FIELD SERVICE MANUAL

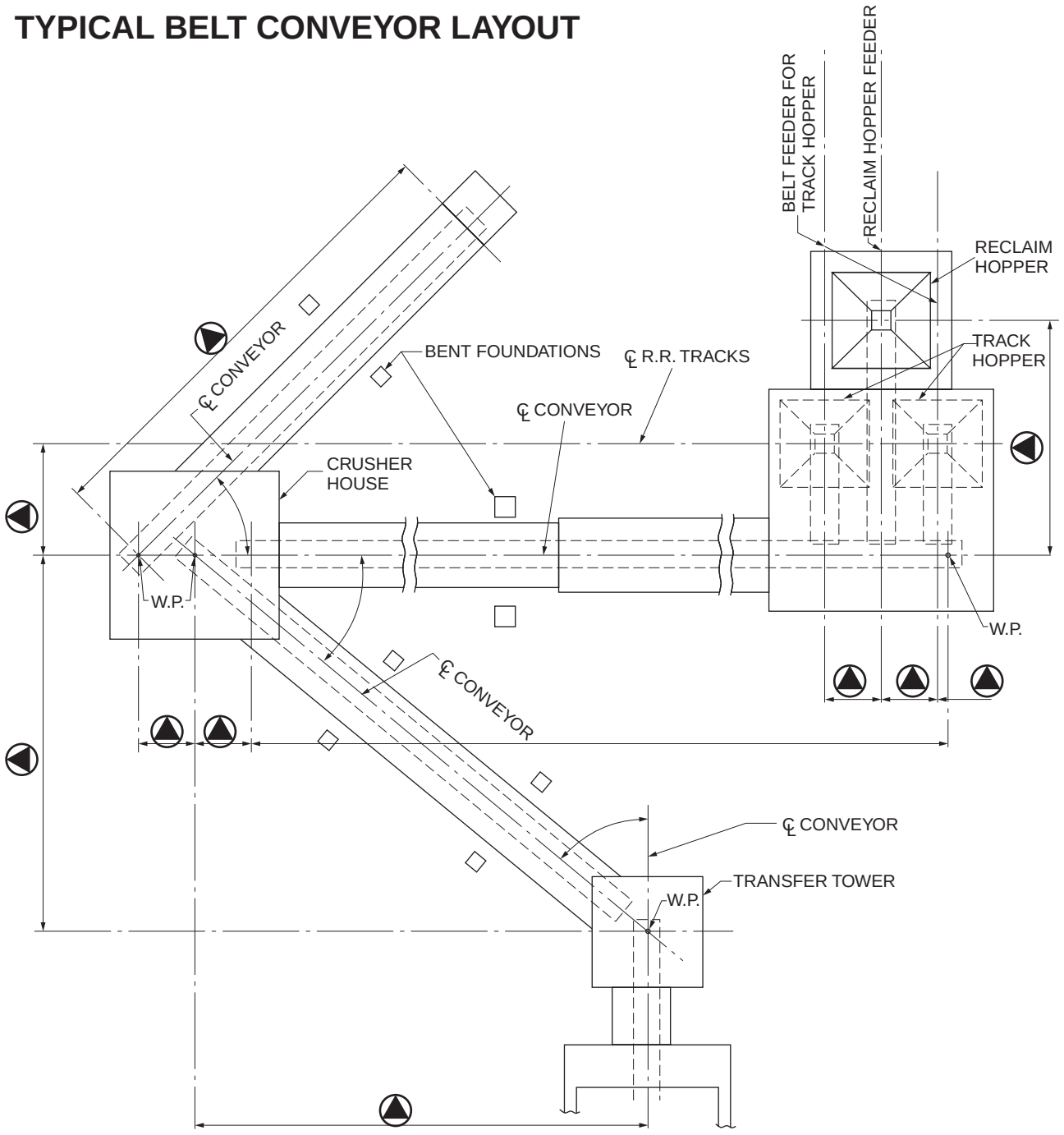
Rexnord

IMPORTANT – Safety Instructions

Compliance with safety standards, including OSHA and other Federal, State, local codes or regulations is the responsibility of the user of the conveyor installation. Placement of guards and other safety equipment in accordance with safety standards is dependent upon the area and use to which the system is put. A safety study should be made of the conveyor application and guards should be installed wherever appropriate. “Safety Standard For Conveyors And Related Equipment” ANSI B20.1 is a guide for safe construction, installation, operation and maintenance of conveyors and related equipment.

SECTION I
GENERAL BELT CONVEYOR INFORMATION

TYPICAL BELT CONVEYOR LAYOUT



The above layout illustrates a typical belt conveyor arrangement. The working points (W.P.) and centerlines (℄) of the various conveyors are shown.

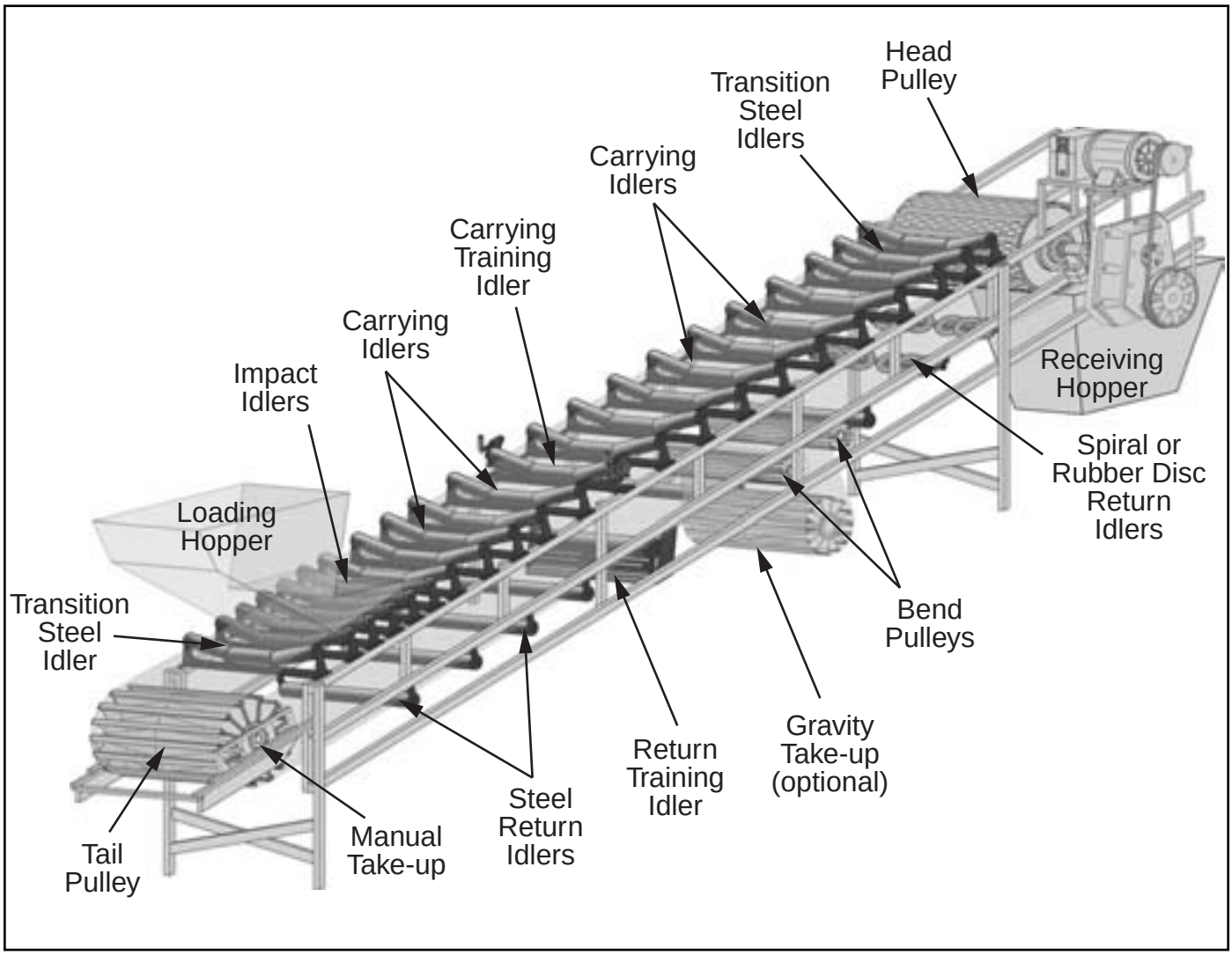
The drawings prepared by the Engineers and Equipment Manufacturers utilize this layout as a basis for foundation and conveyor designs. In addition, profile drawings must be used to show elevations of pits, tunnels, crusher house and transfer towers and related chutes.

The accuracy with which these base lines and grades are set has a direct bearing on the ease of erection of structural supports and conveyor runs.

Indicates the key dimensions from the conveyor centerlines and working points.

THE BELT CONVEYOR

The layout shown below illustrates a basic belt conveyor. Unlimited variations of elevation, loading, discharge, idlers, their spacing, pulleys and accessories are possible.



IDLER FUNCTIONS

IMPACT: Designed to absorb impact and protect the belt from sharp edged material. Normally spaced as close together as possible.

CARRYING: Support the belt and provide a trough to contain the material. Normal spacing 3 to 5 feet.

TRAINING: Used to compensate for irregular loading, wind, and other varying conditions. Normally spaced **no closer** than 50 feet to the head or tail pulley.

TRANSITION: These idlers ease the belt from a troughed configuration to the flat pulley surface reducing stress in the outer belt edges.

RETURN: Simply support the belt on its return journey. 10 feet spacing is typical.

PROBLEM-SOLVER: Since these contact the dirty side of the belt, they are normally placed prior to the belt contacting another pulley and could be **spiral, rubber disc, poly roll,** or urethane coated to resist material build up. In areas where abrasive wear is a problem, 1/4" roll

SECTION II
BELT CONVEYOR INSTALLATION INFORMATION

STEEL ERECTION

The concrete base on which the conveyor will be installed must be set accurately. The anchor bolts must be positioned exactly as shown on the general arrangement drawing. If the location of the anchor bolts is not correct, the situation must be remedied. If the error is slight, it is possible to compensate by elongating the bolt holes in the steel pads. However, if the error cannot be corrected in this manner the bolts will have to be relocated.

Any sizeable error in locating the bolts would mean additional trouble later in the erection of the conveyor. Tie in points could be missed, loading and discharge areas misdirected and interference with existing structures encountered.

See the example below and particularly note the concrete base for anchor bolts. It is apparent that if the base is not located accurately there are many areas which may cause problems as the erection progresses.

Erection should start at an anchored or lower end of the conveyor. Examination of the general arrangement drawings will show the relationship between working points and mark numbers. The mark number sequence and location must be followed during field erection.

The working points shown represent the only tie between existing and proposed steelwork, buildings **and** equipment. These points are critical and must be located with accuracy to insure correct installation of conveyors.

Accurate alignment is necessary to insure a true running belt. All steelwork must be square, level and in line. Several sections must be bolted together on the ground before lifting, taking care that the maximum allowable spans between supporting bents is not exceeded. Proper clearances must be maintained. All shafting must turn freely with bolts in place.

The frames, trusses, etc. must be installed correctly. Temporary bracing is to be used wherever necessary to handle loads which the structure may be subjected during erection.

Standard construction of fabricated steel allows for minor variation in lengths and hole locations. Minor misfits are considered a normal part of erection work. The accumulation of tolerances in foundations, grades, setting of anchor bolts, etc. make it necessary to use drift pins, reamers, gas cutting and welding equipment. Dimensional tolerances must be compensated for in fit-up.

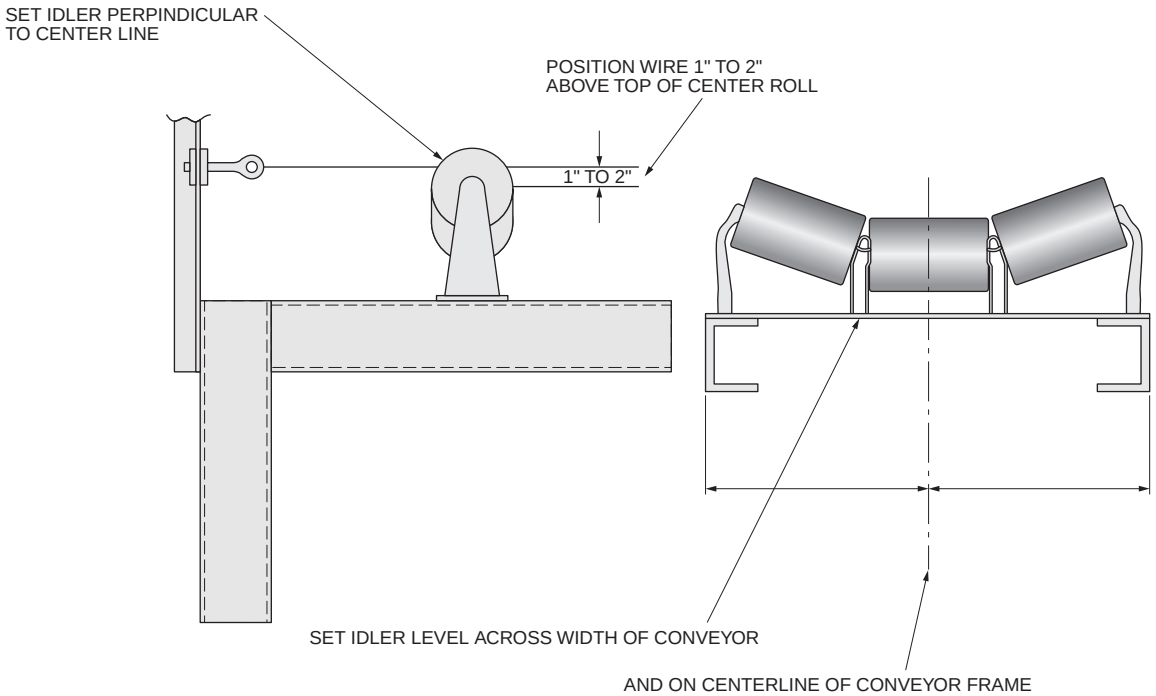
When new truss sections or conveyor units are tied into existing units, it is expected that a major amount of fit-up may be required. The accumulated tolerances are already built into the existing equipment, making the job of tie-in and alignment a matter of detail fit-up.

No welding should be done until the structure has been fit-up and properly aligned.

The conveyor stringers and decking should be set up, checked for centers, and leveled before being permanently secured to supporting members.

Before proceeding with the steel erection, a centerline for the conveyor should be established. This is done by stretching piano wire the entire length of the frame (or portions of the frame on long conveyors.) Anchor the wire at convenient points, a suggested method is given below:

1. Secure an eyebolt to a piece of steel.
2. Locate the eyebolt on the approximate centerline of the conveyor. Remember to keep the eyebolt above the center roll of the idlers.
3. Fasten eyebolt bracket to structure.
4. Install a similar eyebolt bracket at the opposite end (or at a convenient intermediate point if the frame has a bend, slope or reflex curve.)
5. String the piano wire, adjust on centerline, pull taut, and secure.



MACHINERY ERECTION

The basic working points that were used during the steel erection should now be transferred to the conveyor frame to assist in the proper location and alignment of the pulleys and idlers, etc.

When located correctly, the piano wire affords a working centerline from which measurements for alignment can be made.

The bearing pads should be leveled before installation of the pulley shaft assemblies. If shims are necessary, they should be large enough to take the entire machined surface of the bearing base.

Before installing any pulley shaft assemblies, check the general arrangement drawing for size and mark numbers.

After securing the head and tail pulley shaft assemblies, perpendicular to the line of belt travel, parallel with each other and level, it is good practice to set stop blocks against the bearings and weld these blocks to the steel. The holes in the bearing base are slotted and the stop blocks will prevent the bearings from shifting.

Install bend pulleys and the gravity take-up pulley as shown on the general arrangement drawing.

Automatic Take-Up

Be sure that the pulley turns freely and that the take-up frame slides easily to compensate for variations in belt tension. Use recommended amount of counterweight and adjust if necessary.

Manual Take-Up

Adjust the take-up so that the belt tension is sufficient to insure that the loaded belt will operate over the terminal pulleys without slipping. Excessive take-up on the belt will cause undue strain on shafting, bearings and belt splicing. It will also tend to keep the belt from troughing properly.

IDLER INSTALLATION

Storage and Preparation

If idlers and other equipment arrive on the job site in advance of their installation, some protective measures should be taken against exposure to the weather and other adverse conditions.

Rex idlers are normally shipped on skids or pallets. These should be stored so that water will not collect around them and should be covered if stored outdoors.

Before installation, idlers should be inspected and cleaned of any foreign matter that may have accumulated during storage or transit. Foreign matter on idler rolls can cause damage to the belt.

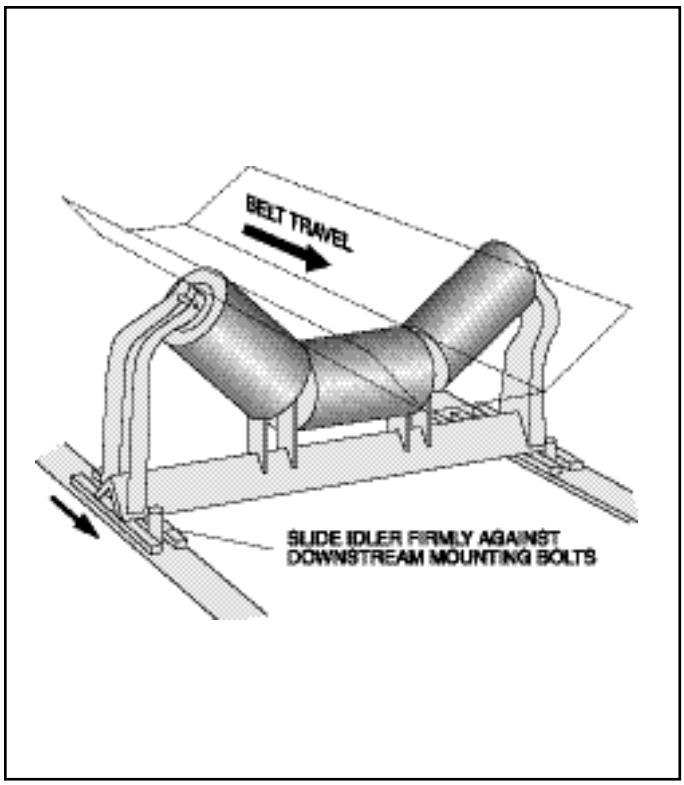
Troughing Idlers

When installing a conveyor system, troughing or carrying idlers should be installed first.

Starting at the tail end of the conveyor, the first standard troughing idler should be located an approximate distance from the centerline of the tail pulley equal to one belt width for 20° troughed idlers, $1^1/_2$ times belt width for 35° troughed idlers, and twice the belt width for 45° troughed idlers.

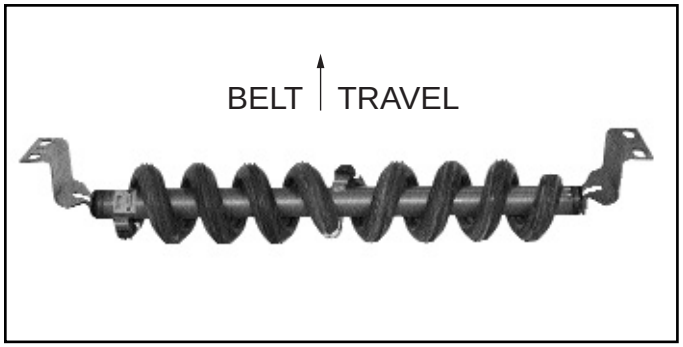
It is good practice to use a 20° troughing idler as a transition idler for the first and last idler when using 35° troughing idlers, and both a 20° and a 35° troughing idler when using 45° troughing idlers.

Place idlers in position by sliding them in the direction of belt travel firmly against the mounting bolts and lightly tighten. Final alignment requires that the center of all idlers are in a straight line, perpendicular to the line of belt travel, properly spaced, and level. When alignment is complete, bolt the idlers securely in place.



Return Idlers

After the carrying idlers have been set in place, the return idles should be installed. The return idlers must be installed perpendicular to the conveyor centerline and level. Leave the training idlers out until the belt has been properly trained.



Single return idlers are used where sticky materials adhere to the belt, where a corrosive environment is present or abrasive wear is a problem. Their unique construction minimizes belt fleet and damage to the return belt due to material build-up on the idler rolls. **Spiral return idlers can be used for belt travel in one direction only.** Install only as instructed on installation instruction tag.

BELT INSTALLATION

Position of Take-Up

The screw take-up should be set about 3" from the full forward position (toward head end of conveyor).

The gravity take-up frame should be positioned approximately one foot below the upper stop on the take-up guides. The dimension should be measured from the bottom of the upper stop of the take-up frame.

Installation of Belt

On conveyors with short centers (200-300 feet), there should be no problem in removing all of the slack from the belt.

On conveyors with long centers, it may be necessary to take two hitches while stringing the belt; one to remove slack on the return side, – then a second hitch on the carrying side. It is important to remove as much slack as possible while stringing the belt. The belt will stretch during its initial operation, which points out the importance of stringing a tight belt initially.

Handling of Belts

Conveyor belts are usually packaged in cylindrical crates which may be rolled from place to place. All crates and rolls are marked with an arrow showing the direction in which the crate or roll should be rotated.

When hoisting the belt, a bar is passed through the hole in the center of the roll. Chains or cables looped around the bar should have a spreader above the roll to avoid damage to the belt edges. Never store the belt on its edges. The belt should always be suspended on a tube or bar if it is to be stored for any length of time.

Stringing and Splicing of Belt

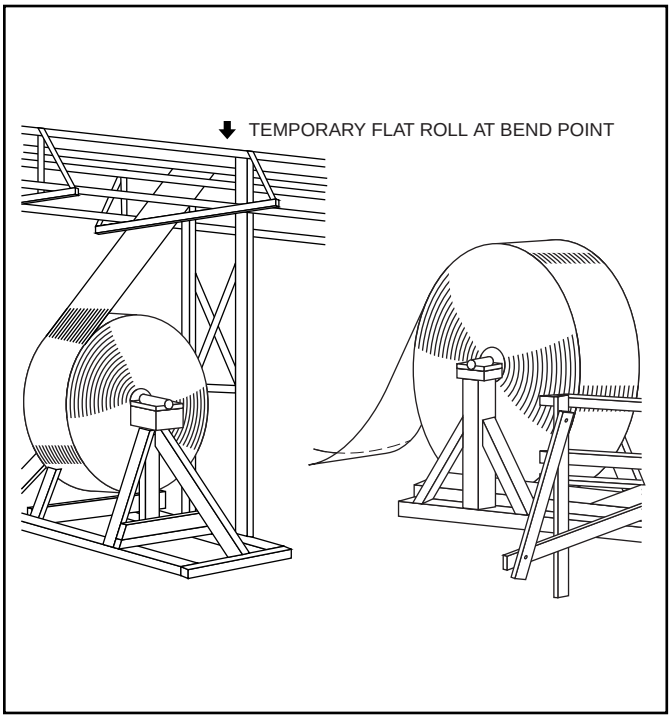
The roll of belting should be brought to a location which will allow ease of stringing. Mount the roll on a shaft and suitable structure for unrolling and threading on to the conveyor. (See sketch next page.)

NOTE

A temporary flat idler roll should be installed at the bend point of the belt.

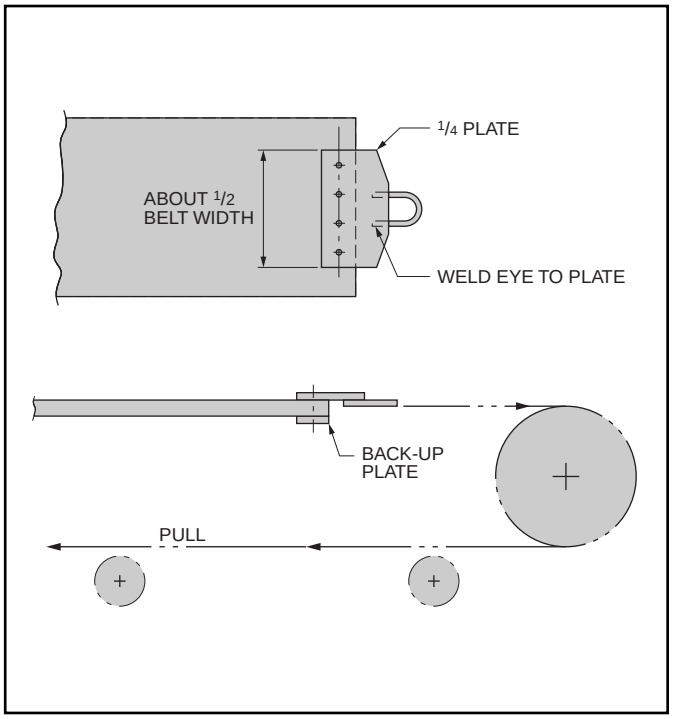
Conveyor belting is normally rolled at the factory with the carrying side out. Consequently, the belt must lead off the top of the roll if it is being fed onto the carrying idlers. If the belt is being fed onto the return idlers, it must be lead off the bottom of the roll.

In some cases, such as in mines, where head room does not permit maneuvering a roll, the belt may have to be pulled off the roll and reefed. Extreme care should be exercised to see that the loops have large bends to avoid kinking or placing undue strain on the belt. Weight should never be placed on the belt when it is in this position. (See sketch.)



Before stringing the belt, the erector should make certain that the thickets rubber cover of the belt will be on the top or load carrying side.

Holes or notches should not be cut through the belt for attaching a pull rope. A clamping device should be used to distribute the force across the belt. (See sketch.)



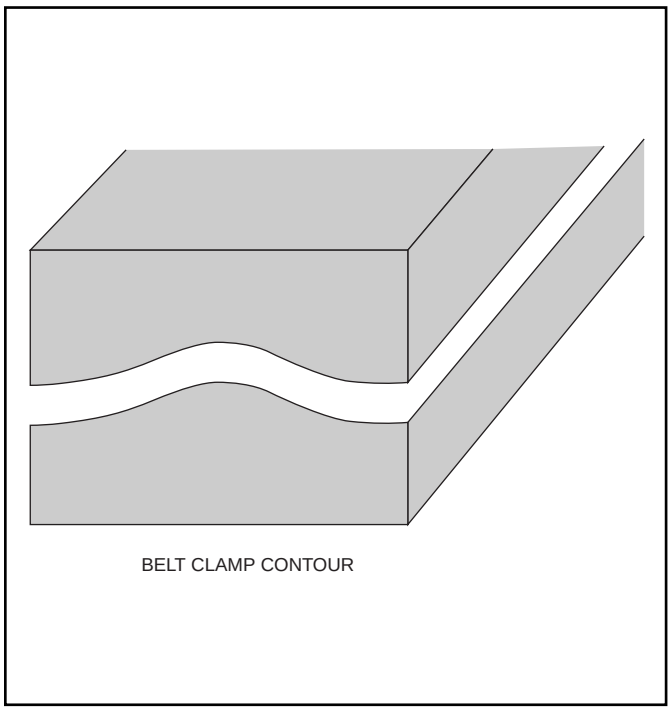
Since the clamp must pass through narrow opening, it is usually made of 1/4" plate approximately one-half of the belt width. The bolts are placed through both plates at 6" intervals and 2" from the belt end. A rope or cable is attached to this clamp by means of an eye welded to the plate. The rope or cable is then threaded over the conveyor and attached to some suitable towing device to pull the belt.

Installations having a relatively high degree of slope (12 degrees or more) must be handled with more precautions against runaway. As the belt is fed on, the tension at the roll tends to build up due to the weight of the belt on the slope. Therefore, some method of braking is required. Customary practice is to use a belt clamp, mounted on the conveyor structure, through which the belt is threaded. Where the slope is very long, additional clamps should be used, spaced approximately 1,000 feet apart.

The final splice should be made at the bottom of the slope where the splicing tension required is lowest. Making the final splice at the top is possible, but a higher tension will be required.

Tensioning the Belt

Once the belt has been pulled onto the conveyor it must be tensioned prior to splicing to avoid initial dissipation of take-up travel. The tensioning operation takes place at the location where the last splice will be made. Clamps are placed on each end of the belt. These are made of hard wood and have a clamping surface as indicated. (See sketch.)



BELT CLAMP CONTOUR

Tension is applied by means of come-alongs which are hooked on each end of the belt clamps.

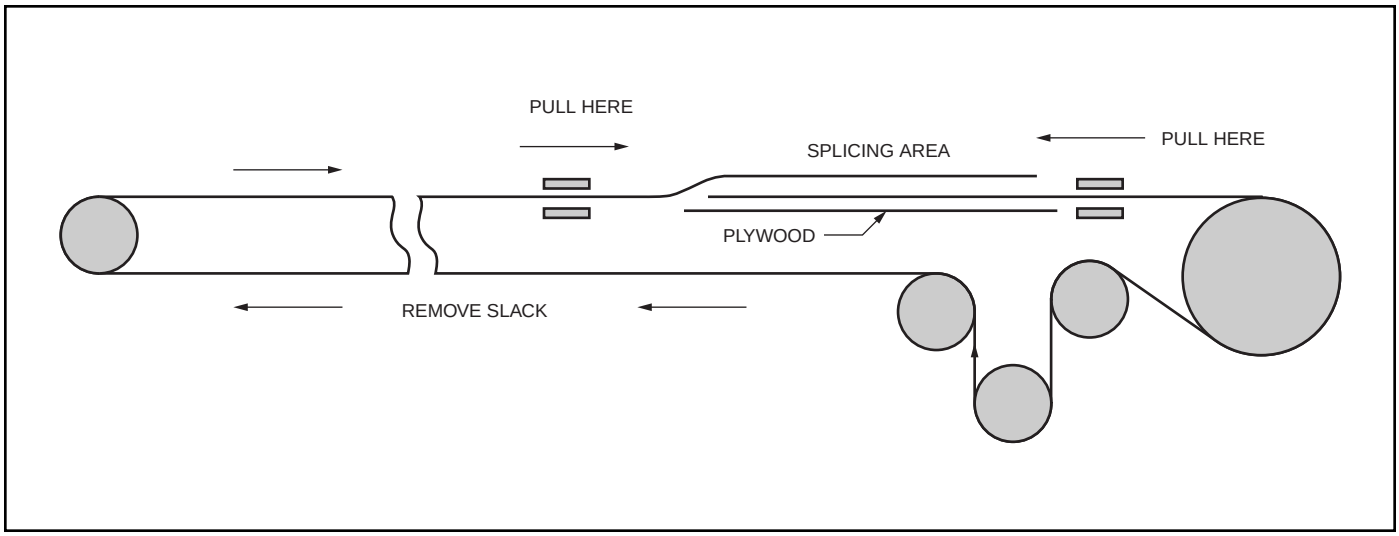
Certain basic statements can be made about splicing tensions:

1. Belts, which are clamped off on one end and tensioned by pulling in one direction only, require more splicing tension than those pulled in both directions.
2. Slope belts spliced at the top of a slope require more splicing tension than those spliced at the bottom.
3. Slope belts having an anti-rollback which **cannot** be released must be tensioned by pulling in the direction of belt travel only. Use a series of clamp-off devices to take out belt slack.
4. Check the belt frequently during tensioning to make sure that the belt is free and not binding anywhere.

Short belts may easily have too much tension applied and thus have a harmful effect on the pulley bearings as well as the belt.

On a conveyor with a gravity take-up, the splice should be made near the take-up.

It is recommended that the belting manufacturers detailed instructions are followed when making the actual splice.



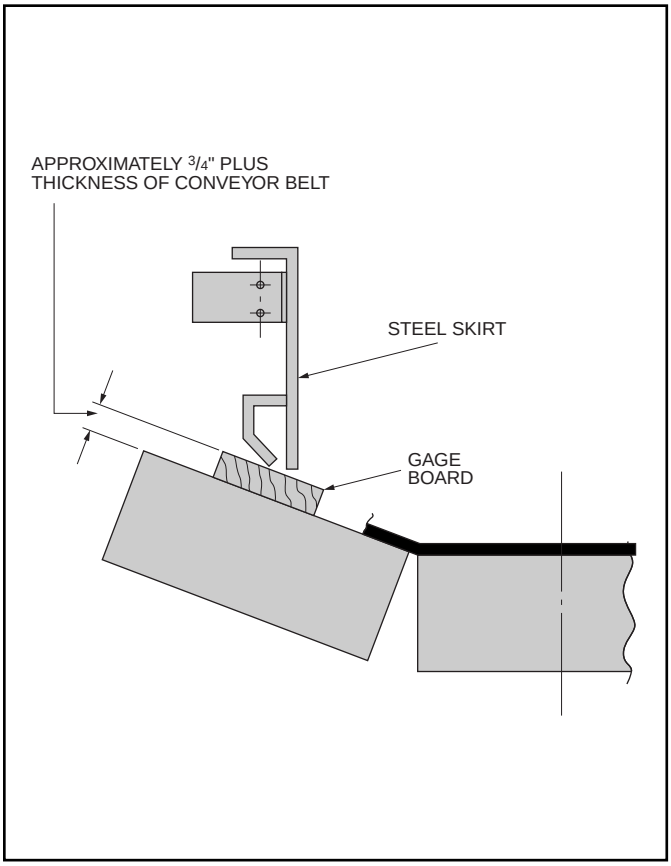
Mechanical Fasteners

Each box of mechanical fasteners is complete with a set of instructions and a list of tools required to splice the belt.

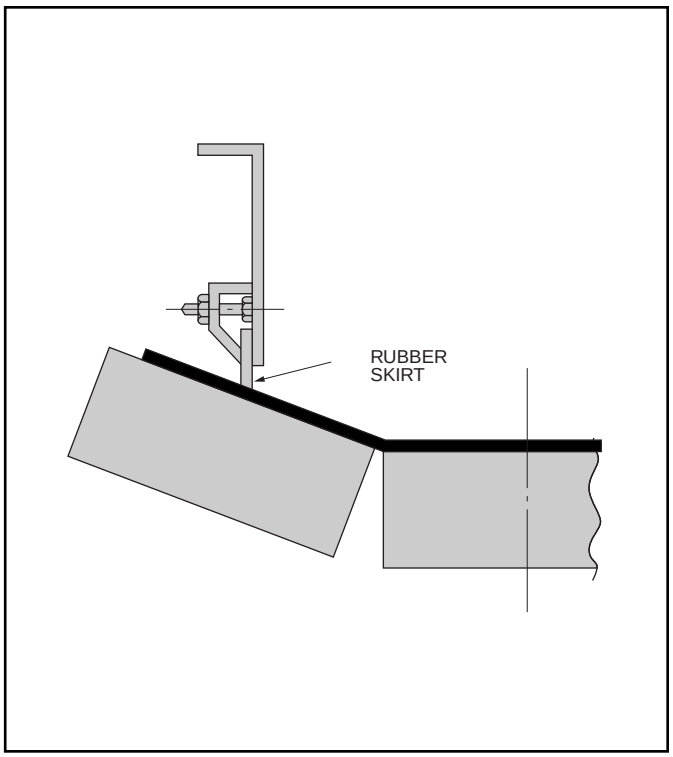
Belt Scrapers

A scraper is located at the head end of a belt conveyor to remove material from the belt and into a receiving chute. A counterweight or spring keeps the scraper blade against the belt. Proper field adjustment is required periodically.

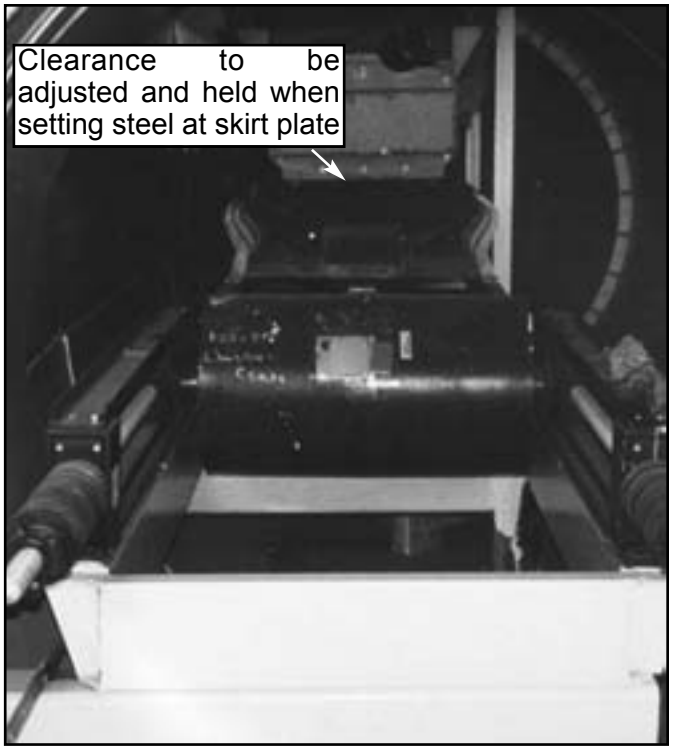
RUBBER SKIRTS-LOADING AREAS



When setting the steel for the loading skirts, use a board as a gage for clearance between the idler roll and the bottom of the steel skirt.



After installation of the conveyor belt, install the rubber skirt. The rubber should lay on the conveyor belt with a minimum of pressure.



INSTALLATION CHECKLIST

The following items should be inspected before initial operation:

1. Head and foot shafts parallel to each other and pulleys in-line.
2. All bolts properly tightened.
3. Idlers secured in-line.
4. Reducer filled to proper oil level.
5. Oil in chain guards, S.A.E. #30, to proper level.
6. Correct motor rotation.
7. Check and remove all tools and any other foreign objects from the belt, particularly on the return side where they may get between the terminal pulleys and belt. Grease on the belt should be removed immediately as it will deteriorate the belt.
8. Counterweight installed and gravity take-up blocking removed.
9. Screw take-up pulled back and pulley square.
10. Belt wipers installed and properly adjusted.
11. Emergency stop cords and switches installed.
12. Bearing stop blocks welded to terminal frame steel, or adjusting screws tight up against bearing bases.
13. Flop gates operative and in correct position for material flow.
14. Rubber skirting at loading points installed and adjusted.

For Notes

SECTION III
BELT CONVEYOR OPERATION INFORMATION

CONVEYOR START-UP

Before actual start-up of a conveyor system, electrical controls should be checked to insure that the entire system can be stopped quickly in case of emergency.

During initial start-up, the conveyor should be jogged on and off until the belt has made several complete revolutions. During this period, make a thorough check of all equipment to determine proper adjustment and function.

BELT TRAINING

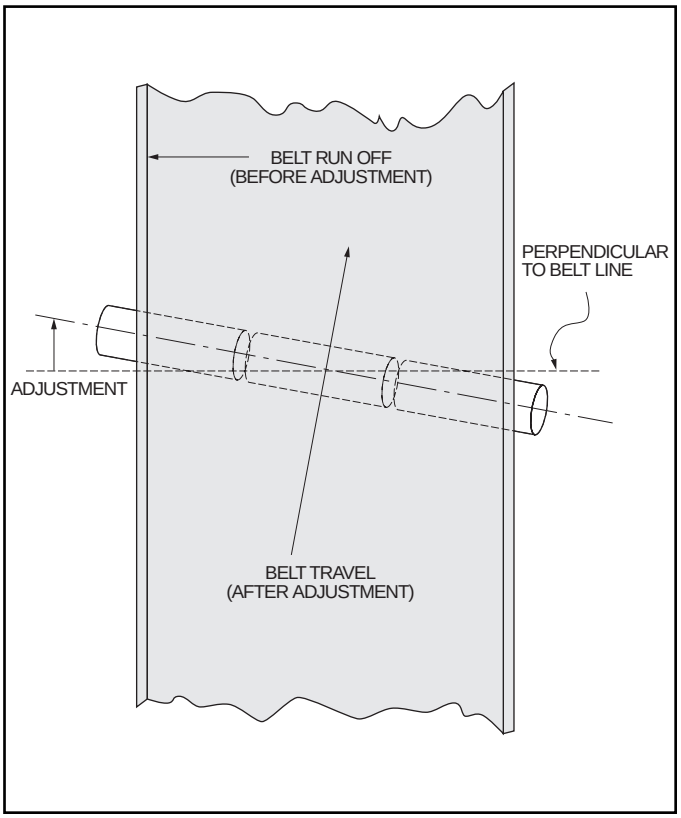
Belt training is a process of adjusting idlers and loading conditions in a manner which will correct any tendency of the belt to run off. **DO NOT ATTEMPT** to train the belt by unequal adjustment of the screw take-ups.

A misaligned conveyor will cause the belt to run-off to one side. The belt will tend to creep to the side that makes first contact with the idler roll. This condition can usually be corrected by adjusting a few idlers to change th contact points. The return side should be adjusted first, starting at the head end. Note the run-off point and adjust a few of the preceding idlers. The adjustments are made by shifting the idlers so that the belt contacts the roll opposite the run-off. (See sketch.)

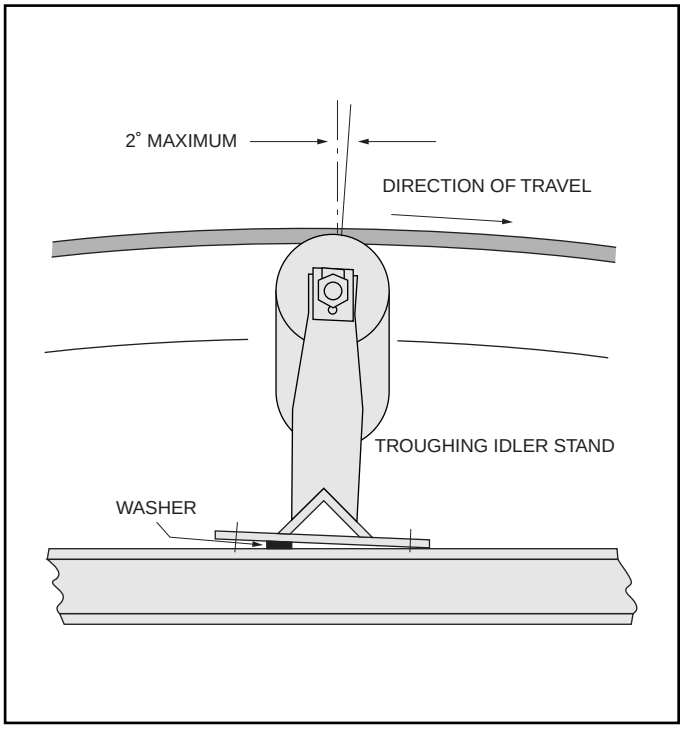
A slight adjustment on a number of idlers is recommended.

Repeat this procedure at other points along the belt, if necessary, until the return side is running true.

The carrying side can then be adjusted by using this same procedure starting at the tail end and proceeding toward the head end.



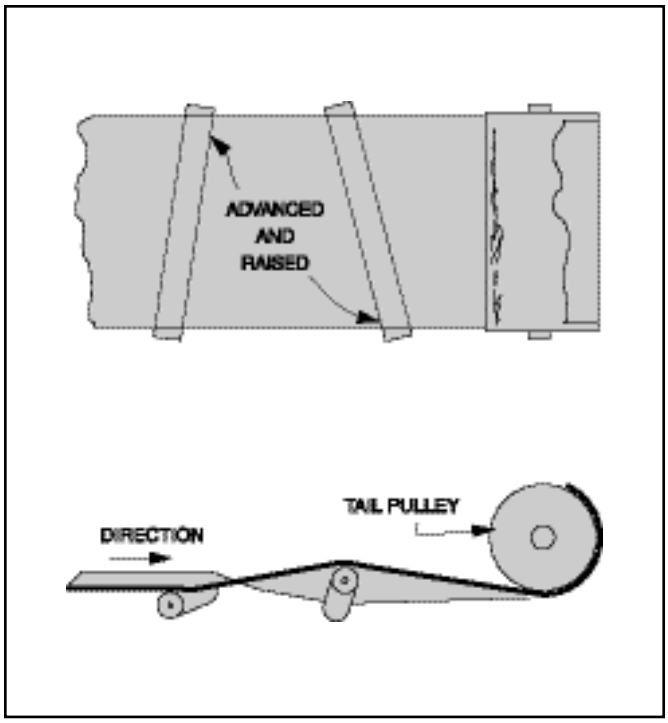
Belt training may be improved by tilting the troughing idlers. (See sketch.)



Tilt the idlers forward a maximum of 2° in the direction of belt travel. This is done by placing washers under the back of the mounting pads.

Return idlers cannot be tilted, however, by shifting their axis, they can be used to provide a corrective effect.

This can be done by slightly advancing and raising the alternate ends of the return rolls nearest the tail pulley. This can be done for expediency on a *temporary* basis. If this area is a training problem, a self-aligning return idler should be installed about



the 2nd or 3rd idler from the tail pulley.

NOTE

Shifting or tilting of idlers for belt training can only be used for belts traveling in **one direction only**. This remedy cannot be used for **reversing belt** conveyors.

Training Loading Belt

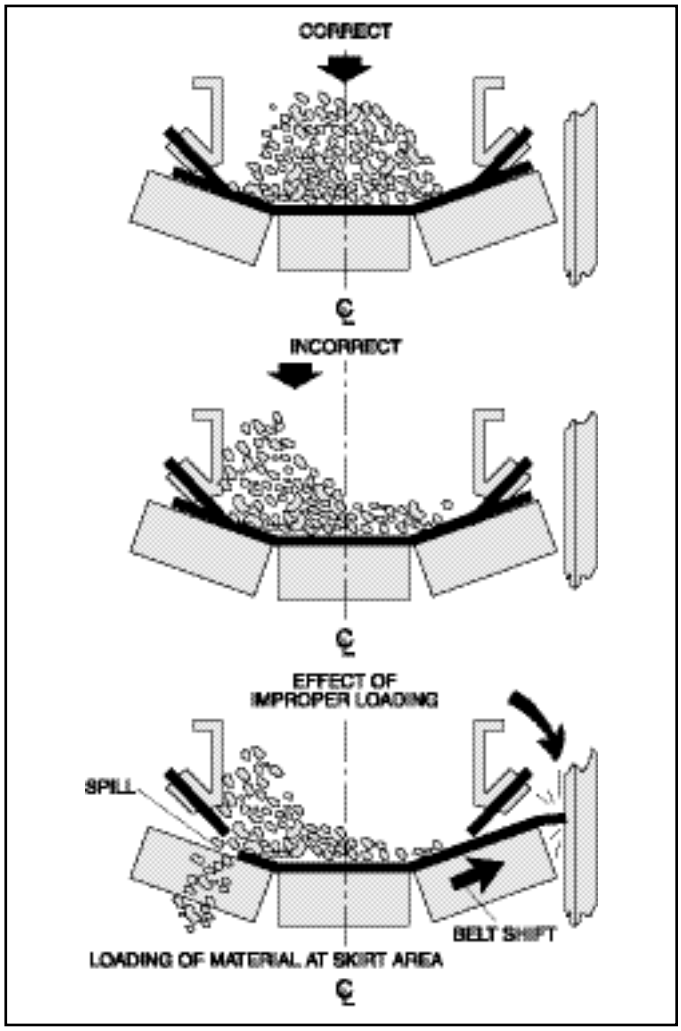
Once the belt has been properly trained while running empty, the belt must be checked when carrying a full load.

A properly trained belt will run true under loaded conditions. A loaded belt that runs off center is usually caused by improper loading. Chutes should distribute the load evenly and on the center of the belt.

Loading

Start with a light load and gradually work up the load that the conveyor was designed to handle. Check chutes to see that the material is being directed onto the center of the belt.

Off-center loading is harmful to the belt, idlers, and shafting. An off-center load will affect belt alignment in that the belt will run off center. A centered load will maintain belt alignment. (See illustration below.)



The loading point of a belt conveyor is the critical area. Here the conveyor is subjected to maximum abrasion and impact. The desired condition is to load the material at the same speed and direction of travel as the belt, with a minimum amount of impact and on the center of the belt.

The skirts must be adjusted to prevent spillage and to keep the load centered on the belt. The maximum recommended distance between skirtboards is two-thirds the width of a troughed belt. It is desirable to reduce this spacing to one-half the width of the troughed belt when conveying free flowing materials.

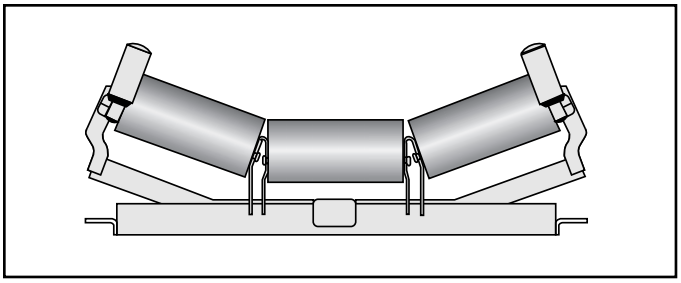
The skirt length should be designed to prevent side spillage until the material is at rest on the belt. If the material is still tumbling as it passes the skirt end, the skirts should be lengthened.

TYPES AND ADJUSTMENT OF TRAINING IDLERS

A properly aligned and centrally loaded belt will track in the center of the idlers without using training idlers. Training idlers are used to compensate for occasional irregular loading, the effects of wind, and other varying conditions.

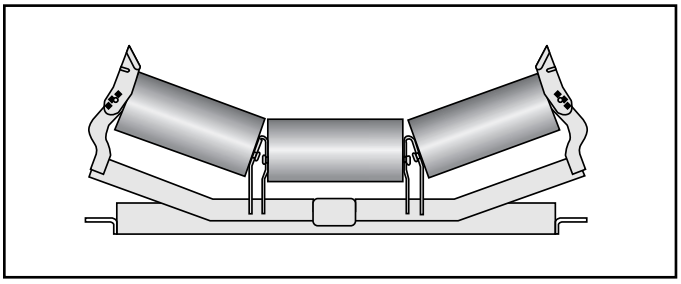
TROUGHING TRAINING IDLERS, POSITIVE TYPE

Troughed training idlers are installed along the conveyor length, as required, but not closer than fifty feet from a pulley. Positive type can be used on belts traveling in *one direction only.*



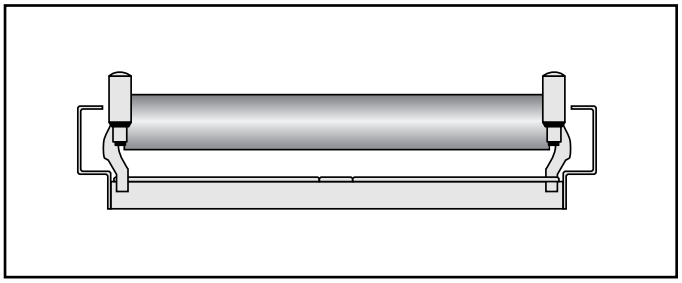
TROUGHING TRAINING IDLERS, ACTUATING SHOE TYPE

Actuating shoe type can be used on reversing belts and on belts with traveling trippers or stackers.

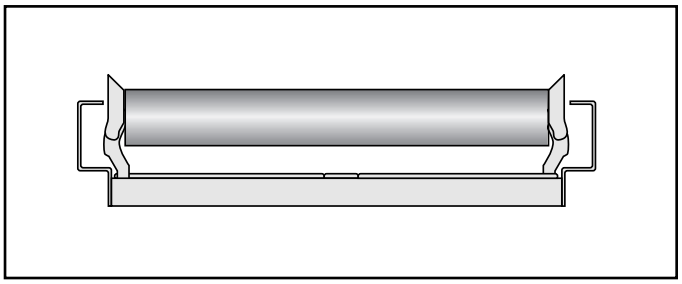


RETURN TRAINING IDLERS, POSITIVE TYPE

Return training idlers are installed along the conveyor length as required, but not closer than fifty feet from a pulley. Positive arm and inclined pivot type can be used on belts traveling in one direction only.



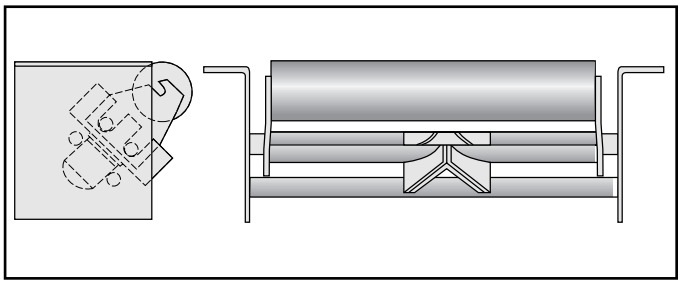
RETURN TRAINING IDLERS,



ACTUATING SHOE TYPE

Actuating shoe type can be used on reversing belts.

RETURN TRAINING IDLERS,



INCLINED PIVOT TYPE

Inclined pivot type can be used on belts traveling in one direction only.

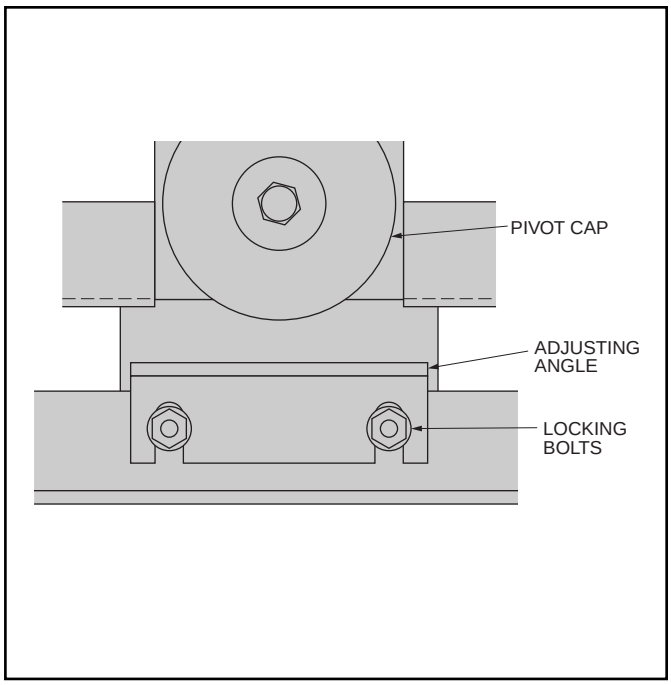
SIDE GUIDE IDLERS

Side guide idlers do not train a belt. They are used to prevent a belt from running off the pulleys and to prevent the belt from damage caused by the conveyor structure and other objects.

They should be installed so that they do not touch the belt edge when it is running normally. If the belt runs against side guide idler rolls continuously, belt damage can occur even if the rolls rotate freely.

TRAINING IDLER PIVOT ADJUSTMENT

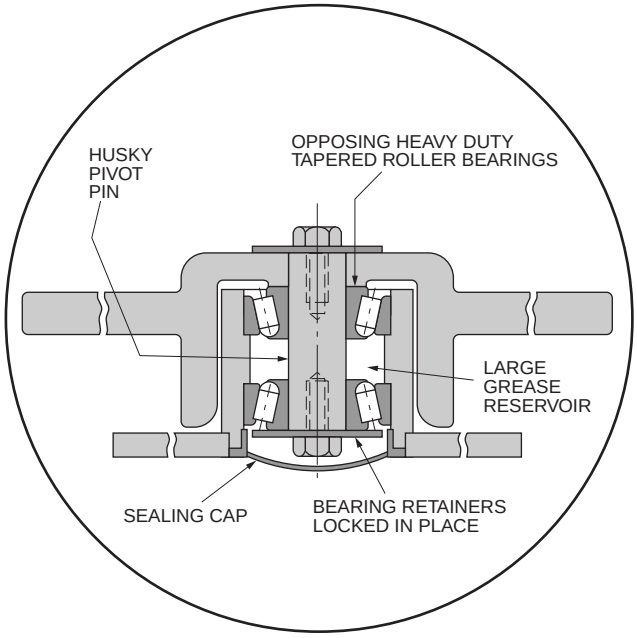
Adjustment of the pivoting action of training idlers can be made by loosening the two bolts and moving th angel in or out to change the amount of allowable movement. The pivot stop is set at the factory for normal operation.



CENTRAL PIVOT FOR TRAINING IDLERS

General Information

Heavy cast housing and cap. Bearing cavity pregreased and sealed for long bearing life. Opposing tapered roller bearings to handle radial and thrust



SECTION IV
CONVEYOR IDLER MAINTENANCE AND LUBRICATION INFORMATION

CONVEYOR IDLER INSPECTION

Regularly scheduled inspections of conveyor systems is the best preventive maintenance possible. Problem areas can be detected and corrected before damage occurs to the belt or equipment.

A check of the loading areas is the best place to start. Loading chutes should be delivering material to the belt evenly and centered on the belt. Uneven or off-centered loading is the greatest cause of problems on any belt conveyor.

Noticeable vibrations should be located and eliminated as this may loosen mounting bolts and cause the idlers to shift. Misalignment problems must be corrected at once.

Walking the length of the conveyor installation and checking the idler rolls to be sure that they are all turning freely and smoothly, with no excessive end play, is recommended as part of the periodic inspection.

Roll failure can, in most cases, be found before the roll stops rotating. Unusual noises are an early indication of roll failure. Stalled rolls must be cleared immediately. If rotation is retarded by material build-up against the roll, clear immediately. Stalled rolls not only drain energy from the system, but also cause excessive roll shell and belt wear and should be replaced.

First, stop the conveyor and lock out the power switch.

Then remove and replace any rolls not operating properly. Faulty rolls can be disassembled and repaired.

Watch for unusual wear patterns on the idler rolls, which can be caused by off-centered loading or idler misalignment.

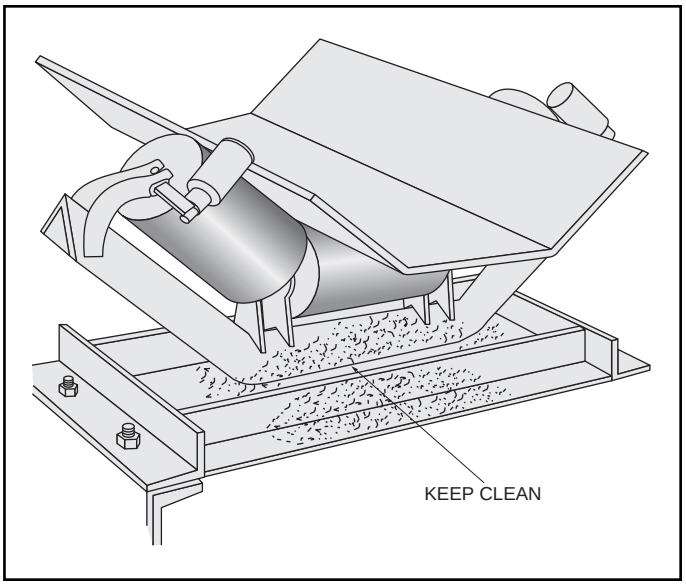
Check idler alignment and adjust as required, remember to retighten mounting bolts. If off-centered loads occur make corrections to chute work.

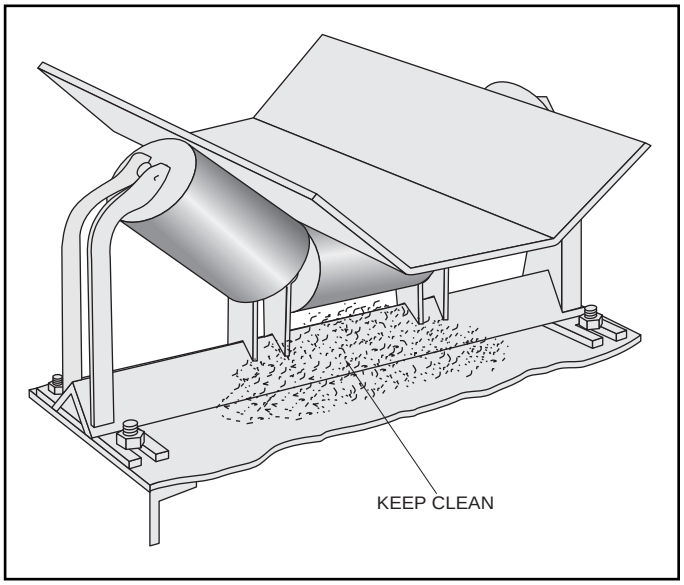
Check for material build-up on idler rolls, particularly the return rolls as these are in direct contact with the carrying side of the belt.

If build-up occurs check the belt cleaner to be sure that it is operating properly. If a belt cleaner has not been installed, it is recommended that one is placed in operation as soon as possible.

Excessive build-up on idler rolls will cause damage to the belt. *Shut down the conveyor, locking out the power switch* and clean up or repair immediately. Rex spiral or rubber disc return idlers are designed to keep material build-up on the rolls to a minimum.

Check all training idlers to see that they are pivoting freely.





Clean up any spilled material that might restrict the idler from pivoting freely and free any frozen pivots.

Check to be sure all lubrication fittings are in good condition. Replace where needed.

CONVEYOR IDLER MAINTENANCE

Inspection and Maintenance

A scheduled maintenance program, followed faithfully by trained people, can usually help avoid costly interruptions in production and repairs to equipment. Many operators make a cursory check at least once a day to find obvious problems. A more comprehensive inspection is made at period intervals.

Inspection should include checking the following:

1. Inspect the belt for breaks or cuts or for indications that the belt edge is rubbing.
2. Make sure center of the belt is running on the center of the idler.
3. Loading areas should be checked to see that material is being loaded evenly, and on the center of the belt.
4. Rubber skirts on chutes and skirt plates are adjusted to prevent spillage.
5. Belt cleaners are properly adjusted and working.
6. Rex idlers are designed to be self cleaning. Accumulation of material must not be allowed to prevent idler rolls from rotating or prevent training idlers from pivoting.
7. Check to see that all idler rolls are rotating. A stalled roll will cause excessive roll shell and belt wear and should be replace.

CONVEYOR IDLER LUBRICATION

All idlers are prelubricated at the factory and are ready for operation. All external lubrication lines (either furnished by Rexnord or added by the customer) should be filled with grease when installed to insure that the idlers will get grease when lubrication cycle is started.

Under normal conditions, relubrication should be every 4000 to 6000 hours until a clean bead of grease appears around the final opening of each seal. (See sketch.)

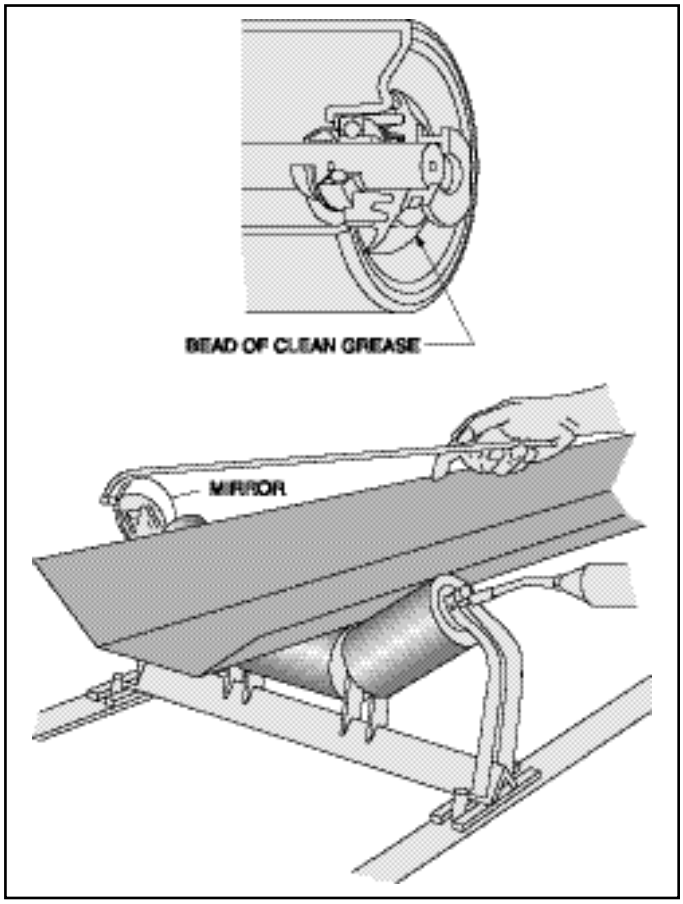
The lubrication cycle can be lengthened in applications where operating conditions are clean, dry, of moderate temperature and slow speed. The cycle should be shortened in applications where severe dirt, high humidity, elevated temperatures, high speeds, free water, prolonged shutdown, or other extreme conditions are encountered. Periodic inspection during the first few years of operations will provide the best determination of required relubrication frequency.

Rex idlers are greased at the factory with Lithium EP grease with a NLGI #2 consistency having the following characteristics.

1. Lithium soap base
2. Mineral oil
3. Worked penetration 265-295 @ 77°F
4. Operating range of +225°F to –10°F
5. Bleed rate 3% maximum

It is recommended that an equivalent grease be used. When using any other type of grease, it is imperative that it be compatible with the original grease.

When lubricating idlers, the use of high pressure equipment is not only unnecessary but is actually undesirable unless used with great care. High pressure may cause damage to bearings and seals. It is recommended that a VOLUME TYPE GREASE GUN BE USED; one that delivers an ounce of grease per seven to ten strokes of the lever.



All fittings should be wiped clean before lubricating so as not to introduce dirt.

IDLER LUBRICATION TECHNIQUES

Rex idlers should be lubricated with a **high volume**-low pressure gun to insure purging of all seals. This type of grease gun delivers an ounce of grease every 7 to 10 pumps. High pressure-low volume guns should not be used because they do not deliver enough volume of grease per stroke to purge all seals. The greasing system relies on a generous volume of grease per stroke to create the pressure distribution necessary to purge all seals.

An ounce of grease is normally required to purge a CEMA B or C idler. (1.5 oz. for CEMA E.)

A good grade of NLGI #2 grease with low bleed characteristics should be used. Mobil Oil Company grease Mobilux EP2 or equal is recommended.

REXNORD PATENTED THRU-GREASING SYSTEM

Most customers recognize the need to lubricate idler bearings in order to extend idler life. Relubricating flushes out contaminants especially through the labyrinth (clearance type) seals.

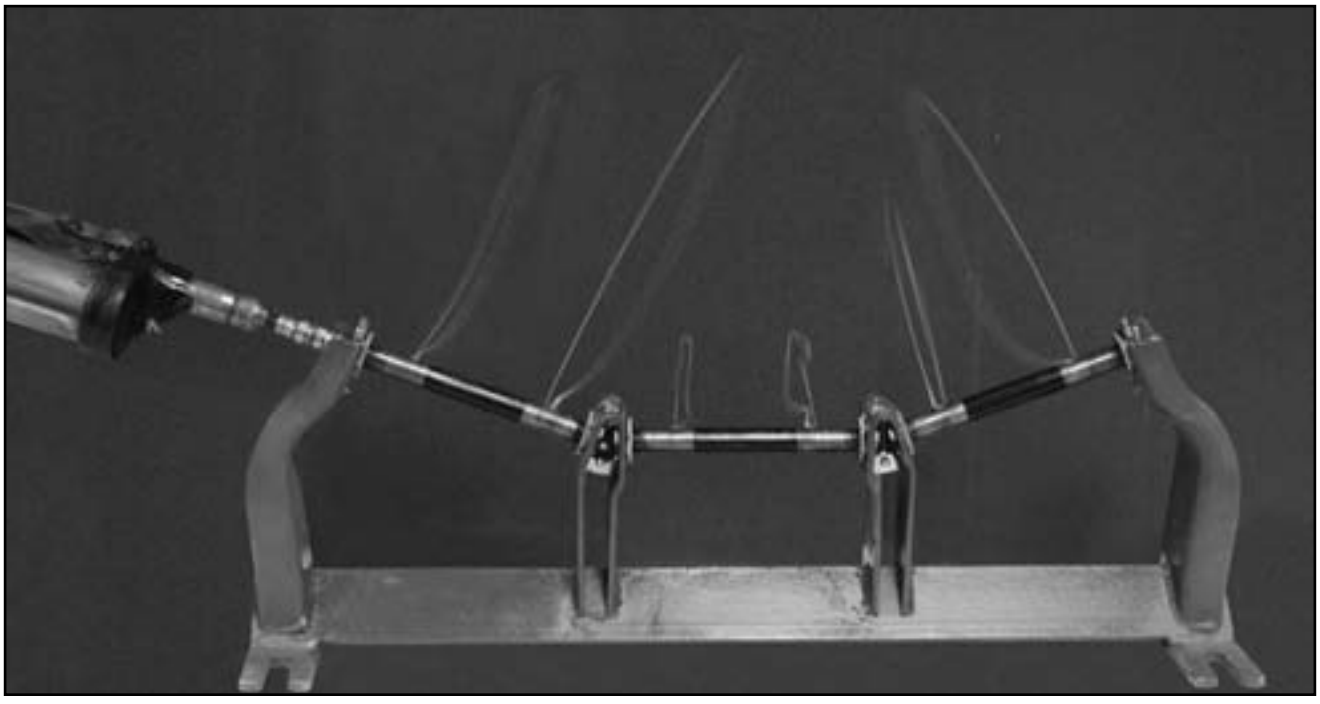
The most positive way to assure that grease reaches each bearing is to have an individual fitting on each bearing. But vulnerability to damage, added cost, and inconvenience of multiple grease points make this impractical.

One-point thru-greasing is now available from most idler manufacturers. This system is essentially a channel through the center of the idler with outlets to the six bearings (Fig. 1). A grease fitting at one or both ends of the idler is used to introduce fresh grease. A short tube is generally used to transfer grease from roll to roll.

One-point thru-greasing is successful **only** if the system can meter grease equally to all six bearings – a proven feature of Rex idlers.

Radial hole size becomes critical when using open, purge type seals. A large diameter radial hole allows most of the grease to be released through the first two labyrinth seals. Pressure at the third, fourth, fifth and sixth seals is practically zero – as shown in Figure 3. A small diameter radial hole restricts grease flow and produces a more uniform pressure (Figure 5).

Figure 2 is a schematic diagram of a typical one-point thru-grease system. A pressure-distance diagram (Fig. 3) shows a momentary high pressure at bearing #1 and some residual pressure at bearings #2 and #3, but almost no pressure from bearing #4 on. Without a pressure differential between the inside of the shaft and the outside, grease will not flow through the bearing cavity. Pressure can be increased throughout the system by blocking off all exists. Figure 4 shows what happens to a hypothetical system with all outlets blocked.



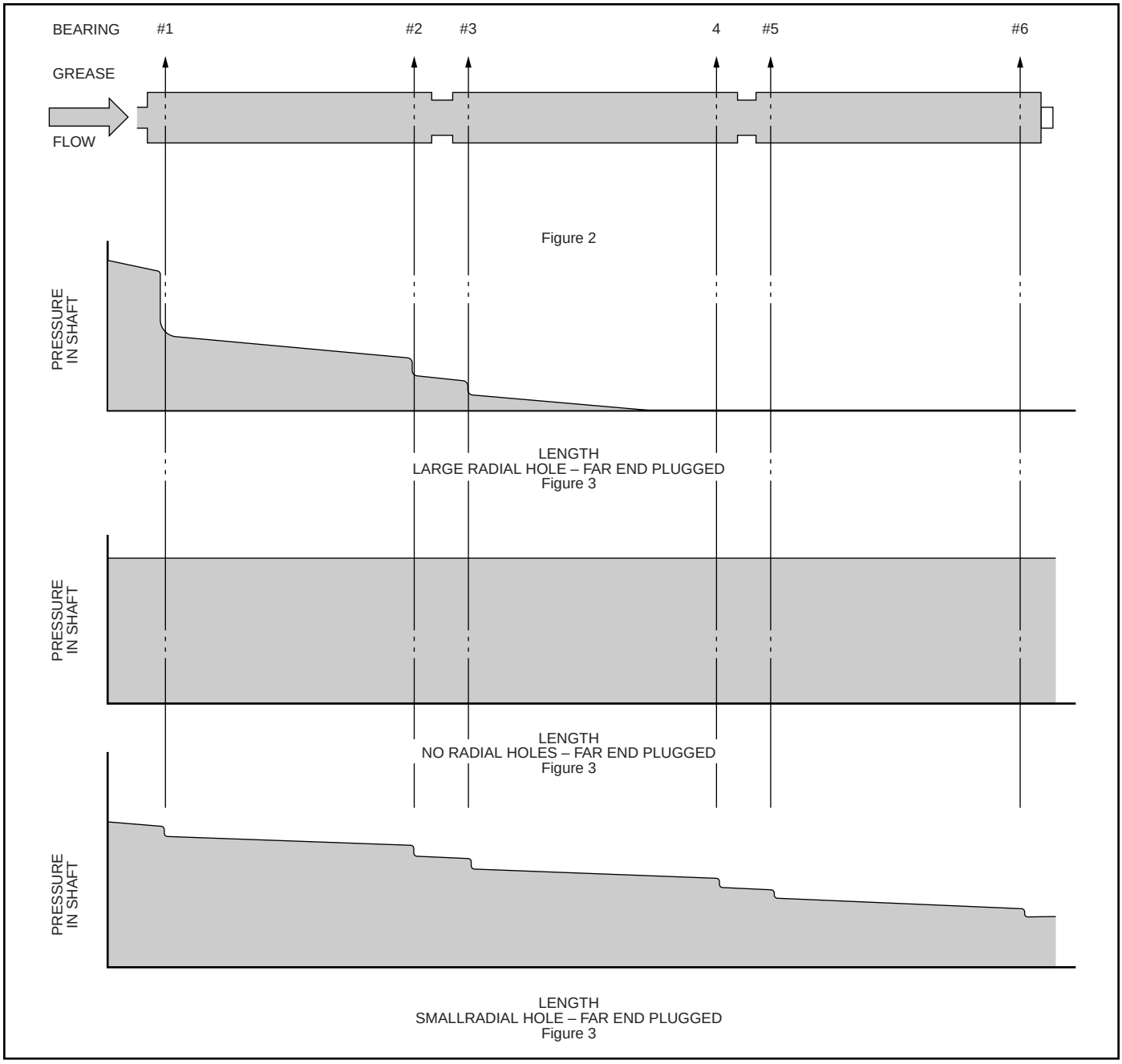


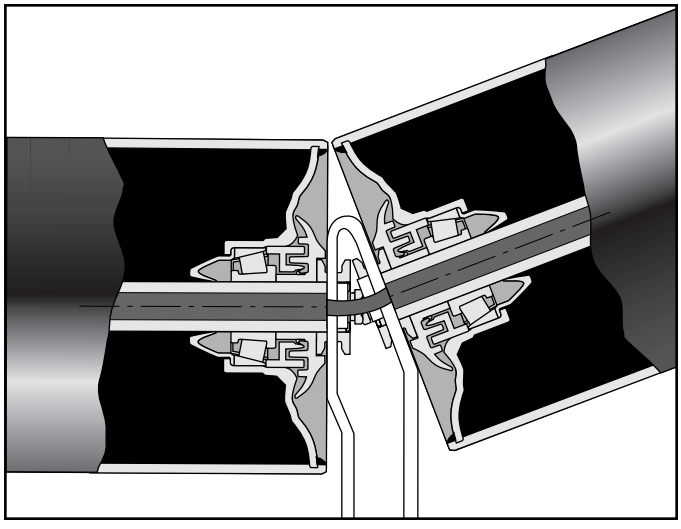
Figure 2

Figure 3

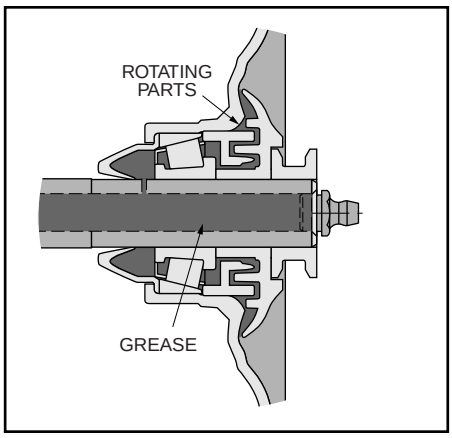
Figure 3

Figure 3

Figure 5 diagrams pressure-distance in a system where small diameter radial holes meter grease to each bearing. In the system, the radial holes are small enough to restrict grease flow into the bearing cavities. This causes a momentary high pressure *throughout the system*. This high pressure is relatively uniform from end to end, and release of grease through the small radial grease holes is also relatively uniform. The large diameter, reinforced rubber connecting tubes tend to “give” a little, acting as “surge tanks” to smooth out the pressure peaks and assure flow into the six bearings. The tube can be seen in Figure 6.

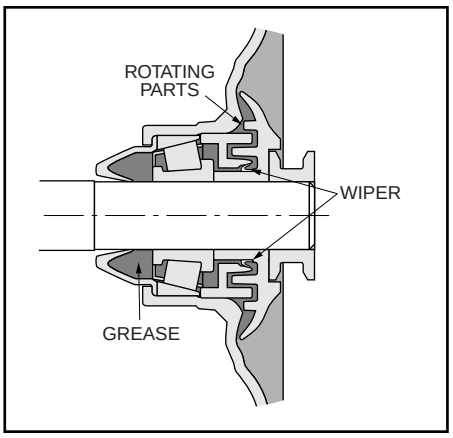


REX "G" SEAL
REGREASABLE OR FACTORY SEALED



REGREASABLE IDLERS
Better Protection Against Abrasives and Moisture

Rex offers a special combination *labyrinth* and *protective outer shield* for your operating environment. This seal has five *hard-to-get-through* passages filled with grease to block contaminants from the roller bearings. The outer and inner seals are close tolerance injection molded nonmetallic. The labyrinth/shield seal is particularly excellent for long overland horizontal conveyors, because of its low friction torque or for applications where water is present or when frequent washdowns are required.



FACTORY-SEALED IDLERS
Better Protection Against Abrasives and Moisture

Rex offers a special combination of *labyrinth* and *protective outer shield* for your operating environment. This seal has five *hard-to-get-through* passages filled with grease to block contaminants from the roller bearings. The outer and inner seals are close tolerance injection molded nonmetallic. The factory sealed idlers feature the same labyrinth/shield seal as the regreasable idlers but with an added internal wiping seal to further delay the penetration of contaminants. This product will provide excellent service in relatively clean environments or where minimum maintenance can be provided.

SECTION V
BELT CONVEYOR TROUBLE-SHOOTING GUIDE

Any belt conveyor installation can be subject to a wide variety of difficulties which may become costly in terms of replacement and plant downtime unless the problem is quickly diagnosed and corrected. This guide is intended to point out the majority of belt conveyor problems and set forth their probably causes and cures.

Locate your specific problem in the “complaint” column below and note the numbers to the right. They represent the most likely causes for the problem, in order of probable occurrence, and how to correct them. The list on the next page details the causes and cures by number. The cures will correct the majority of belt conveyor troubles. However, some remedies require lengthy procedures which should be referred to your Rexnord representatives.

COMMON BELT CONVEYOR COMPLAINTS

COMPLAINT	CAUSE In Order of Probable Occurrence						COMPLAINT	CAUSE In Order of Probable Occurrence					
Belt runs off at tail pulley	7	15	14	17	21	–	Excessive wear, including rips, gouges, ruptures and tears.	12	25	17	21	8	5
Entire belt runs off at all points of the line.	26	17	15	21	4	16	Excessive bottom cover wear.	21	14	5	19	20	22
One belt section runs off at all points of the line.	2	11	1	–	–	–	Excessive edge wear, broken edges.	26	4	17	8	1	21
Belt runs off at head pulley.	15	22	21	16	–	–	Cover swells in spots or streaks.	8	–	–	–	–	–
Belt runs to one side throughout entire length at specific idlers.	15	16	21	–	–	–	Belt hardens or cracks.	8	23	22	18	–	–
Belt slip.	19	7	21	14	22	–	Covers become checked or brittle.	8	18	–	–	–	–
Belt slip on starting.	19	7	22	10	–	–	Longitudinal grooving or cracking of top cover.	27	14	21	12	–	–
Excessive belt stretch.	13	20	21	6	9	8	Longitudinal grooving or cracking of bottom cover.	14	21	22	–	–	–
Belt breaks at or behind fasteners; fasteners tear loose.	2	23	13	22	20	10	Fabric decay, carcass cracks, ruptures, gouges (soft spots in belt).	12	20	5	10	8	24
Vulcanized splice separation.	13	23	10	20	2	9	Ply separation.	13	23	11	8	3	–

CAUSES AND THEIR CURES

1. **Belt bowed –** Avoid telescoping belt rolls or storing them in damp locations.* A new belt should be straighten out when “broken in” or it must be replaced.
2. **Belt improperly spliced or wrong fasteners –** Use correct fasteners. Retighten after running for a short while. If improperly spliced, remove belt splice and make a new splice.* Set up regular inspection schedule.
3. **Belt speed too fast –** Reduce belt speed.
4. **Belt strained on one side –** Allow time for new belt to “break in.” If belt does not break in properly or is not new, remove strained section and splice in a new piece.*
5. **Breaker strip missing or inadequate –** When service is lost, install belt with proper breaker strip.
6. **Counterweight too heavy –** Recalculate weight required and adjust counterweight accordingly.* (If using screw take-ups reduce take-up tension to point of slip, then tighten slowly.)
7. **Counterweight too light –** Recalculate weight required and adjust counterweight accordingly. (If using screw take-up, increase tension).
8. **Damage by abrasives, acid, chemicals, heat, mildew, oil –** Use belt designed for specific condition. For abrasive materials working into cuts and between plies, make spot repairs with cold patch or with Permanent Repair Patch. Seal metal fasteners or replace with vulcanized step splice. Enclose conveyor for protection against rain, snow and sun. Don't overlubricate idlers.
9. **Differential speed wrong on dual pulleys –** Make necessary adjustment.*
10. **Drive underbelted –** Recalculate maximum belt tensions and select correct belt. If conveyor is over-extended, consider using two-flight system with transfer point. If carcass is not rigid enough for load, install belt with with proper flexibility when service is lost.
11. **Edge worn or broken –** Repair belt edge. Remove badly worn or out-of-square section and splice in a new piece.
12. **Excessive impact of material on belt or fasteners –** Use correctly designed chutes and baffles. Make vulcanized splices. Install impact idlers. Where possible, load fines first. Where material is trapped under skirts, adjust skirtboards to minimum clearance.*
13. **Excessive tension –** Recalculate and adjust tension. Use vulcanized splice within recommended limits.
14. **Idler rolls not turning –** Correct or replace stalled rolls. Lubricate. Improve maintenance. (Don’t overlubricate.)
15. **Idlers or pulleys out-of-square with center line of conveyor –** Realign. Install limit switches for greater safety.
16. **Idlers improperly placed –** Relocate idlers or insert additional idlers spaced to support belt.*
17. **Improper loading, spillage –** Feed should be in direction of belt travel and at belt speed, centered on the belt. Control flow with feeders, chutes and skirtboards.
18. **Improper storage or handling –** Refer to your Rexnord representative for storage and handling tips.
19. **Insufficient traction between belt and pulley –** Increase wrap with snub pulleys. Lag drive pulley. In wet conditions, use grooved lagging. Install correct cleaning devices on belt. Install centrifugal switch for safety.
20. **Material between belt and pulley –** Use skirtboards properly. Remove accumulation. Improve maintenance.
21. **Material build-up –** Remove accumulation. Install cleaning devices, scrapers and inverted “V” decking.* Improve housekeeping.
22. **Pulley lagging worn –** Replace worn pulley lagging. Use grooved lagging for wet conditions.
23. **Pulleys too small –** Use larger diameter pulleys.
24. **Radius of convex vertical curve too small –** Increase radius by vertical realignment of idlers to prevent excessive edge tension.
25. **Relative loading velocity too high or too low –** Adjust chutes or correct belt speed. Consider use of impact idlers.
26. **Side loading –** Load in direction of belt travel, in center of conveyor.
27. **Skirts improperly placed –** Install skirtboards so that they do not rub against belt.

* Consult your Rexnord representative for additional recommendations or procedures. Space limitation prevent us from printing complete information in this guide.

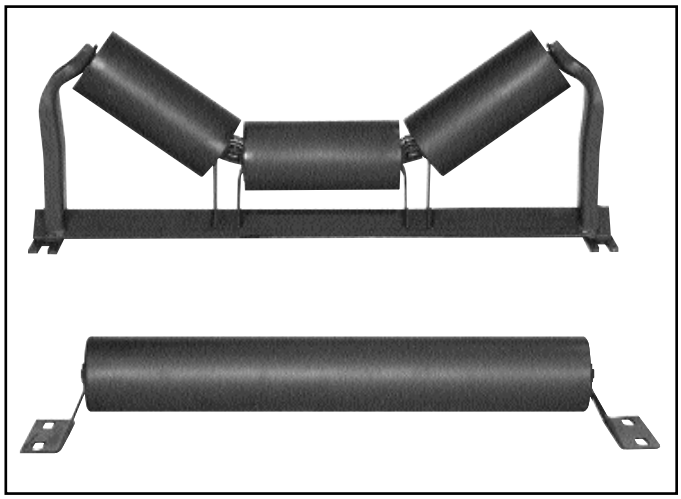
SECTION VI
IDLER REPLACEMENT PARTS IDENTIFICATION

TYPES OF IDLERS

Carrying Idlers (Troughing or Flat)

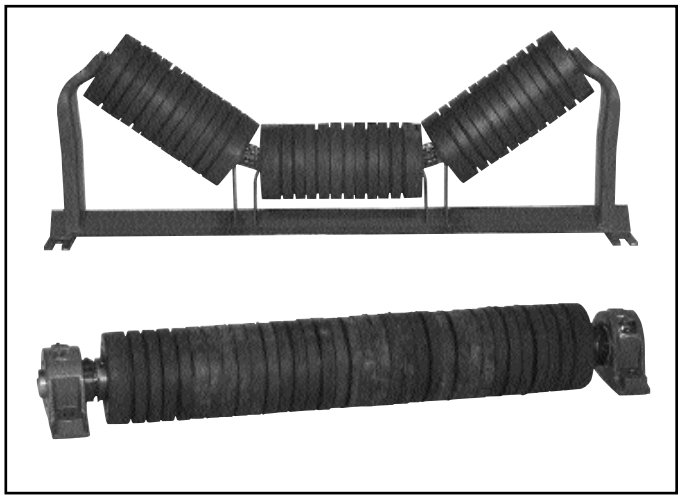
Support the belt in the section of the conveyor that transports the material. These idlers may be flat or troughed to shape the belt to prevent spillage and are available in 20°, 35° and 45° trough angels with equal or unequal roll lengths.

Ceramic or urethane covered rolls also available.



Impact Idlers

Prevent damage to the belt at the loading point. These idlers may be troughing or flat types with grooved, molded rubber rolls. It is standard practice to use impact idlers at all loading and transfer points when the impact exceed 40 foot pounds

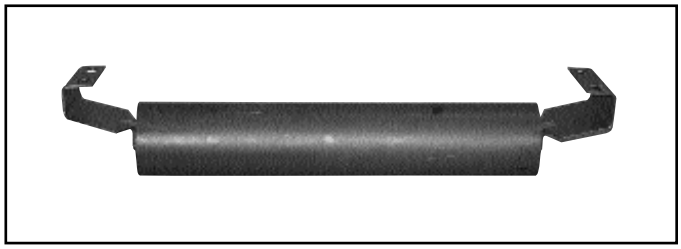


Return Idlers

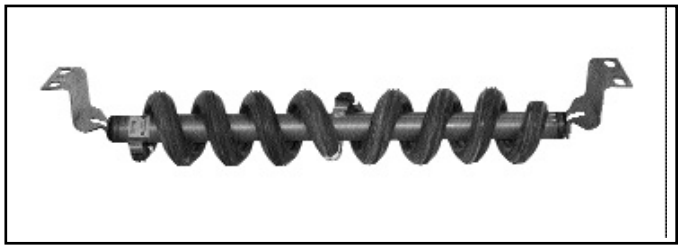
Support the empty belt between the discharge point and the tail pulley.

a. **Standard –** Used where materials are not sticky, corrosive or abrasive.

   Ceramic or urethane covered rolls also available.



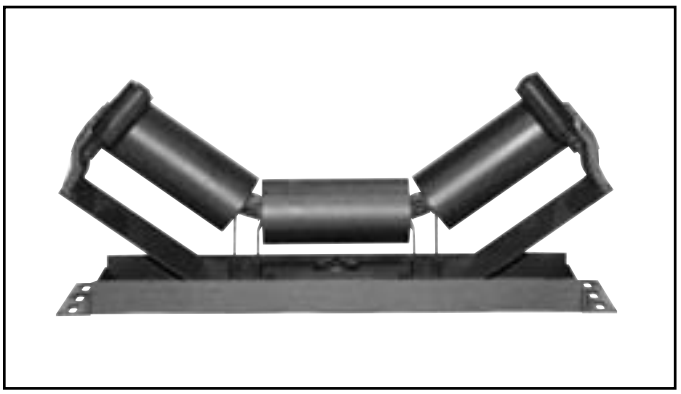
b. **Spiral –** Used where sticky materials adhere to the belt where a corrosive environment is present or abrasive wear is a problem. Their unique construction minimizes belt fleet and damage to the return belt due to material build-up on the idler rolls. Spiral roll idlers can be used for belt travel in one direction only.



TYPES OF IDLERS, (cont)

c. Rubber disc – Used under the same conditions as the spiral idler. These idlers can be used for belt travel in either direction. Massed end discs are standard.

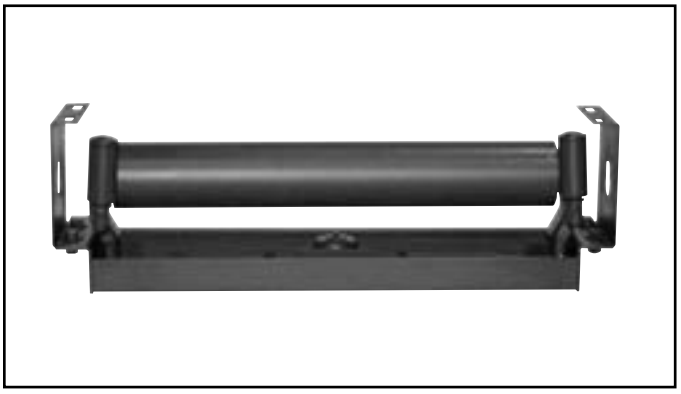
Urethane and ceramic disc rolls also available.



Carrying Belt Training Idlers (Troughing or Flat)

Assist in keeping the belt centered on the conveyor. Actuating shoe type is used on belt traveling in either direction. Positive type is used on belt traveling in one direction only and is illustrated.

Ceramic or urethane covered rolls also available.

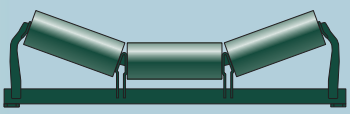


Return Belt Training Idlers

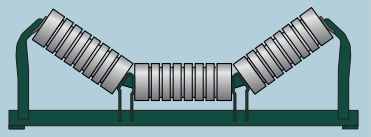
Used for the same purpose as are Carrying Training Idlers. They are of the actuating shoe type, belt travel – either direction, and the positive and inclined pivot types, belt travel – one direction only. The positive arm type is illustrated.

Ceramic or urethane covered rolls also available.

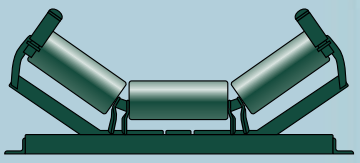
Idler Styles



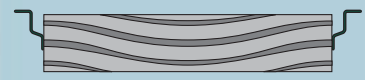
Troughing



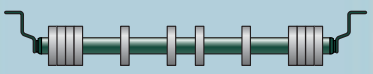
Impact



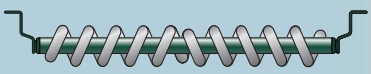
Troughing Training



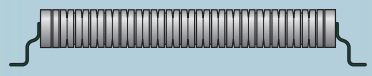
Ribbed Covered Return



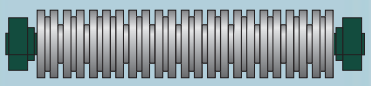
Disc Return



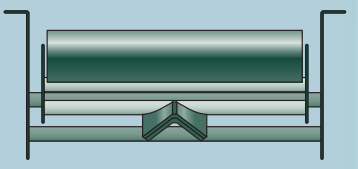
Spiral Return



Flat Impact



Live Shaft Impact



Inclined Return Training

Rexnord

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CEMA
CONVEYOR EQUIPMENT MANUFACTURERS ASSOCIATION

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