minimum Side-flex Radius	
	in	mm	in	mm
1700	2.17	55.1	5.75	146.1
AC 1700	2.17	55.1	5.75	146.1
1701	2.09	53.1	5.75	146.1
1701 TAB	2.09	53.1	5.75	146.1
AC 1701 TAB	2.09	53.1	5.75	146.1
1702	2.09	53.1	5.75	146.1
1755	1.09	27.7	5.38	136.5
1757 TAB	3.25	82.6	6.00	152.4
LBP 1757 TAB	3.25	82.6	6.00	152.4
1757 TAB G	3.25	82.6	8.00	203.2
1765	2.17	55.1	4.92	125.0
2500 TAB	2.63	66.8	9.50	241.3
2550 TAB	3.50	88.9	9.50	241.3

NOTES

GUIDE CLEARANCE TABLE

Rex® Multiflex Chain Track Details

Side-flexing

Chain Style		1701	1701T AC 1701T	2500T	AC 1700 1700 1765	1702	1755	1757T LBP 1757T 1757T G	2550T
Hold Down Style		**Bevel**	**TAB**	**TAB**	**N/A**	**N/A**	**N/A**	**TAB**	**TAB**
Guide Clearance Straight	in	2.19	2.34	2.97	2.28	2.34	1.20	2.44	3.76
	mm	55.6	59.5	75.4	58.0	59.4	30.5	61.9	95.4
Guide Clearance Corner	in	2.34	2.25	2.81	N/A	N/A	N/A	*	N/A
	mm	59.4	57.2	71.4	N/A	N/A	N/A	*	N/A
Corner Wearstrip Thickness	in	0.63	0.63	0.75	Must Use Corner Disc	Must Use Corner Disc	Must Use Corner Disc	*	Must Use Corner Disc
	mm	16.0	16.0	19.0				*	

*Rexnord only offers corner discs for these chains; however corner tracks can be utilized.

NOTES

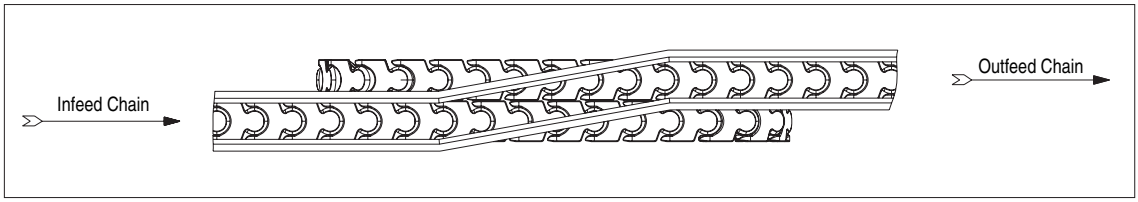
Contact Rexnord Application Engineering for more information 1.262.376.4800

CONVEYOR DESIGN RECOMMENDATIONS

Transfers

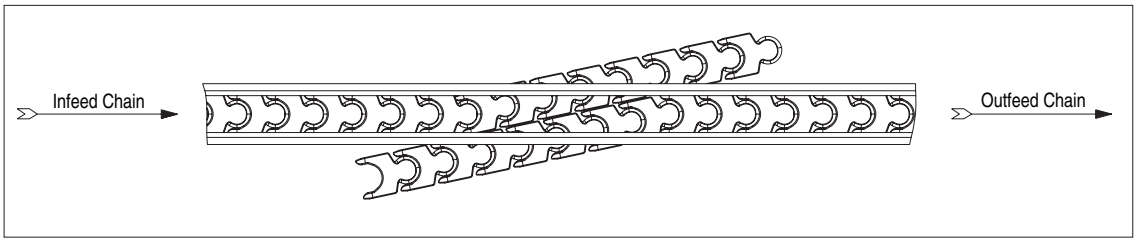
⇨Smooth transfer of the conveyed product from one chain to another is essential. The various methods are described below:

Side Transfer



✓ ⇨Adjacent strands of chain should share a common wearstrip
⇨No stranded products

Inline Transfer

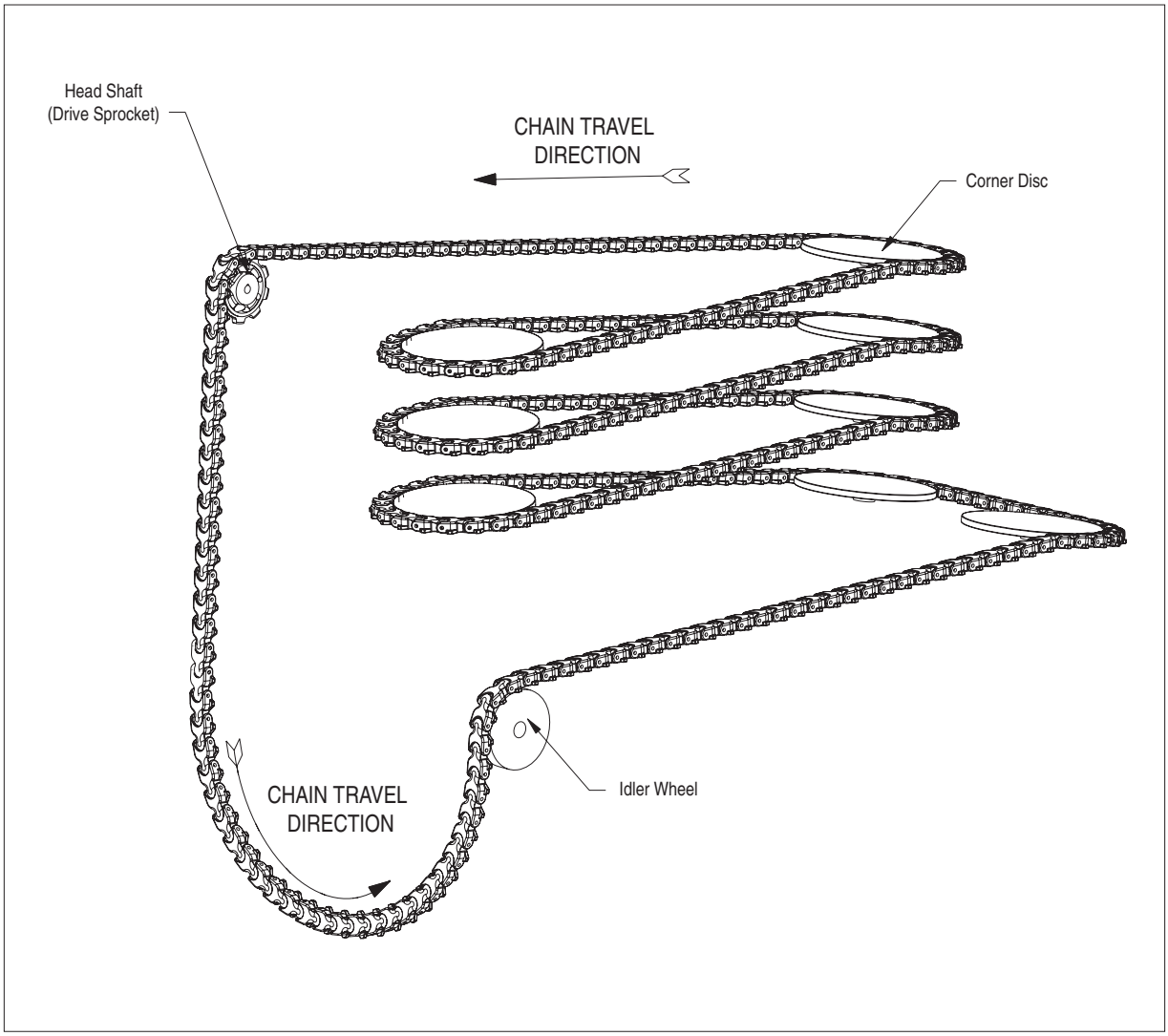


✓ ⇨Adjacent strands of chain should share a common wearstrip
⇨Allows product to remain in straight line
⇨No stranded products

These arrangements are used in an offset wrap drive, which allow a single strand of chain to be used; see page EM - TT - 21 (TableTop® Section) for offset wrap drive details.

Alternate Drive Configurations

Alpine Conveyor



- ⇨Rex® Multiflex chains have the ability to elevate or lower products in a very compact area. This figure shows a typical elevating system and how the chain is returned in a non-standard configuration
- ⇨Full return is not required
- ⇨The chain hangs straight down from the drive sprocket and side-flexes back up into the tail section
- ⇨Elevators can be designed with free-hanging (catenary sag) and sliding returns
- ⇨Roller returns are not recommended
- ⇨The straight and corner return sections can be the same as the carry section
- ⇨The chain is run in the conveyor upside down through the return section
- ⇨Depending on chain design, discs may have to be mounted upside-down in the return

CONVEYOR DESIGN RECOMMENDATIONS

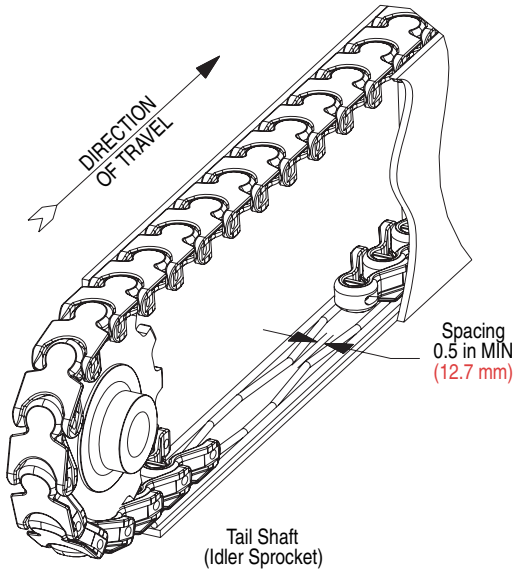
Return Ways

Serpentine Style Return

⇨A wide selection of chain returns are possible with Rex® Multiflex chains which offers considerable conveyor design freedom

⇨The chain is fully supported

⇨Allows for drainage and the passage of foreign materials

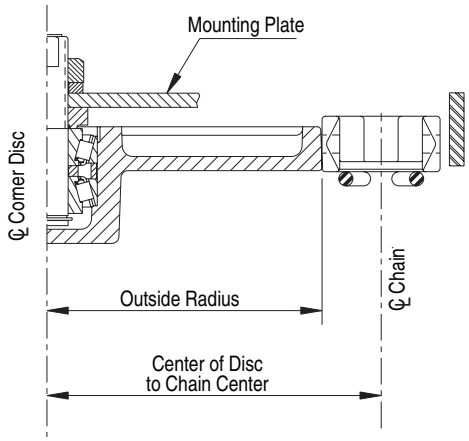


Conveyor with Serpentine Return Bed

Side-flexing - Straight Edge Design

⇨The corner disc in the return section is mounted in the same manner as in the carry section

⇨Depending on chain design, discs may have to be mounted upside-down in the return



Typical Construction - Corner Section Utilizing Corner Disc

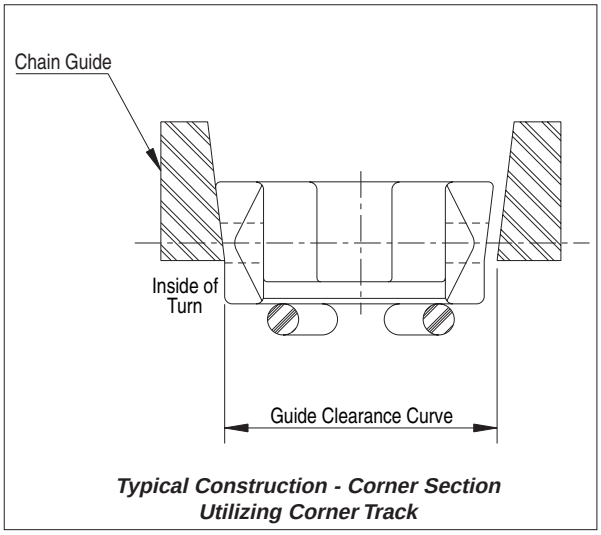
When returning chain with molded inserts (HPM), caution should be taken to insure that the inserts do not interfere with the return elements.

Possible solutions:
- Return the chain on its TABs
- Return the chain on the outer edge of the links via rollers or wearstrips

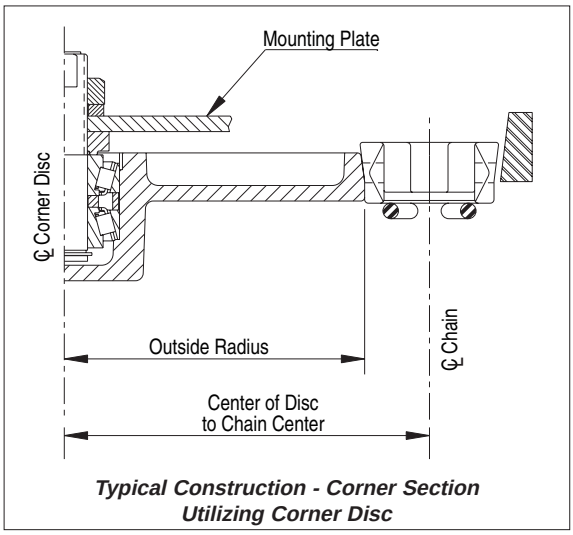
Contact Rexnord Application Engineering for more information 1.262.376.4800

Return Ways

Side-flexing - Bevel Design



Typical Construction - Corner Section Utilizing Corner Track

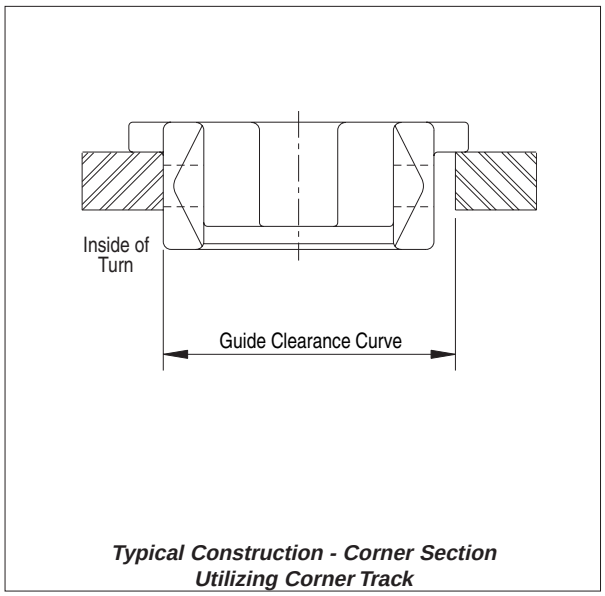


Typical Construction - Corner Section Utilizing Corner Disc

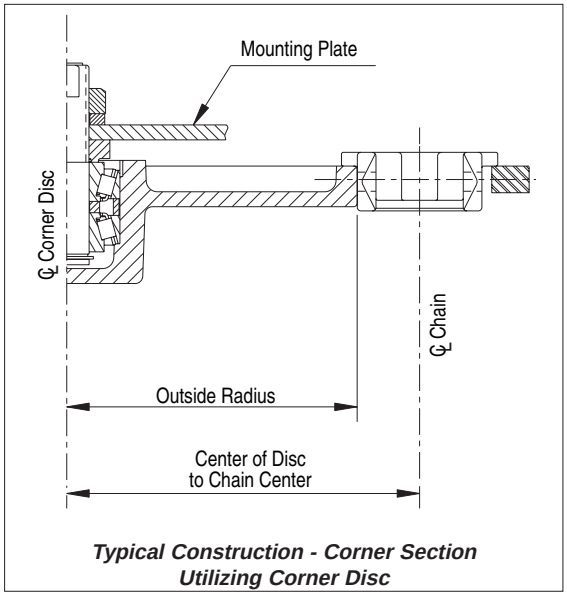
⇨The corner disc in the return section is mounted in the same manner as in the carry section

⇨Depending on chain design, discs may have to be mounted upside-down in the return

Side-flexing - TAB Design



Typical Construction - Corner Section Utilizing Corner Track



Typical Construction - Corner Section Utilizing Corner Disc

⇨The corner disc in the return section is mounted in the same manner as in the carry section

⇨Depending on chain design, discs may have to be mounted upside-down in the return

CAUTION **1700, 1702, 1755, 1765 and 2550 chains MUST utilize corner discs.**

Contact Rexnord Application Engineering for more information 1.262.376.4800

CONVEYOR DESIGN RECOMMENDATIONS

Return Ways

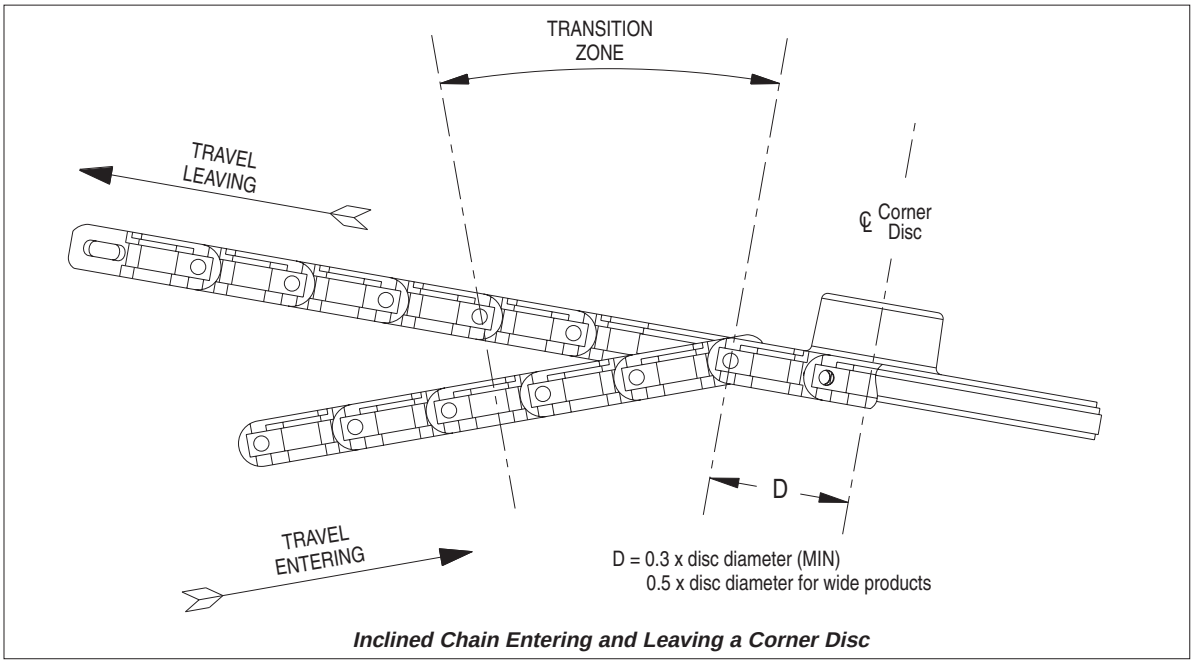
Multiflex Incline Conveyors

CAUTION To assure proper functioning of these conveyors it is important that:

⇨The chain enters and leaves the disc in the same plane as the disc

⇨In the transition zone, the wearstrips should be curved to accomplish smooth transition from one plane to the next

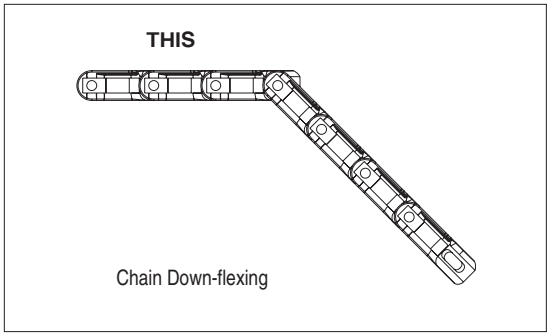
⇨The maximum angle of incline or decline for an application depends on product stability and friction between chain and product



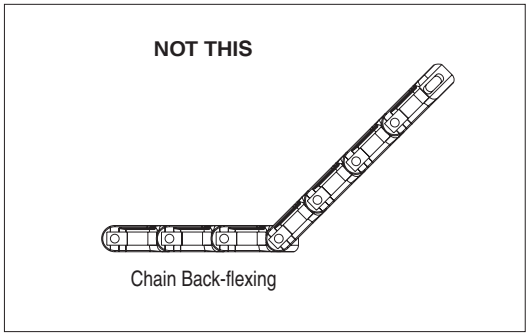
Inclined Chain Entering and Leaving a Corner Disc

⇨When inclining, the chain must pass through a transition zone **prior** to entering the disc

⇨The disc should be tipped so that it lies in the same plane as the chain exiting the disc



⇨Any change in angle of chain travel should be made by down-flexing the chain as shown



⇨Back-flexing through a change in angle will cause the chain to rise out of the conveyor frame

Return Ways

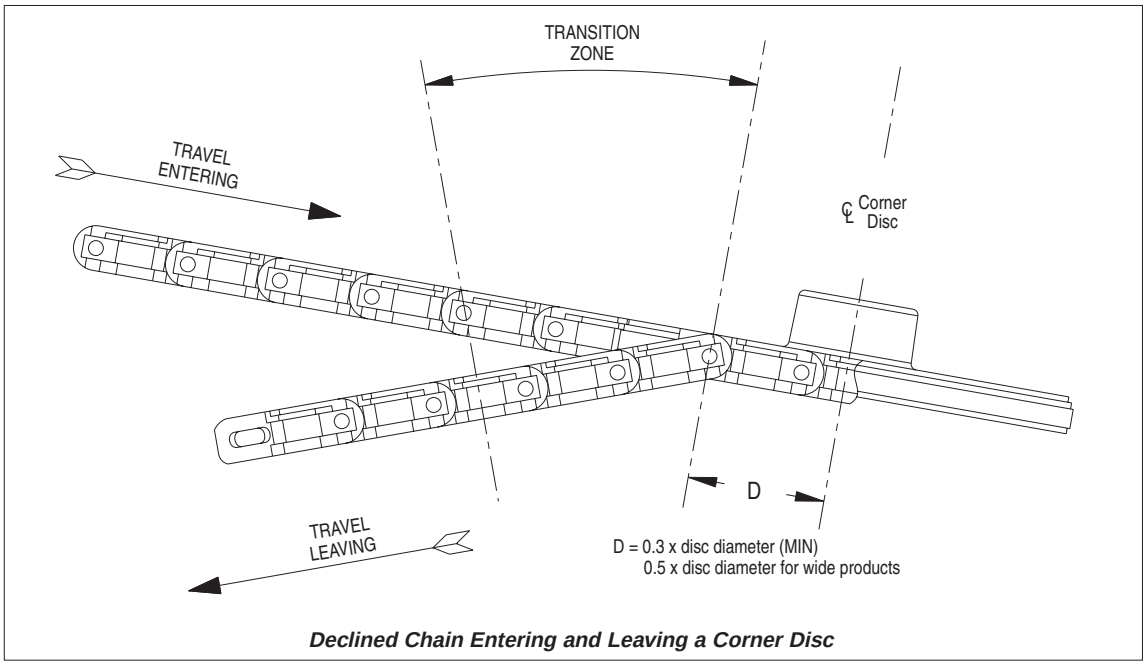
Multiflex Incline Conveyors

CAUTION To assure proper functioning of these conveyors it is important that:

⇨The chain enters and leaves the disc in the same plane as the disc

⇨In the transition zone, the wearstrips should be curved to accomplish smooth transition from one plane to the next

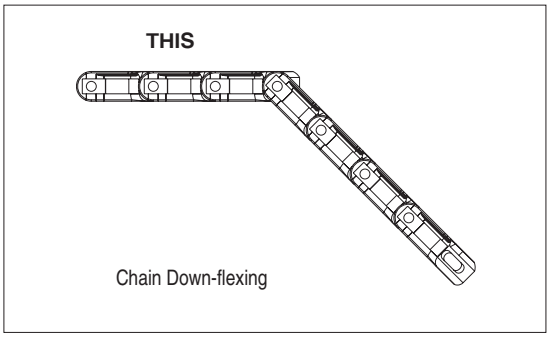
⇨The maximum angle of incline or decline for an application depends on product stability and friction between chain and product



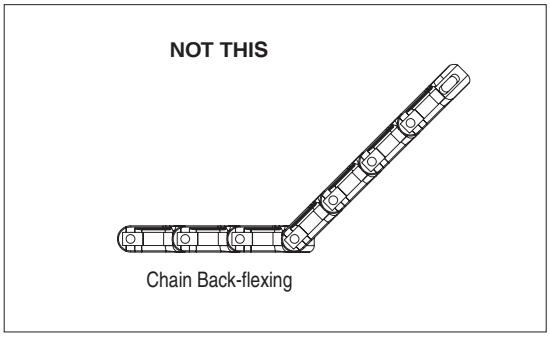
Declined Chain Entering and Leaving a Corner Disc

⇨When inclining, the chain must pass through a transition zone **prior** to entering the disc

⇨The disc should be tipped so that it lies in the same plane as the chain exiting the disc



⇨Any change in angle of chain travel should be made by down-flexing the chain as shown



⇨Back-flexing through a change in angle will cause the chain to rise out of the conveyor frame

CONVEYOR DESIGN RECOMMENDATIONS

Return Ways

Catenary Sag

⇨The function of the catenary is to allow a place for excess chain to accumulate

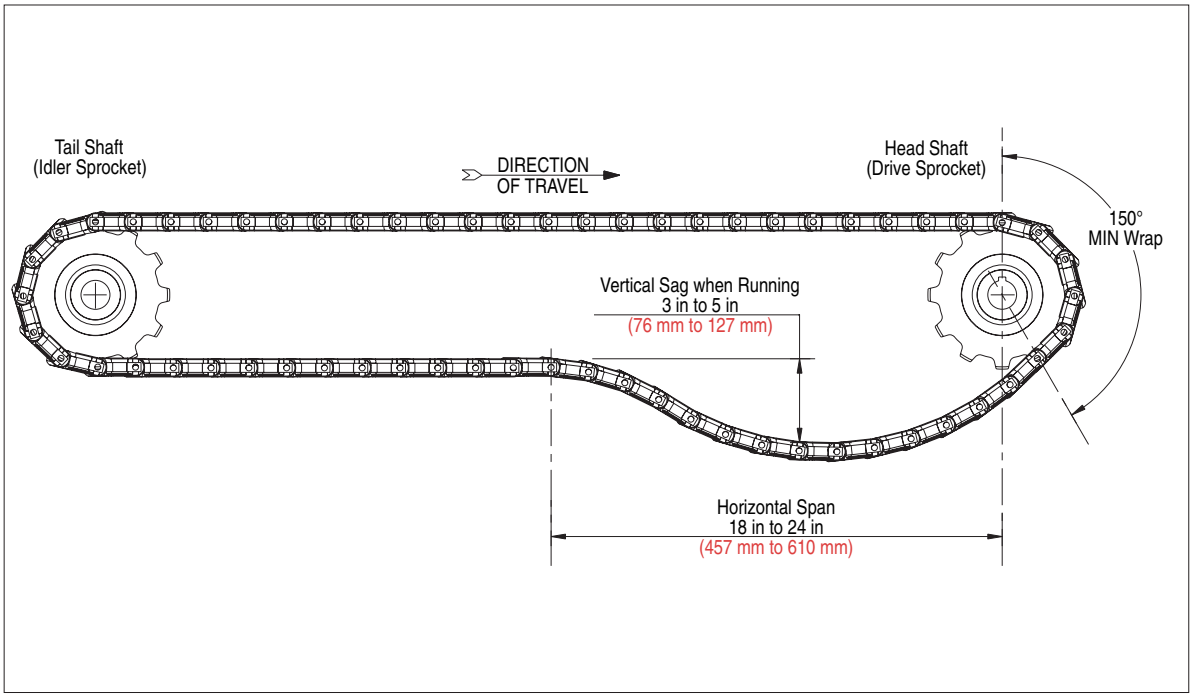
⇨Rex® Multiflex chains should never be run tight

⇨The catenary sag should be measured when running

⇨If catenary sag is excessive or increases due to wear, it should be adjusted by removing links to obtain the proper sag

⇨Take-ups are typically not recommended

⇨The catenary sag should be located as close to the drive as possible



CAUTION

The catenary sag area must be free of all obstructions, such as frame cross-members, supports, drive components, that can damage the chain or inhibit proper catenary sag.

Return Ways

Entry Radius for Sliding Returns

CAUTION

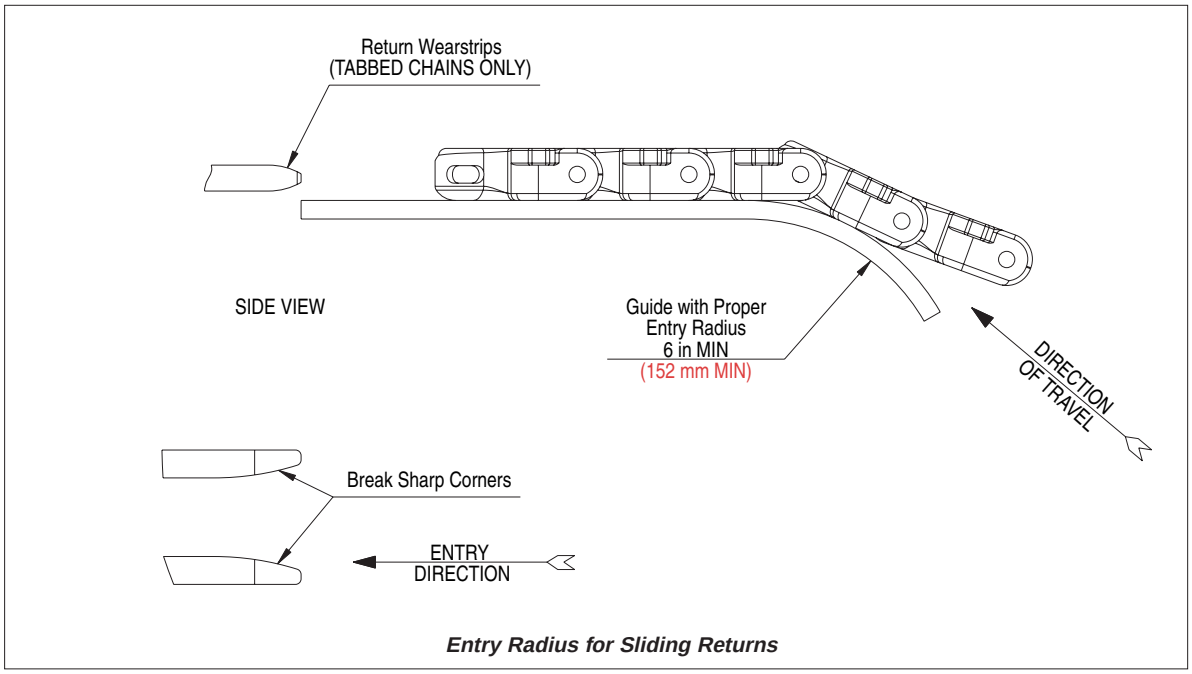
⇨Provide a generous entry radius to the return section which permits the chain to feed smoothly into the return ways

⇨The entry radius should be greater than the minimum back-flex radius of the chain (see table below)

⇨Rexnord recommends a 6 in (152 mm) minimum entry radius to prevent non-uniform wear

⇨When returning a chain on its TABs, guide the chain onto the return wearstrips using a guide shoe (see table on page EM - MF - 15 for proper guide clearance)

⇨At the entry of the return wearstrips, provide rounded corners to prevent catching or snagging of the chain flights



Entry Radius for Sliding Returns

Back-Flex Radius Table		
Chain Style	**Min. Back-flex Radius**	
	in	mm
1700, AC1700, 1701, 1701TAB, AC1701TAB, 1702, 1755, 2500TAB, 2550TAB	1.50	38.1
1757TAB, LBP1757TAB	4.00	101.6
1765	2.50	63.5

CONVEYOR DESIGN RECOMMENDATIONS

Sprocket and Wearstrip Location

⇨The distance from the end of the wearstrip to the sprocket shaft centerline should equal dimension "C"; otherwise the wearstrip will interfere with the free articulation of the chain as it enters the sprocket

⇨The leading edges of the wearstrip should be beveled

⇨The following formulas and dimensions used in conjunction with the figure will give the proper shaft and wearstrip positioning:

Sprocket Location for Conventional Chains

A = (Pitch Diameter/2) - E

C = One Chain Pitch (which ensures support under chain at all times)

⇨See table below for C & E dimensions

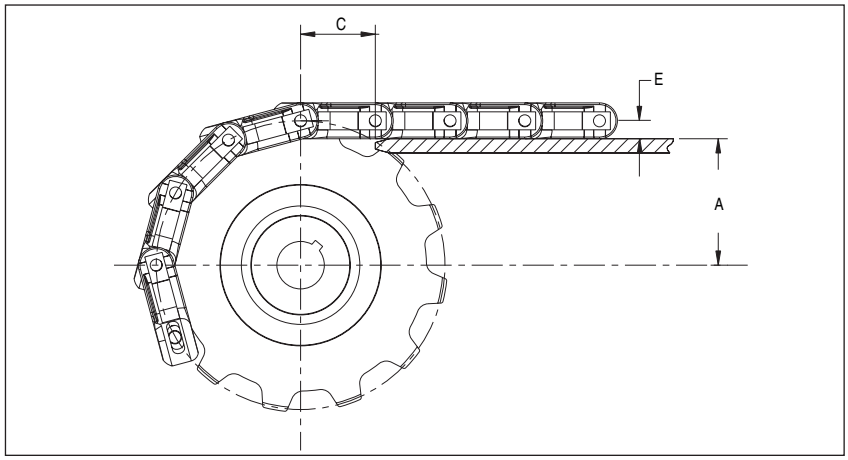
Example:
For a 1700 chain utilizing a 10T sprocket:

A = (Pitch Diameter/2) - E = (6.369 in/2) - 0.470 in = 2.715 in
C = 1.97 in

Metric:
A = (Pitch Diameter/2) - E = (161.77 mm/2) - 11.94 mm = 68.95 mm
C = 50.0 mm

✓Tolerances

A = +0.03 in / -0.00 in (+0.8 mm / -0.0 mm)
C = +0.25 in / -0.00 in (+6.3 mm / -0.0 mm)



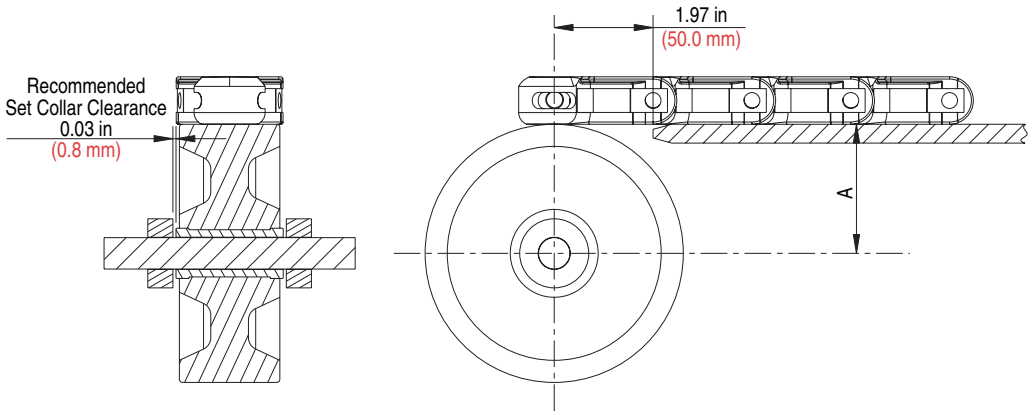
Shaft Drop Values - For Conventional Chains					
Chain Series	Chain Numbers	"C" Dimension		"E" Dimension	
		in	mm	in	mm
1700	1700, AC1700	1.97	50.0	0.470	11.94
1701	1701	1.97	50.0	0.480	12.19
1701TAB	1701TAB, AC1701TAB	1.97	50.0	0.480	12.19
1702	1702	1.97	50.0	0.480	12.19
1755	1755	1.58	40.0	0.250	6.35
1765	1765	1.97	50.0	0.470	11.94
2500TAB	2500TAB	3.00	76.2	0.700	17.78
2550TAB	2550TAB	3.00	76.2	0.700	17.78

For 1757 chains, see page EM - TT - 26 (TableTop® section).

Contact Rexnord Application Engineering for more information 1.262.376.4800

Idler Wheel and Sprocket Location (Stationary Shafts Only)

⇨For proper location and smooth operation, the idler wheels should be mounted slightly below the top of the wearstrips



Idler Wheel	"A" Dimension		Chains Used
	inches	mm	
1700-8T Idler Wheel	2.57	65.3	1701, 1701TAB, 1702, 1765
1757-10.5T Idler Wheel	2.95	74.95	1757

Idler Wheel Location

Shafting Recommendations for Stationary Tail Shafts

Recommended Materials:

⇨Carbon Steel (dry environments only)
⇨Stainless Steel

Suggested Hardness:

⇨25 to 30 Rc

Suggested Surface Finish:

⇨63 µ-in Ra

✓Rexnord recommends rotating shafts in bearings. If bearings are not used, the following are guidelines for operating Rex® Multiflex sprockets on stationary shafts:

Sprocket	Max. Recommended Chain Speed	
	FPM	MPM
N - Acetal	0 - 50	0 - 15
UHMWPE	0 - 50	0 - 15
NS - Nylon, Split	0 - 50	0 - 30
LF Bushing (Idler Wheel)	0 - 50	0 - 90
Bronze Bushing	0 - 50	0 - 150
Bearings	Recommended for Speeds > 300	Recommended for Speeds > 90

Contact Rexnord Application Engineering for more information 1.262.376.4800

CONVEYOR DESIGN RECOMMENDATIONS

Keyway and Setscrew Sizes

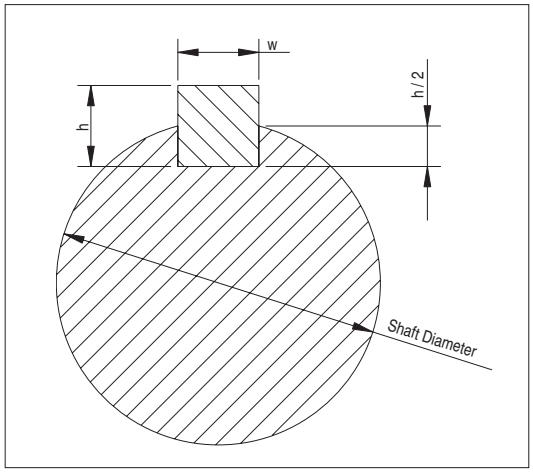
English:

Shaft Diameter	KEYWAY Key Width (w)	KEYWAY Key Height (h)	KEYWAY Keyseat Depth (h/2)	Setscrew Size
> 9/16" to 7/8"	3/16"	3/16"	3/32"	1/4-20
> 7/8" to 1-1/4"	1/4"	1/4"	1/8"	3/8-16
> 1-1/4" to 1-3/8"	5/16"	5/16"	5/32"	3/8-16
> 1-3/8" to 1-3/4"	3/8"	3/8"	3/16"	3/8-16
> 1-3/4" to 2-1/4"	1/2"	1/2"	1/4"	1/2-13
> 2-1/4" to 2-3/4"	5/8"	5/8"	5/16"	1/2-13

Metric:

Shaft Diameter	Key Width (w)	Key Height (h)	Keyseat Depth (h/2)	Setscrew Size
> 22mm to 30mm	8mm	7mm	3.5mm	M6 x 1
> 30mm to 38mm	10mm	8mm	4mm	M8 x 1.25
> 38mm to 44mm	12mm	8mm	4mm	M10 x 1.5
> 44mm to 50mm	14mm	9mm	4.5mm	M10 x 1.5
> 50mm to 58mm	16mm	10mm	5mm	M12 x 1.75
> 58mm to 65mm	18mm	11mm	5.5mm	M12 x 1.75

Rexnord uses ANSI Standards for Keyway Dimensions.



Keyed round bore sprockets are available with one setscrew as standard. Additional setscrews can be provided upon request. Metric round bore sprockets are not supplied with setscrew as standard

CAUTION

If multiple strands share a tail shaft, key only one sprocket and allow others to rotate. Collars should be utilized to prevent floating.

Split Sprocket Bore Nomenclature

Shaft Ready - Tight fit on the shaft with a keyway and setscrew.

Plain Bore - Same tight fit bore as the shaft ready bore, but without a keyway and setscrew.

Idler Bore - Round bore with a clearance fit (no keyway or setscrew). Designed to spin freely on the shaft.

Rough Stock Bore - Wide tolerance bore used for work in process. Not for use on any shaft. Must be further machined for actual use.

Rex® TableTop® CALCULATION PROGRAM

The Rex® TableTop® Calculation Program is available to perform chain pull calculations for specific conveyor applications.

To obtain the most recent calculation program:

⇨Download from Technical Support at: http://www.rexnord.com/flattop

⇨Contact Application Engineering

Prior to performing chain pull calculations, the following information is needed:

⇨Chain style, material and width
⇨Wearstrip material
⇨Corner disc or corner track material
⇨Lubrication conditions
(i.e. dry, water, soap and water, oil)
⇨Chain speed (FPM) or (MPM)
⇨Product weight (lbs/ft) or (kg/m)
⇨Product material
⇨Number of starts per hour (e.g. indexing conveyors)
⇨Percent of time product accumulation occurs
(i.e. slippage)
⇨Portion of conveyor where product accumulation occurs
⇨Conveyor layout with dimensions

The calculation output sheet contains the following information:

⇨Calculated headshaft chain tension
⇨Maximum allowable headshaft chain tension
⇨Percent of allowable chain tension
⇨Total horsepower required with an assumed gearbox efficiency of 100%
⇨Calculated corner tension (PV)
⇨Maximum allowable corner tension

If the percent of allowable chain tension is 100% or less, your conveyor application is within chain capacity.

CAUTION The horsepower requirement the program calculates is the "design horse power" that is required to power the conveyor based on the input parameters. Additional considerations should be made for the type of drive used, efficiency losses in the power train, as well as any gearbox manufacturer's recommendations.

If the calculated corner tension is less than the maximum allowable corner tension, your conveyor application is within chain PV capacity.

The Rex® TableTop® Chain Calculation Program calculates the following:

⇨Carousel conveyor analysis
(i.e. offset wrap drive conveyors)
⇨Universal conveyor analysis
(i.e. alpine systems, multiple loading systems)
⇨Catenary sag vs. length vs. tension
⇨Catenary sag vs. length vs. excess chain
⇨Product backline pressure (due to accumulation)

CAUTION The Rex® TableTop® Calculation Program does not take environmental conditions into consideration. This calculation program **ONLY** provides information on whether the chain is within capacity.

Friction Formulas

⇨When inclining or declining, the coefficient of friction must be modified between chain and wearstrip (Fw)

Incline: $Fw_{incline} = (Fw_{horizontal} \times Cos\emptyset) + Sin\emptyset$

Decline: $Fw_{decline} = (Fw_{horizontal} \times Cos\emptyset) - Sin\emptyset$

For an example of calculating chain speed, see page EM - TT - 31 (TableTop® Section).

MULTIFLEX PRODUCT SIZES AND WEIGHTS

Typical Product Sizes and Weights

Content		Container Material	Container Size	Base Dimensions		Weight Full		Single File		En Masse	
				inches	mm	lbs	kg	lbs/ft	kg/m	lbs/ft²	kg/m²
Dairy	Milk	Paper	1/2 Pint	3 x 3	76.2 x 76.2	0.60	0.27	2.4	3.6		
		Paper	Pint	3 x 3	76.2 x 76.2	1.10	0.50	4.4	6.5		
		Paper	Quart	3-1/8 x 3-1/8	79.4 x 79.4	2.30	1.04	8.8	13.1		
		Paper	1/2 Gallon	4-1/8 x 4-1/8	104.8 x 104.8	4.50	2.04	13.1	19.5		
		Plastic	Gallon	6 x 6	152.4 x 152.4	8.90	4.04	17.8	26.5		
	Yogurt	Plastic	6 oz	2-5/8" Ø	66.7Ø	0.40	0.18	1.8	2.7	9.7	46.9
		Plastic	6 Pack / 4 oz Containers	5 x 7	127 x 177.8	1.57	0.71	3.8	5.6		
	Cottage Cheese	Plastic	1/2 lb	4 Ø	101.6Ø	0.60	0.27	1.8	2.7	6.2	30.3
		Plastic	1 lb	4-3/4 Ø	120.7Ø	1.10	0.50	2.8	4.1	8.1	39.4
		Plastic	2 lb	5 Ø	127Ø	2.30	1.04	5.5	8.2	15.3	74.4
Beverages	Concentrated Juice	Paper	12 oz	2-5/8 Ø	66.7Ø	1.00	0.45	4.6	6.8	24.1	117.2
	Juice	Plastic	Gallon	6 Ø	152.4Ø	1.17	0.53	2.3	3.5	5.4	26.3
		Glass	Gallon	6 Ø	152.4Ø	3.59	1.63	7.2	10.7	16.6	80.6
		Paper	6.75 oz Box (Tetra)	1-1/2 x 2-1/4	38.1 x 57.2	0.48	0.22	3.8	5.7		
		Plastic	10 Pack / 6.75 Boxes (Tetra)	3 x 10-1/2	76.2 x 266.7	4.87	2.21	19.5	29.0		
	Soft Drink	Aluminum	250 ml PET	2-5/64 Ø	52.9Ø	0.63	0.29	3.6	5.4	24.3	117.4
		Aluminum	12 oz	2.6 Ø	66.0Ø	0.85	0.39	3.9	5.8	20.9	101.8
		Plastic	500 ml PET	2-37/64 Ø	65.5Ø	1.16	0.53	5.4	8.0	29.0	141.0
		Plastic	20 oz PET	2-7/8 Ø	73.0Ø	1.37	0.62	5.7	8.5	27.6	134.1
		Plastic	1 Liter PET	3-3/16 Ø	81.0Ø	2.31	1.05	8.7	12.9	37.8	183.7
		Plastic	1-1/2 Liter PET	4-3/16 Ø	106.4Ø	3.40	1.54	9.7	14.5	32.2	156.7
		Plastic	2 Liter PET	4-1/2 Ø	114.3Ø	4.40	2.00	11.7	17.5	36.1	175.7
		Plastic	3 Liter PET	5-1/8 Ø	130.2Ø	6.38	2.89	14.9	22.2	40.4	196.3
	Beer	Glass	12 oz	2-1/2 Ø	63.5Ø	1.50	0.68	7.2	10.7	39.9	194.0
		Glass	12 oz Non-Returnable	2-3/4 Ø	69.9Ø	1.20	0.54	5.2	7.8	26.4	128.1
		Glass	16 oz Non-Returnable	2-3/4 Ø	69.9Ø	1.60	0.73	7.0	10.4	35.2	170.8
		Glass	32 oz	2-5/8 Ø	66.7Ø	3.40	1.54	15.5	23.1	82.0	398.6
		Glass	64 oz	3-5/8 Ø	92.1Ø	3.88	1.76	12.8	19.1	49.1	238.6
		Aluminum	12 oz	2.6 Ø	66.0Ø	0.85	0.39	3.9	5.8	20.9	101.8
		Paper	12 Pack / 12 oz Cans	10-3/4 x 7-3/4	273.1 x 196.9	10.40	4.72	11.6	17.3		
		Paper	12 Pack Fridge Pack	16 x 4-7/8	406.4 x 123.8	10.32	4.68	7.7	11.5		
		Paper	24 Pack / 12 oz Cans	16 x 10-3/4	406.4 x 273.1	20.16	9.14	15.1	22.5		
		Paper	24 Pack / 12 oz Cans (cube)	10-3/4 x 7-3/4	273.1 x 196.9	20.16	9.14	22.5	33.5		
		Paper	18 Pack / 12 oz Cans	16 x 7-3/4	406.4 x 196.9	14.69	6.66	11.0	16.4		
		Paper	30 Pack / 12 oz Cans	13-1/2 x 7-3/4	342.9 x 196.9	24.48	11.10	21.8	32.4		
	Wine / Champagne	Glass	750 ml	2-7/8 Ø	73.0Ø	2.88	1.31	12.0	17.9	57.9	281.9
		Glass	1.5 Liter	4-1/4 Ø	108.0Ø	6.37	2.89	18.0	26.8	58.6	284.9
		Glass	12 oz	2-1/2 Ø	63.5Ø	1.22	0.55	5.9	8.7	32.5	157.8
		Paper	4 Pack / 12 oz Bottles	5-1/8 x 5-1/4	130.2 x 133.4	5.07	2.30	11.9	17.7		
	Coffee	Metal	1/2 lb	4-1/8 Ø	104.8Ø	0.80	0.36	2.3	3.5	7.8	38.0
		Metal	1 lb	4-1/8 Ø	104.8Ø	1.30	0.59	3.8	5.6	12.7	61.7
		Metal	2 lb	5-1/4 Ø	133.4Ø	2.50	1.13	5.7	8.5	15.1	73.3
		Metal	3 lb	6-1/4 Ø	158.8Ø	3.80	1.72	7.3	10.9	16.2	78.6
Food	Baby Food	Glass	Regular	2-3/8 Ø	60.3Ø	0.56	0.25	2.8	4.2	16.5	80.3
	Baby Food	Glass	Junior	2-3/8 Ø	60.3Ø	0.80	0.36	4.0	6.0	23.6	114.8
	Soup	Metal	10.5 oz	2-5/8 Ø	66.7Ø	0.76	0.34	3.5	5.2	18.3	89.1
	Soup	Metal	18.5 oz	3-1/8 Ø	79.4Ø	1.33	0.60	5.1	7.6	22.6	110.0
	Soup	Metal	32 oz	4 Ø	101.6Ø	1.90	0.86	5.7	8.5	19.7	96.0
	Cracker	Paper	10 oz Box	2-1/4 x 5-1/4	57.2 x 133.4	0.72	0.33	3.8	5.7		
	Peanut Butter	Plastic	18 oz	3 Ø	76.2Ø	1.15	0.52	4.6	6.8	21.2	103.3
	Jelly	Glass	32 oz	3-5/16" Ø	84.1Ø	2.15	0.98	7.8	11.6	32.6	158.6
	Jelly	Glass	18 oz	2-5/8 Ø	66.7Ø	1.62	0.73	7.4	11.0	39.1	189.9
	Catsup	Plastic	24 oz	2-1/4 x 3-3/4	57.2 x 95.3	1.63	0.74	8.7	12.9		
	Apple Sauce	Glass	23 oz	3-5/16 Ø	84.1Ø	2.05	0.93	7.4	11.1	31.1	151.2
	Mayonaise	Glass	32 oz	4 Ø	101.6Ø	3.03	1.37	9.1	13.5	31.5	153.1
	Cereal	Paper	14 oz Box	2-3/8 x 7-1/2	60.3 x 190.5	1.06	0.48	5.4	8.0		
	Vegetable	Metal	14.5 oz	2-15/16 Ø	74.6Ø	1.04	0.47	4.2	6.3	20.0	97.5
	Tuna	Metal	12 oz Can	4 Ø	101.6Ø	0.88	0.40	2.6	3.9	9.1	44.5
	Tomato Sauce	Metal	29 oz	4 Ø	101.6Ø	2.07	0.94	6.2	9.2	21.5	104.6
Cleaners	Dish Soap	Plastic	25 oz	2-7/16 x 3-3/8	61.9 x 85.7	1.78	0.81	8.8	13.0		
	Liquid Laundry Soap	Plastic	22 oz	2 x 3-3/8	50.8 x 85.7	1.60	0.73	9.6	14.3		
	Liquid Laundry Soap	Plastic	32 oz	2-5/8 x 4-1/2	66.7 x 114.3	2.30	1.04	10.5	15.6		
	Liquid Laundry Soap	Plastic	100 oz	5-1/2 x 7-3/4	139.7 x 196	7.01	3.18	15.3	22.8		
	Liquid Bleach	Plastic	Quart	3-1/4 Ø	82.6Ø	2.40	1.09	8.9	13.2	37.8	183.5
	Liquid Bleach	Plastic	1/2 Gallon	4-3/4 Ø	120.7Ø	4.80	2.18	12.1	18.0	35.4	171.9
	Liquid Bleach	Plastic	Gallon	6-1/4 Ø	158.8Ø	9.50	4.31	18.2	27.1	40.4	196.5
	Liquid Bleach	Plastic	182 oz	7-1/4 Ø	184.2Ø	8.16	3.70	13.5	20.1	25.8	125.5
Toiletries	Toilet Paper	Paper	Individual Roll	4-1/4 Ø	108.0Ø	0.23	0.10	0.6	1.0	2.1	10.3
	Toilet Paper	Plastic	4 Pack	4-1/4 x 8-1/2	108 x 215.9	0.93	0.42	2.6	3.9		
	Toilet Paper	Plastic	24 Pack	12 x 15-1/2	304.8 x 393.7	5.67	2.57	5.7	8.4		
Automotive	Tire	Passenger	Typical	28 Ø	711.2 Ø	35.00	15.87				
	Tire	Truck	Typical	48 Ø	1219.2 Ø	150.00	68.03				