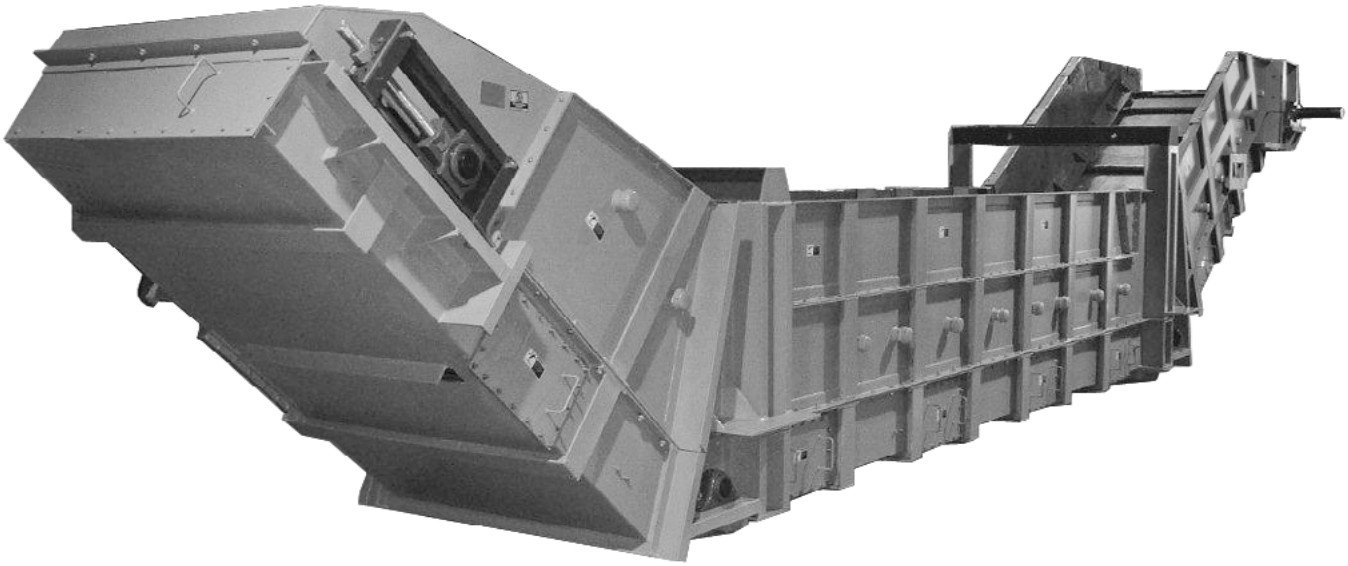
Drag Conveyors



DRAG CONVEYORS **PAGE**

Drag Conveyors

Martin has a long history of designing and manufacturing drag conveyors dating back more than 60 years to the Fort Worth Steel's "incline drag flight elevator".

Currently we offer a broad line of standard and made-to-order drag conveyors to meet our customer's conveying requirements, be it conveying grains or heavy abrasive materials. We have handled these materials in the horizontal, inclined and vertical planes. Martin is ready and willing to help design and manufacture the drag you need for your special application.

Martin offers flat bottom and round bottom drags for conveying relatively free flowing non- abrasive materials in a horizontal or slight incline.

Our mill duty drag conveyors were developed to handle abrasive and potentially hot materials by combining the features of our flat bottom and super duty drags with a very heavy duty construction. We have designed and manufactured submerged drags to handle ash from boilers and industrial incinerators.

Our l path line of drags was designed to handle materials at inclines greater than 20 degrees up to and including vertical. The L-path drag has also been redesigned using abrasive resistant steel liners and flights as well as a forged type chain to convey more abrasive products.

To assure the quality of our drags, Martin has invested in the latest cutting, forming and welding equipment, such as laser cutting equipment, high definition plasmas, CNC angle punches, CNC machining equipment as well as robotics. We also manufacture our own sprockets, our own take-ups and line of inspection doors.

To assure the best service and availability in the industry, Martin is able to manufacture our drag conveyors in nine locations throughout north America.

We are always driven to provide the highest quality service, products and value to our customer without compromising safety.

Easy Application Chart

Drag Type	Materials	Capacity Range	Length Range	Incline Range	Chain Type	Flight Type	Speeds Range
Martin Flat Bottom (MFB™)	Non Abrasive	2800 CFH to 32000 CFH	20' to 200'	0 to 10 degrees	Welded Steel	Non-metallic	100 to 200 FPM
Martin Mill Duty Flat Bottom (MMD™)	Abrasive	1422 CFH to 14063 CFH	20' to 250'	0 to 10 degrees	142, WD & WS	Metallic	25 to 100 FPM
Martin L/S – Flat Bottom (MLP™)	Non Abrasive	600 CFH to 15000 CFH	20' to 125'	20 to 90 degrees	WS & 142	Non-metallic	50 to 100 FPM
Martin Round Bottom (MRB™)	Non Abrasive	2000 CFH to 30000 CFH	20' to 200'	0 to 20 degrees	Welded Steel	Non-metallic	100 to 200 FPM

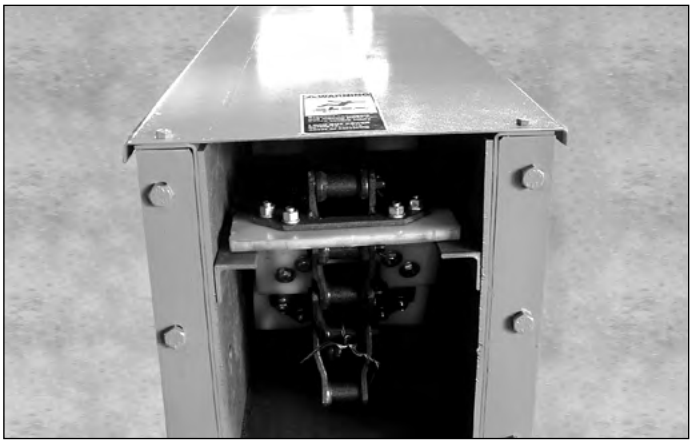
In all the above type drags the material should be relatively free flowing and not sticky.
Particle shape and particle size is also critical to a drags proper operation.
• The above recommendations are general in nature and specific to applications should be directed to Martin.

Flat Bottom
Drag Conveyor

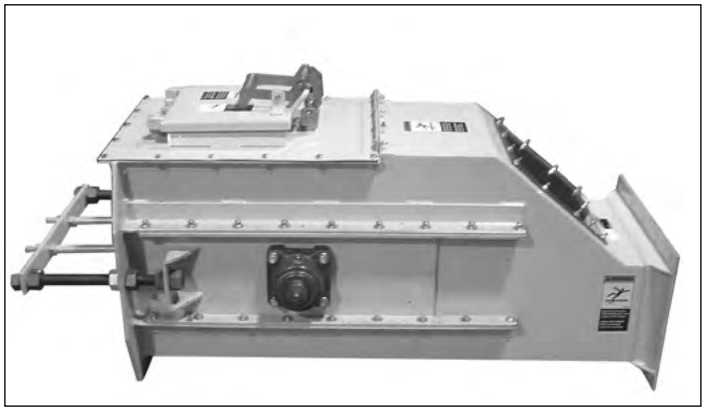
2416 MFB Flat Bottom Drag

Standard Features

- Bolted replaceable bottom
- Bolted flanged cover
- UHMW flights
- Heat treated sprockets
- Rail return system
- Flow thru inlet
- Heavy-duty backing plate



2412 MFB Intermediate



Self-Cleaning and Adjustable Tail Section

Popular Options

- Intermediate discharges
  (reduce bed depth to assure proper discharge.)
- Liners of metallic and non metallic materials
- Abrasive resistant steel bottom plates
- Feed control inlets
- Split sprockets
- Stainless steel construction
- Self-cleaning & adjustable tail sections

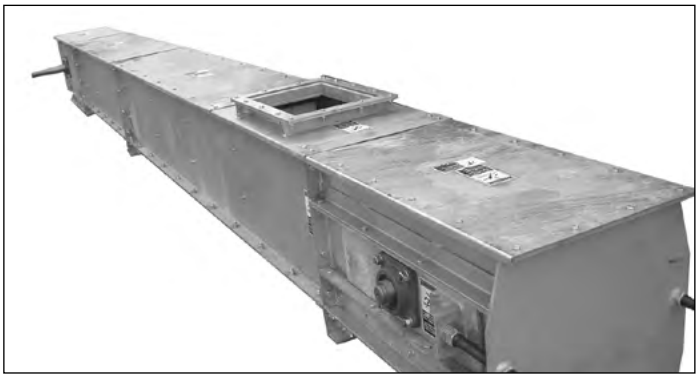
Flat Bottom Drag Conveyor

Capacity Chart for Standard Sizes

Series	1 FPM	100 FPM		125 FPM		150 FPM		175 FPM		200 FPM	
	CFH	CFH	RPM	CFH	RPM	CFH	RPM	CFH	RPM	CFH	RPM
2409	54.38	5,438	27	6,798	34	8,157	40	9,517	47	10,876	54
2412	68.25	6,825	27	8,531	34	10,238	40	11,944	47	13,650	54
2414	78.75	7,875	27	9,844	34	11,813	40	13,781	47	15,750	54
2416	89.25	8,925	27	11,156	34	13,388	40	15,619	47	17,850	54
2418	96.19	9,619	27	12,024	34	14,429	40	16,833	47	19,238	54
3016	111.56	11,156	23	13,945	29	16,734	34	19,523	40	22,312	46
3018	121.13	12,113	23	15,141	29	18,170	34	21,198	40	24,226	46
3020	133.88	13,388	23	16,735	29	20,082	34	23,429	40	26,776	46
3024	159.38	15,938	23	19,923	29	23,907	34	27,892	40	31,876	46

1. Capacities based on 90% loading with a free-flowing material.
2. Selection of conveyors should be based upon the material's characteristic.
3. Capacities and speed will vary for other than free flowing materials.
Please Consult Martin if you have questions concerning your application.

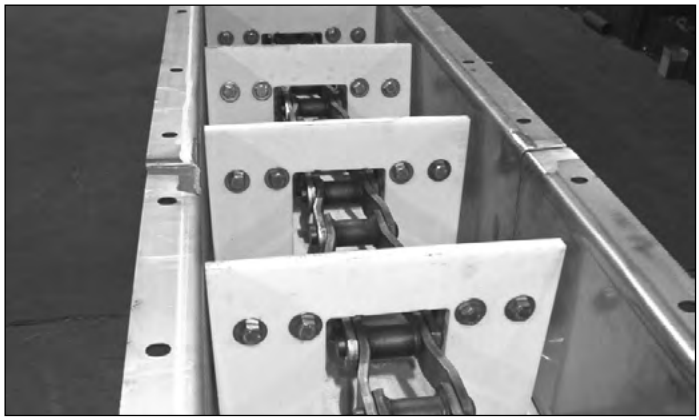
Inlets



Flow Thru Inlet

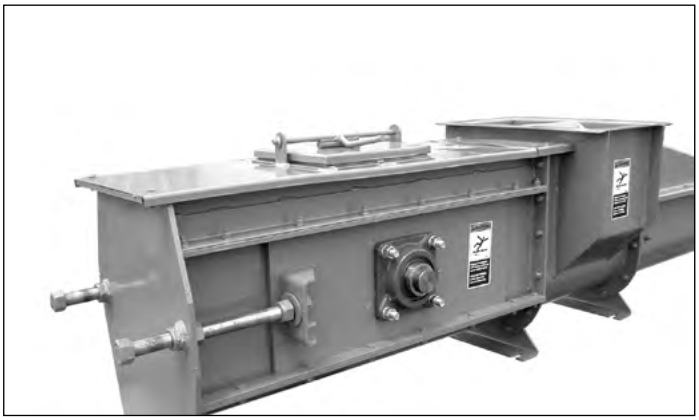
Best suited for free flowing non- abrasive materials with a controlled feed rate to the drag.

Chains



Welded Steel

Welded steel chain is our standard and can be quoted and supplied from a chain manufacture of your choice.

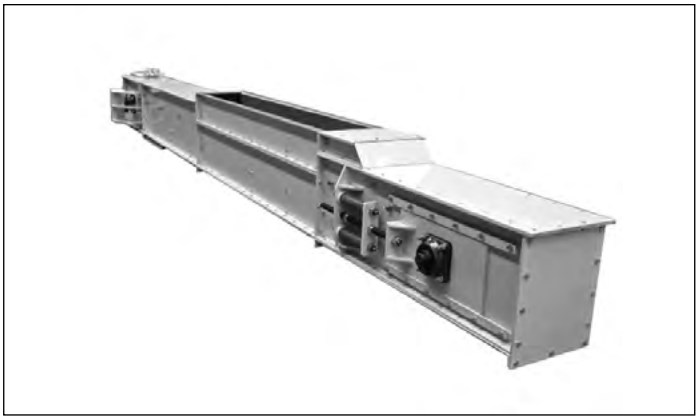


Bypass Inlet

Directs the flow of material to the carry strand of chain and flights.

142 Forged

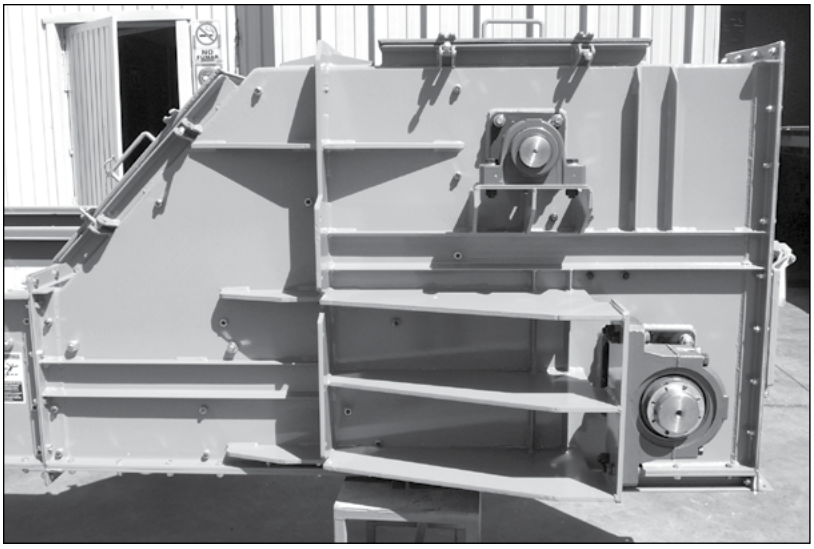
Where abrasion or heat are an issue a 142 chains can be supplied. (Other chains are available.)



Feed Control Inlet

Allows the control of feed rates at the drag, limited to use with the flat, super duty and mill duty drags.

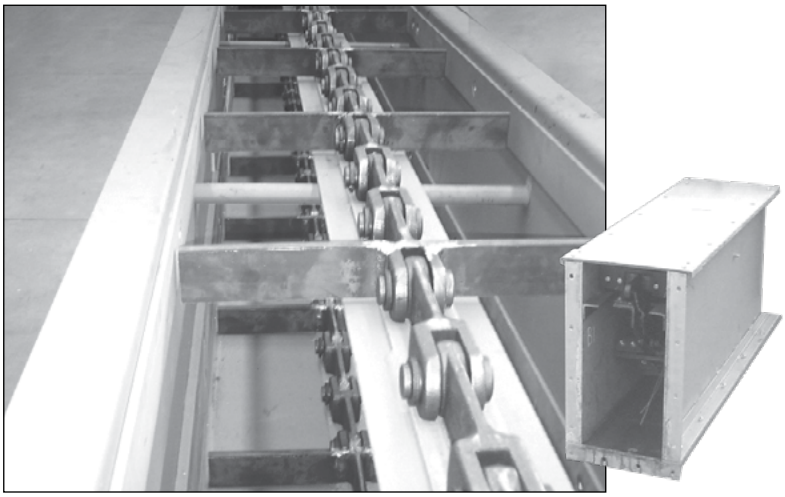
Mill Duty
Drag Conveyor



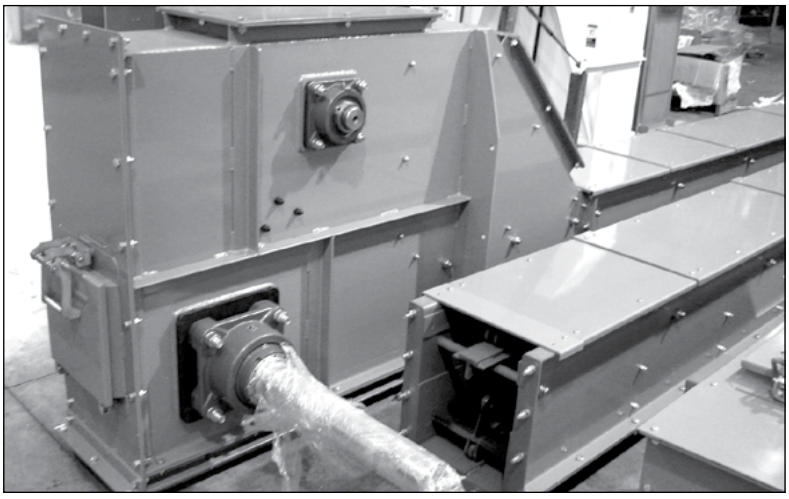
MMD Mill Duty Head with Martin Slack Side Tension Idler Sprocket

Standard Features

- Bolted replaceable bottom
- Bolted heavy flanged cover
- 142 Forged chain
- Heavy duty steel backing plates
- Non-metallic or abrasion resistant steel flights
- Heat treated split sprockets
- Center support rail return system with ar steel wear strips
- Replaceable side liners of various materials
- Flow thru inlet
- Special head section with pillow block bearings
- Heavy duty tails section with MHD take-ups and pillow block bearings



Center Support Rail Return System with AR steel Wear Strips for MMD Drag



MMD Mill Duty Head and Intermediate

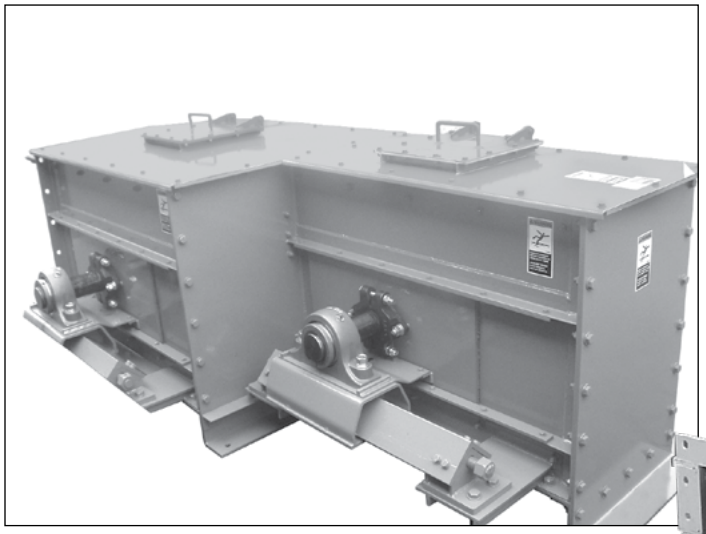
Mill Duty Drag Conveyor

Mill Duty Drag

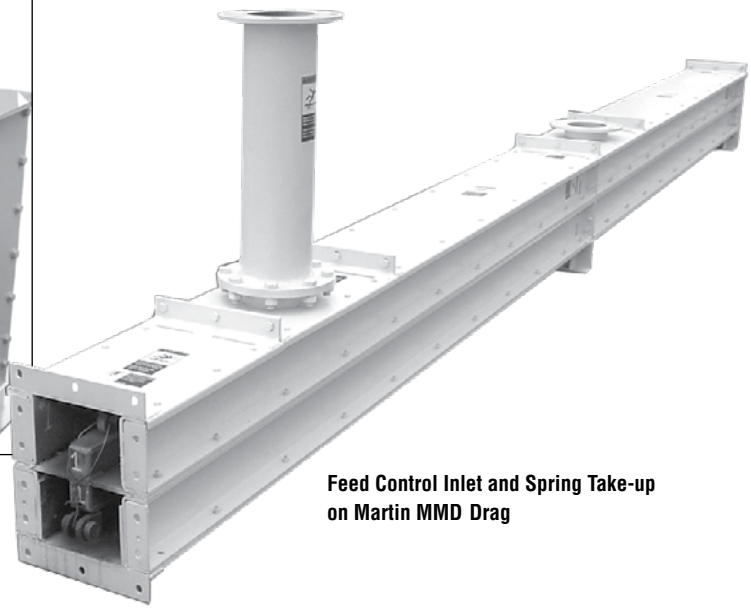
Series	FPM	25 FPM	50 FPM	75 FPM	100 FPM
	CFH	CFH	CFH	CFH	CFH
MD2412	57	1422	2844	4266	5688
MD2416	74	1859	3719	5578	7438
MD3020	118	2953	5906	8859	11813
MD3024	141	3516	7031	10547	14063

Popular Options

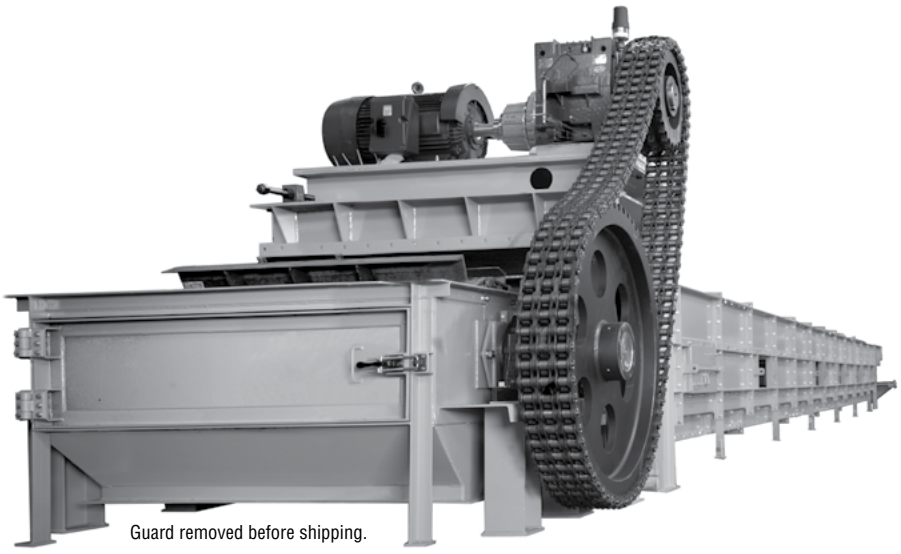
- Special chains like WDH welded steel
- Special heavy duty head section with Martin slack side tension idler sprocket assembly
- Spring loaded take-up
- Hydraulic take-up
- Stainless steel construction
- Liners of various materials both metallic and non-metallic
- Feed control inlet



Feed Control Inlet and Spring Take-up on Martin MMD Drag

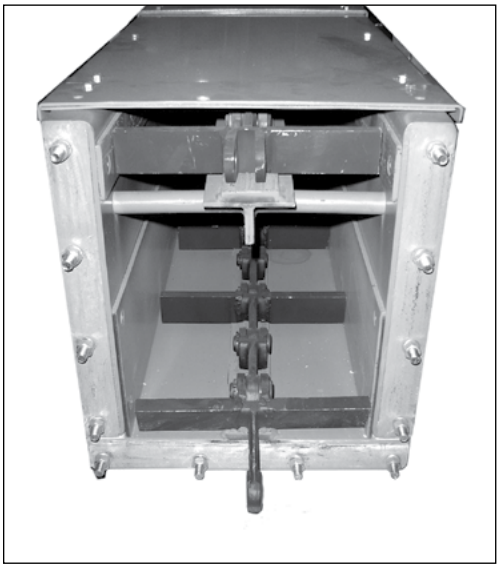


Feed Control Inlet and Spring Take-up on Martin MMD Drag



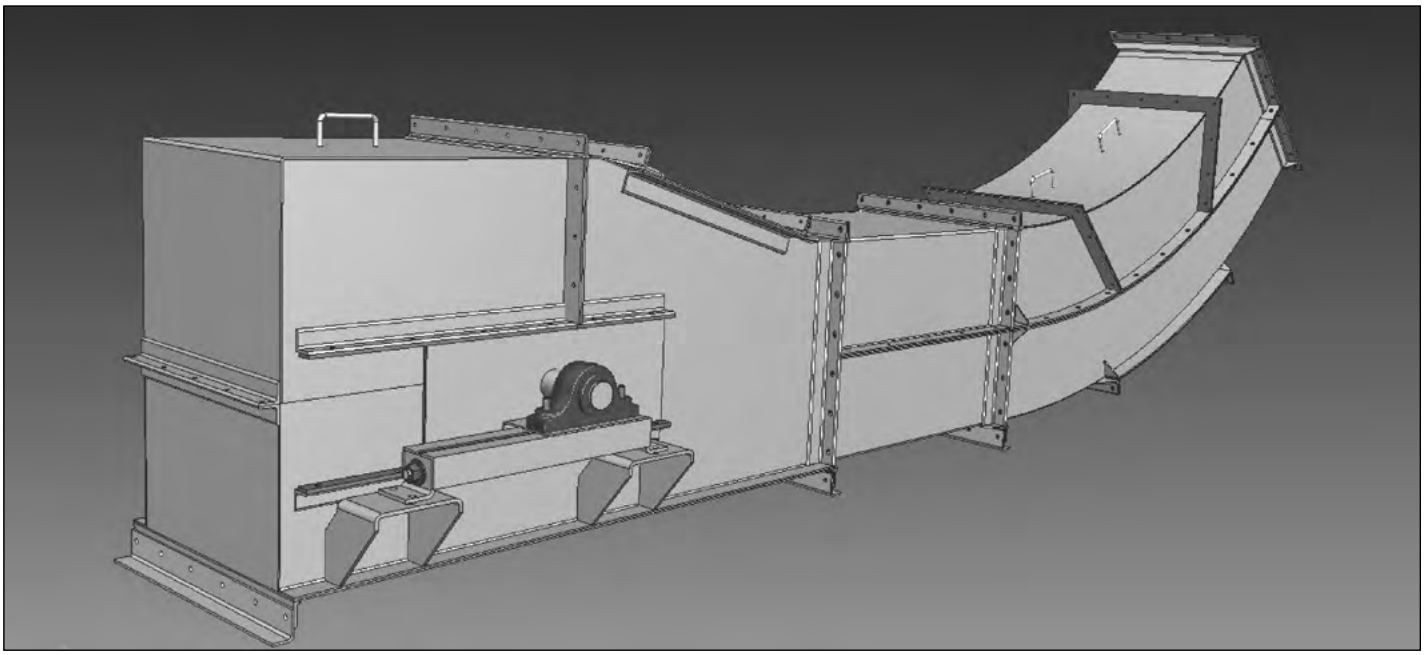
Guard removed before shipping.

Large Drag Conveyor



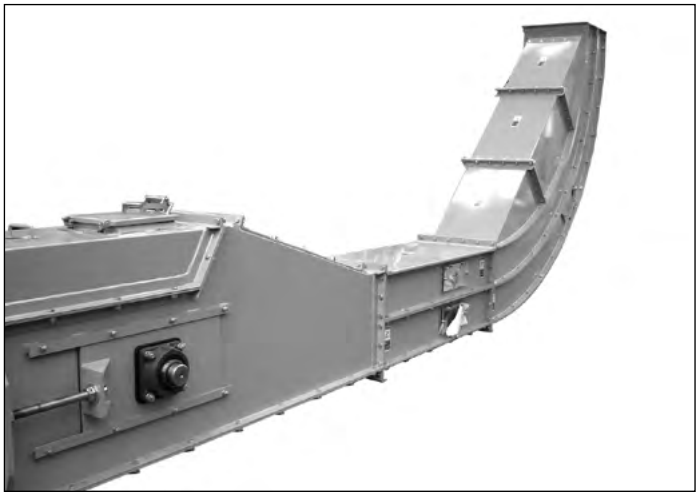
MMD Interior with 142 Chain

L-Path
Drag Conveyor



Standard Features

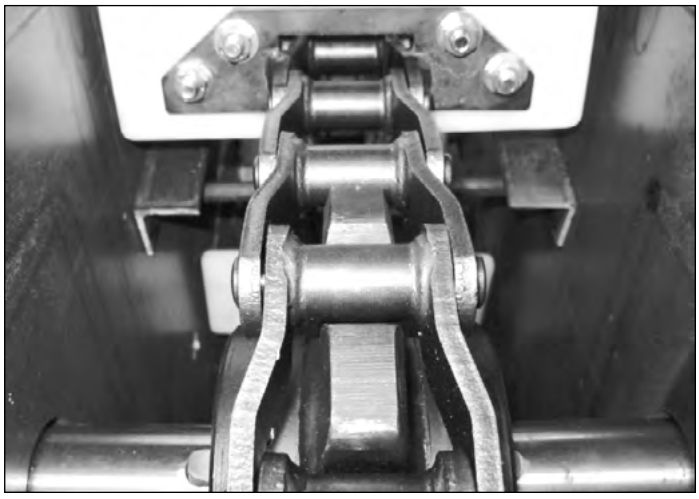
- Seven piece intermediate housing
- Welded steel chain
- Uhmw flights
- Martin ht and split sprockets
- Pillow block bearings
- Martin MHD take-ups



MMD Mill Duty Head and Intermediate

Popular Options

- 142 forged chain
- Mill duty type construction
- Abrasive resistant steel divider plates
- Special flight materials metallic and non-metallic
- Slack chain accommodating lower bend (45 to 90 degree)
- Upper bend section



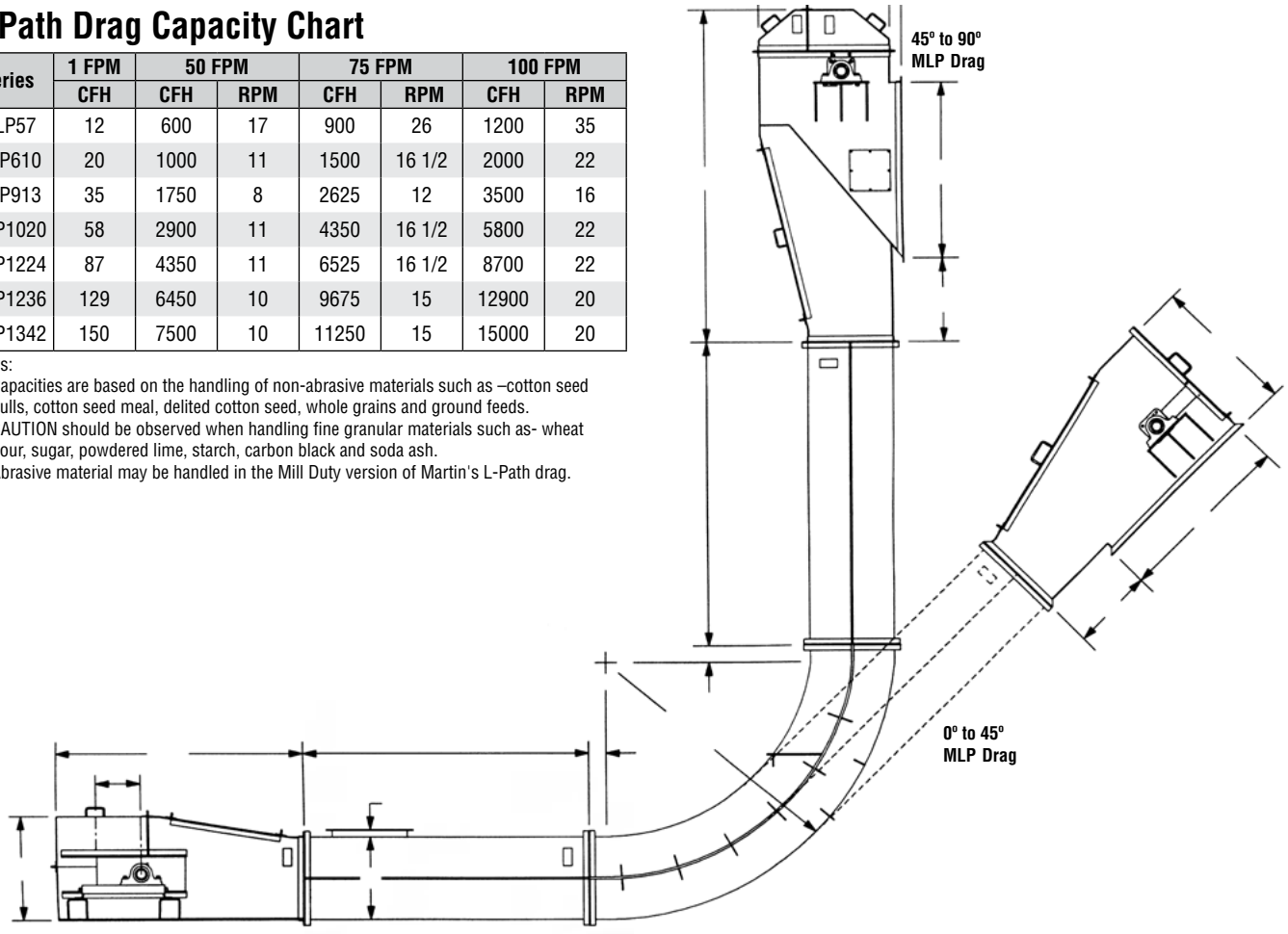
MMD Mill Duty Head and Intermediate

L-Path Drag Conveyor

L-Path Drag Capacity Chart

Series	1 FPM	50 FPM		75 FPM		100 FPM	
	CFH	CFH	RPM	CFH	RPM	CFH	RPM
MLP57	12	600	17	900	26	1200	35
MLP610	20	1000	11	1500	16 1/2	2000	22
MLP913	35	1750	8	2625	12	3500	16
MLP1020	58	2900	11	4350	16 1/2	5800	22
MLP1224	87	4350	11	6525	16 1/2	8700	22
MLP1236	129	6450	10	9675	15	12900	20
MLP1342	150	7500	10	11250	15	15000	20

Notes:
1. Capacities are based on the handling of non-abrasive materials such as –cotton seed hulls, cotton seed meal, delited cotton seed, whole grains and ground feeds.
2. CAUTION should be observed when handling fine granular materials such as- wheat flour, sugar, powdered lime, starch, carbon black and soda ash.
3. Abrasive material may be handled in the Mill Duty version of Martin's L-Path drag.



MLP Drag ready to ship

MMD Special L-Path Drag with Slack Accommodating Bend

Round Bottom Drag Conveyor

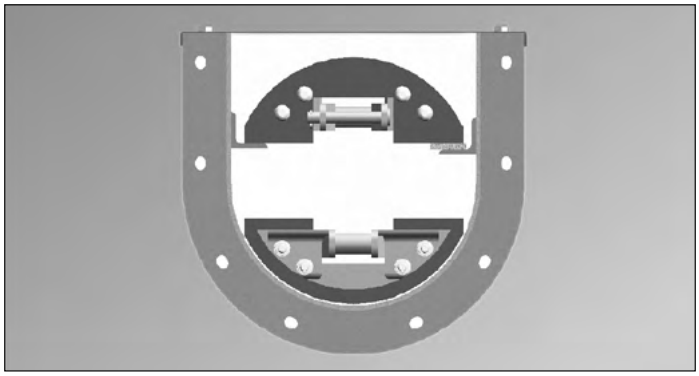
Capacity FPM / RPM

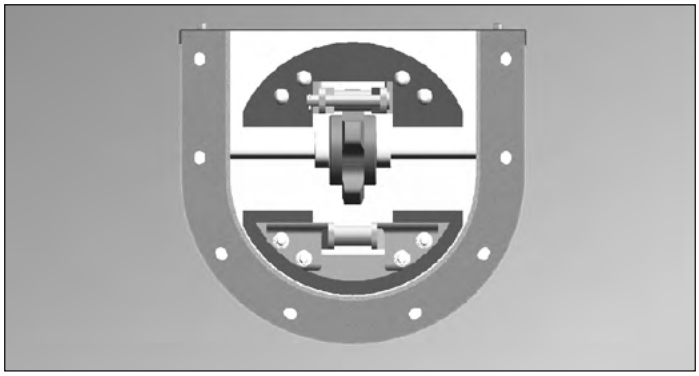
Series	Size	100 FPM		125 FPM		150 FPM		175 FPM		200 FPM	
		CFH	RPM	CFH	RPM	CFH	RPM	CFH	RPM	CFH	RPM
900	9"	2040	33	2600	41	3050	50	3500	58	4080	66
1200	12"	3475	33	4300	41	5200	50	6075	58	6950	66
1400	14"	4750	33	5900	40	7100	50	8300	58	9500	66
1600	16"	6050	32	7600	40	9150	48	10600	56	12100	64
1800	18"	8100	32	10150	40	12300	48	14300	56	16200	64
2000	20"	10500	23	13000	29	15650	35	18200	40	21000	46
2400	24"	14800	23	18150	29	22000	35	25750	40	29600	46

1. 90% loading Capacities based on with a free-flowing material.
2. Selection of conveyors should be based upon the material's characteristic.
3. Capacities and speed will vary from other than free flowing and will be reduced if idler return is used.

Please consult Martin if you have questions concerning your application.

The Martin round bottom drag is designed with the user in mind. We have incorporated larger heat-treated sprockets into the design to reduce noise, vibration and chain chordal action while increasing chain and sprocket life. Our goal is to reduce maintenance and operating costs for the user.



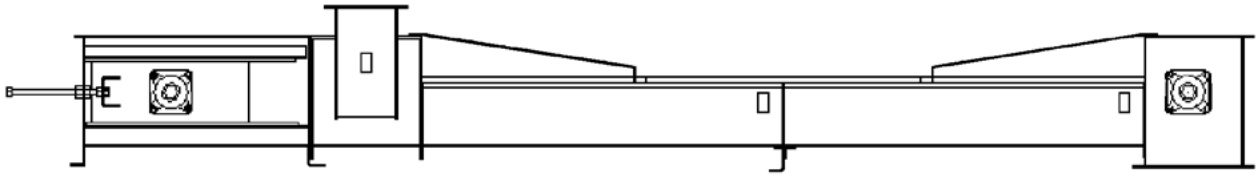


Standard Features

- Bolted flanged covers
- Welded steel chain
- Jig welded attachments
- UHMW flights with heavy duty backing plate
- Dust tight form flanged trough
- Heat treated sprockets
- Rail return system
- Flow thru inlet

Popular Options

- By-pass inlets
- Hip roof covers
- Self-cleaning tail
- Intermediate discharges
- Idler return system
- Abrasive resistant steel return wear strip
- Split sprockets



Martin Round Bottom Drag Conveyor (MRB)

Drag Conveyor Maintenance Tips

Field assembly of Martin MFB™ Drag

Assembly

Return Rails

Assure all return rails are adjusted so they match up evenly at the joints; be sure to grind any burrs off the rail joints. The vertical alignment of the rails is most critical on drags having outboard return rails.

Tightening the Chain

Tightening the chain on initial startup may require the removal of several links of chain. On drags with welded steel chain there will be a 10' section of cottered chain marked at the factory by contrasting spray paint. Do not over tighten the chain; always remember that the take-up control's the chain tension on the return strand. The carrying strand is naturally in tension.

Chain tension is one of the most import aspects of maintaining your drag. Never over tighten the drag chain. The tension should be tightened till the chain is pulled or stripped from the head sprocket but no tighter. Slack side tension can be helped by the use of mechanical devices such as an slack side tension idler sprocket or stripper rail.

An under tightened chain will want to stay engaged with the head sprocket tooth and rap around the head sprocket. A catastrophic failure can be the result of an under tensioned chain. Regular chain inspection is important especially during the initial start-up period, make take-up adjustments as needed.

On **L-path drags** the best place to watch and adjust the tension is at the bottom bend section and at the tail sprocket. The slack accommodating lower bend is an especially convenient way to look at and determine the optimum tension. Adjust tension till the chain is several inches off the divider plate and moves up and down as it runs. The chain movement is a result of chordal action caused by the sprocket (much more noticeable with sprockets having less than 12 teeth). The chain should move freely but should not hit the divider plate. The chain should be snug but not tight at the tail. The chain should disengage smoothly from the head sprocket. Once the drag is running to your satisfaction, mark on the side of the sa bend near the inspection panel the proper location of the chain so that future adjustments are easily determined. By looking through the inspection panel you can see if the chain needs adjusted or links removed. With an L-path drag of more than 30 degrees incline you control the tension from the tail to the lower bend with the take-up; gravity takes care of tension on the incline section.

On the **super duty drag** the take-up adjustment is made at the slack side tension idler sprocket in the head and at the tail. You adjust the take-ups till there is slight sag of the chain coming off the slack side tension idler sprocket, located in the head. The chain at the tail should be snug but not tight. The chain should be smoothly disengaging the head sprocket. Mark the location of the chain when it is properly tensioned on the side of the transition cover at the inspection panel near the head, making future adjustments easier.

The **flat bottom and round bottom drags** chain tension adjustment is done at the tail by tensioning the chain till it is snug but not tight, you should be able to lift the chain when the drag is not running. Observe proper lockout and tag out procedures when maintaining the drag conveyor. With the chain running confirm that the chain is disengaging the head sprocket smoothly.

The **mill duty drag**'s chain tension is either adjusted like a flat bottom drag or a super duty drag depending on the type of head section your drag is furnished with.

Sprocket Alignment

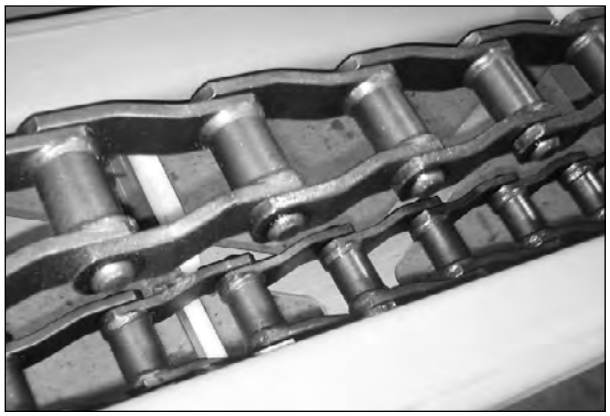
Assure that the sprocket is located in the center of the head and tail sections. Also check that all set screw or set collars are correctly tightened. Assure the sprockets are in alignment with each other, a laser is a useful tool to check sprocket alignment.

Lubrication

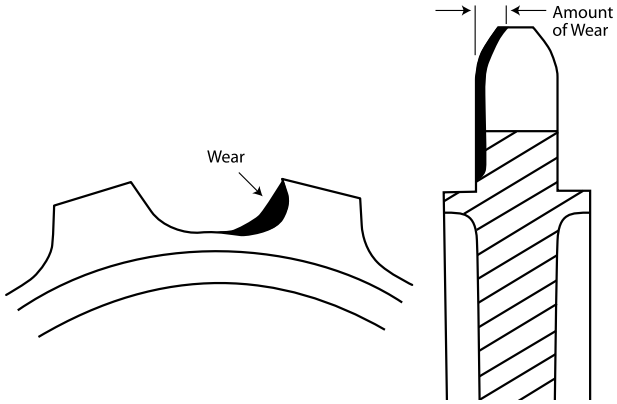
Assure that all bearings are properly lubricated with the manufacture's specified lubricant.

Assure all drives have the correct and adequate oil.

Drag Conveyor Maintenance Tips



Weld Steel Chain and MFB Tail™



Sprocket Wear

Common Operating Mistakes

Over Tightening the Chain

Over tightening the chain is the most common mistake and will cause accelerate chain and sprocket wear. Over tightening of the chain can also increase the wear of the drag flights, reduce bearings life and can cause damage to the shafts. It is better to slightly under tighten the chain than over tightening the chain.

Uneven Take-up Adjustment

Always adjust the take ups evenly and when the drag is not running. Uneven adjustment of the chain can cause accelerated chain, sprocket and flight wear. Uneven adjustment of the take ups may cause the chain to run to one side of the trough causing accelerated trough wear. It may be necessary to use the take up to get chain to run straight but should be minimized and can be an indication of an installation issue.

Not Checking Chain Wear

Set up and follow a preventative maintenance plan that includes regular inspection of the chain for stretch/wear. Chains tend to wear in during the initial operation of the chain so need to be inspected more often during the first 3 months of operation. Adjust the take-ups or remove chain links as needed to maintain proper tension.

Maintenance Tips

Chain Wear

Conveyor chain stretch is commonly used to identify when a drag chain is worn out. It is usually described as a percent of stretch and a commonly used range is 4% to 6% but it is Martin's recommendation that the user contact the chain manufacturer for their recommendation.

When replacing the drag chain it is Martin's recommendation to also replace the sprockets.

Sprocket Wear

As sprockets are worn, the drag chain tends to "cling" to the sprockets or vibrate. The amount of allowable wear is dependent on the chain type and chain size. Wear of between .12" to .24" is a good sign that the existing sprocket needs replaced. The wear appears in the root of the sprocket tooth.

Wear on the side of the tooth is an indication that the alignment of the sprockets may be incorrect. The wear may be an indication that the take-ups are not evenly adjusted or that sprockets are not in alignment. The mis-alignment can be caused by the shaft walking in the bearing or the sprocket moving caused by the set screw being loose. It is also important to assure that the shafts are parallel to each other.

Flight Wear

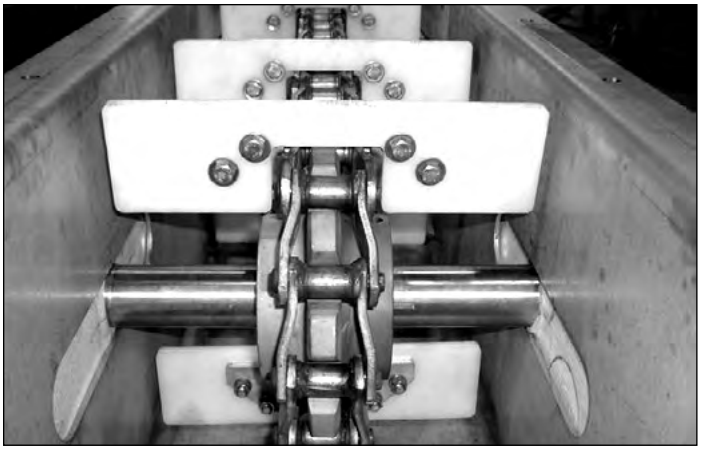
Accelerated flight wear can have several causes but the most common is the high material temperature. Material temperatures are most critical when dealing with non-metallic flights. It is important to check flight wear whenever your process has changed. Chain speed is always a component of flight wear and slower is better when wear is an issue. The chain tension should be checked if flight wear becomes an issue.

Anytime your process or the material changes it may have an effect on flight wear, chain wear and sprocket wear.

Make sure you have and follow a regular preventative maintenance inspection plan that is based on your operating conditions.

Assure you have a Safety Program that includes a Lockout/ Tag out Program.

Engineering Class Sprockets



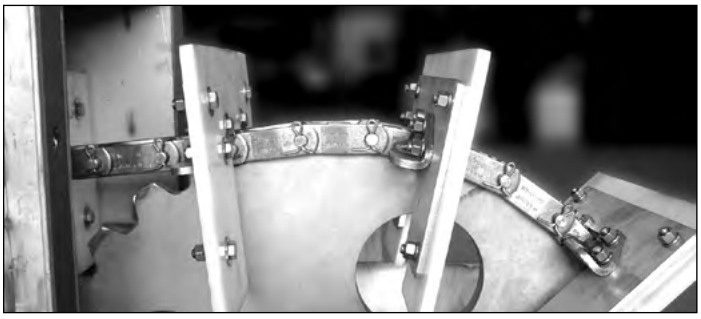
Welded Steel Chain and Sprocket

All welded steel sprockets are heat treated and most can be offered split or with segmented rim for easier replacement. All sprockets can be supplied with a shear pin hub where needed.

Wide Face Drag Sprockets

Wide face drag sprockets are available for chain numbers 102, 104, 120, 480, etc.

Wide face drag sprockets are available in QD, or MST style — induction heat treat available.



Stainless Steel Sprocket

Wide Face Sprocket with Forged Teeth

Cast Steel Sprocket

Segmented Rim Cast Sprockets

Cast Wide Face Traction Wheel

Cast Iron & Steel Sprockets

- Cast split sprockets
- Hunting tooth sprockets
- Rivetless chain sprocket
- Drag chain sprockets (plain & flanged)
- Traction wheels (plain & flanged)
- Plate body sprockets
- Chain saver rim sprockets
- Adjustable hub sprockets
- Chill rim sprockets