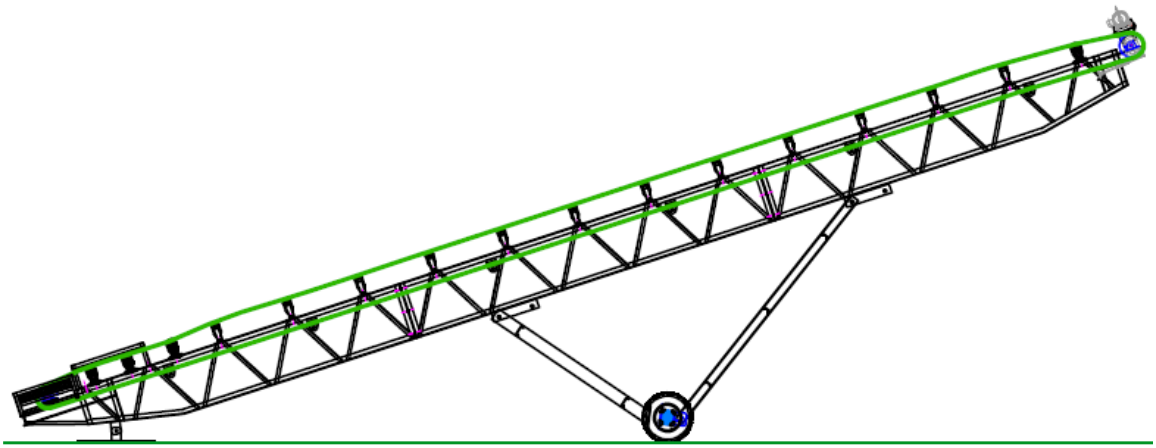
Stacker Assembly Instructions



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1.0 Recommended Tools

The following tools are required for assembly, set up and shakedown:

Size	Description	Use
1 5/16"	Ratchet/Socket Set or Wrenches	Take up adjustment
1 ½"	Ratchet/Socket Set or Wrenches	Axle/Rear Leg Bolts
1 5/16"	Ratchet/Socket Set or Wrenches	Truss Bolts
¾"	Ratchet/Socket Set or Wrenches	Idler (Roller) Bolts
5/8" & 11/16"	Ratchet/Socket Set or Wrenches	Tail Guard Bolts

2.0 Truss Assembly

Arrange truss sections on the ground in the order which they are to be assembled. Truss Sections are marked with letters. Connections are to be made A to A, B to B, etc. (See Figure 1 for an example)

Special Note: Pre-Assembled 40 ft. sections are bolted and welded by the manufacturer. It is recommended that stackers in excess of 40 ft be field welded as shown in Figure 1. Welds are recommended at the cord angles.

Figure 1

Bolt truss sections together using the 7/8 x 2 bolts, nuts and flat washers provided. Use a flat washer on BOTH SIDES. (See Figure 2)

Figure 2

SPECIAL NOTE: For 100 ft and 120 ft Portable Stackers, splice plates are provided to be bolted to the sides and tops of the joints. (See Figure 2A Below.)

Figure 2A

3.0 Idler (Roller) Installation

Install idlers using the 1 ½ x ½ bolts, nuts and flat washers provided. **Rollers should be mounted "square" to the conveyor frame and parallel to the Head and Tail Rollers.** Connections should be made with one washer and nut on top. Typical idlers supplied include Five (5) at 20 degree and the balance at 35 degree. Four 20 degree idlers are installed at the tail immediately after the tail pulley and one installed at the head before the head pulley. (See Figure 3) CEMA B Idler shown. **NOTE: See Appendix C for Grain Stacker 20 Degree Idler Spacing Photos**

Figure 3

4.0 Belt Installation

Pull belt over top idlers and on top of return rollers. (See Figure 4) Make sure Cover is on top. Belts come in different grades, plys and PIW (pounds per inch width) ratings. The cover is the thick rubber layer. (Please see Appendix B for Wrap Drive Schematic) (See Appendix C for Gravity Take – up Schematic.)

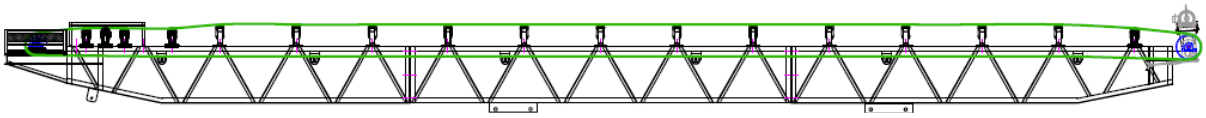


Figure 4

5.0 Gearbox Oil

Your gearbox has been shipped WITHOUT oil. Depending on your location, the ambient temperatures and season where the stacker will be used will dictate the type of lubricant to be used. Please refer to the Speed Reducer Instruction Manual included with the stacker.

6.0 Assemble Undercarriage

6.1 Bolt rear leg to the axle using the 1 x 2 1/2 bolts, nuts & flat washers provided. (Note: The rear leg is Channel)

6.2 Pin front leg to axle. (Note: The front leg is Pipe.)

Assembly should look similar to Figures 5 and 6.

Please Note: Axle assembly show may not be the same as that supplied with your stacker; however, the basic connections are the same.

Figure 5

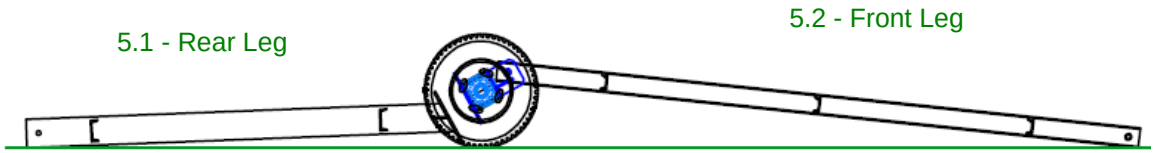


Figure 6

Special Note: At this time, while everything is still on the ground, check the following:

- Conveying Belt Cover is on top
- Gearbox has been filled with oil
- Bolted connections are tight
    - Idlers
    - Rear Axle Leg
    - Head and Tail Roller Bearings
    - Gear Box Motor Mount and Guard
    - Load Zone
    - Tail Guard
- V-Belts are tight
- Lug Nuts are tight

7.0 Undercarriage & Truss Assembly

7.1 Install Pivot plate, if not already installed. Lift Truss at Head and position directly over assembled undercarriage. (See Figure 7)

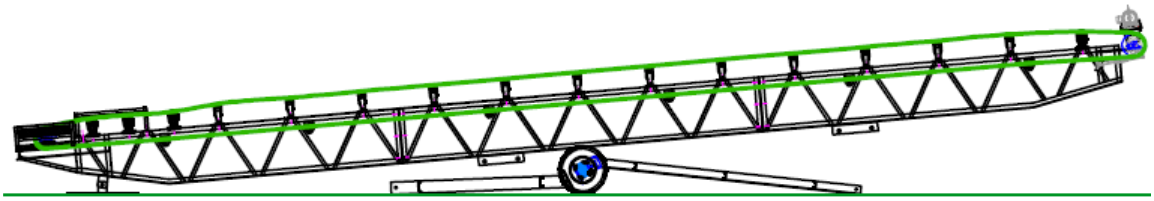


Figure 7

7.2 Secure Front Leg into desired trunion Position. (See Figure 8)

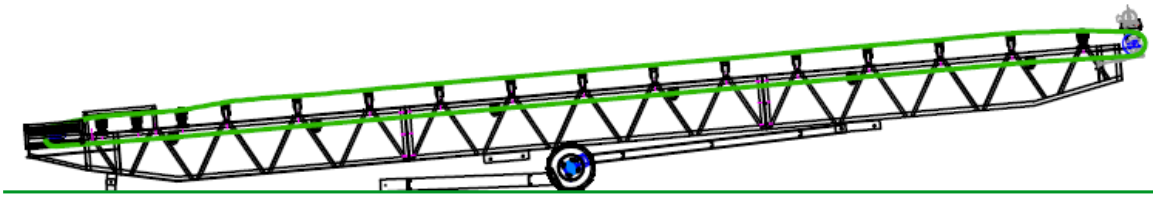


Figure 8

7.3 Raise head of conveyor and pin Rear Leg into desired position. (See Figure 9)

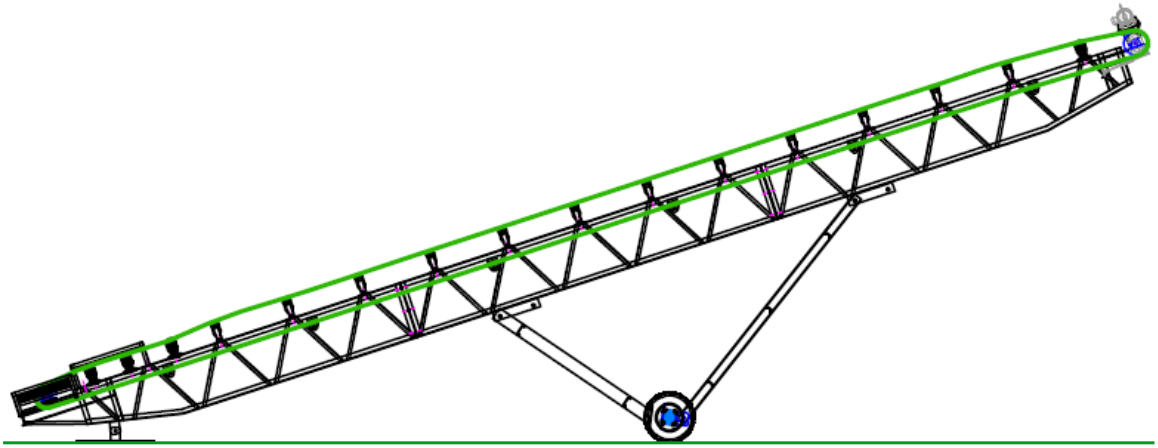


Figure 9

7.4 Position Stacker and anchor Pivot Plate

8.0 Test Run and Shakedown

NOTE: IF YOUR STACKER IS EQUIPPED WITH A BACK STOP, LOOSEN THE V-BELTS AND VERIFY MOTOR ROTATION. DAMAGE TO THE BACK STOP MAY RESULT AND ARE NOT COVERED BY WARRANTEE!

NOTE: YOUR REDUCER DOES NOT HAVE ANY OIL! FILL WITH THE APPROPRIATE AMOUNT PRIOR TO OPERATING!

On completion of the previous steps, it is time to run the conveyor and train the belt. The head and tail rollers should be parallel to one another. If the belt tracks to one side or another, adjust the tail pulley take-ups first to correct the problem.

If the belt continues to track to one side, check the alignment of the idlers, head pulley and tail pulley. They should all be parallel to one another. (Please See Appendix A for more Belt Tracking Tips.)

After test run, inspect entire stacker for loose bolts and guards. Ensure the belt does not rub any structural members as this may cause premature belt failure. Be sure to check the motor and gearbox V-belt alignment as well as for any oil leaks around the gearbox shafts.

APPENDIX A

General Tracking/Training Procedures

Tracking the belt is a process of adjusting idlers, pulleys, and loading conditions in a manner that will correct any tendencies of the belt to run other than true.

A normal sequence of training is to start with the return run working toward the tail pulley and then follow with the top run in the direction of belt travel. Start with the belt empty. After tracking is completed, run the belt with a full load and recheck tracking.

Tracking adjustment is done while the belt is running and should be spread over some length of the conveyor preceding the region of trouble. The adjustment may not be immediately apparent, so permit the belt to run for several minutes and at least three full belt revolutions after each idler adjustment to determine if additional ÔtrackingÓ is required.

After adjustment, if the belt has overcorrected, it should be restored by moving back the same idler, and not by shifting additional idlers or rollers.

If the belt runs to one side at a particular point or points on the conveyor structure, the cause will probably be due to the alignment, or leveling of the structure, or to the idlers and pulleys immediately preceding that particular area, or a combination of these factors.

If a section or sections of the belt run off at all points along the conveyor, the cause is possibly in the belt itself, in the belt not being joined squarely, or in the loading of the belt. With regard to the belt, this will be due to camber. Its condition should improve after it is operated under full load tension. It is a rare occasion when a cambered belt (less than 1/2%) needs to be replaced.

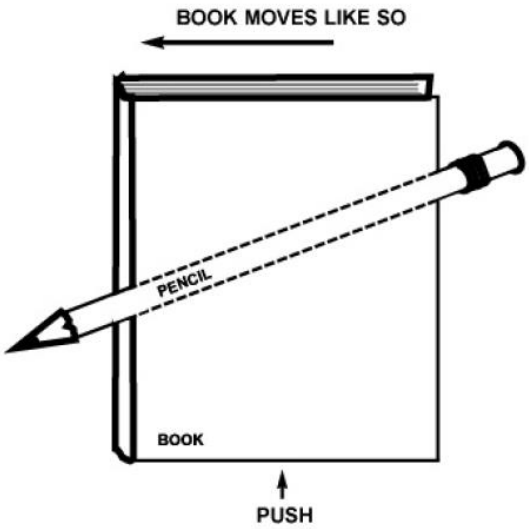
These basic rules can be used to diagnose a belt running poorly. Combinations of these rules sometimes produce cases which do not appear clear-cut as to cause, but if there is a sufficient number of belt revolutions, the running pattern will become clear and the cause disclosed. In those unusual cases where a running pattern does not emerge, it is quite likely that at some point the belt is running so far off that it is fouling structure or mounting brackets, bolts, etc. This results in highly erratic performance and can be a real problem. We would suggest that in this event the full tracking procedure be employed. It is quite likely that the erratic performance will be resolved in the process.

When replacing a used belt, go through the system and square and level all rollers, idlers, pulleys and bed before training a new belt.

Basic/Primary Rule of Tracking

The basic and primary rule which must be kept in mind when tracking a conveyor belt is simple, **THE BELT MOVES TOWARD THAT END OF THE ROLL/IDLER IT CONTACTS FIRST.**

The reader can demonstrate this for himself very simply by laying a small dowel rod or round pencil on a flat surface in a skewed orientation. If a book is now laid across the dowel rod and gently pushed by oneÕs finger in a line directly away from the experimenter, the book will tend to shift to the left or right depending upon which end of that dowel rod the moving book contacts first.



Pulley Crown on Lightweight and Monofilament Belt

A crowned pulley can be regarded as a special case of our primary rule of tracking as stated above. The right half of the belt is contacting the center of the pulley sooner than it contacts the right edge of that pulley and therefore will tend to move toward the center. The reverse is true of the left half of the belt. The two forces tend to balance one another by centering the belt.

In addition to this **surface effect,** however, there is a strong internal "balancing of warp tensions occurring." Consider any warp yarn not directly on the center line. If the belt is forced off-center and this warp yarn is drawn toward the mid-point of the crown, tension will be increased on that yarn. As the belt revolves and that yarn seeks to move back to its normal position, this tension will diminish. Yarns on both sides of the belt seek that position which results in the least stress to themselves, consistent with the physical structure across which they are stressed and consistent with their individual position within the matrix of the belt carcass. Accordingly, the belt will shift on the crowned pulley until these stressing forces are balanced and minimized Ðcentering the belt.

Experiment has shown that a crown is most effective when it has a long unsupported span of belt approaching the pulley. The lateral position of the belt can be influenced by the crown more easily when there is a minimum of resistance being offered by a supporting slider bed or by supporting idlers.

All-State Belting goes to great lengths to provide balanced carcass belts so that the belt will self center and track on the crown.

In most non-unit-handling conveyors this optimum condition does not exist on the top run and consequently, crown on the head pulley is of little value in training the belt. Further, it is a distinct detriment as far as lateral distribution of tension in the belt is concerned. Head pulleys therefore, should be uncrowned in normal circumstances. Tail pulleys and take-up pulleys which may have a fairly long approaching span without support can be crowned with some beneficial results.

The effectiveness of the crown is increased to a length of approximately 10 feet. Lengthening the unsupported span beyond 10 feet does not seem tc increase the effectiveness of the crown. Diminishing the length of the unsupported span on the other hand, does diminish the effectiveness of the crown. The shorter the unsupported span, the less effective the crown will be. Snub pulleys can reduce effectiveness by 50% or more.

We recommend a standard pulley crown of 1/16" on radius per foot of pulley face. This results in an increase in pulley diameter at a point 12" from the edge of the pulley of 1/8" above the edge diameter. A crown of 1/8" per foot should be considered maximum. Crowns may be trapezoidal or radius.

It is further recommended that the crown not be carried beyond a point 18" in from the edge of the pulley. If the pulley width is greater than 36" it is recommended that a trapezoidal pulley be used. In other words, that pulley will have a flat face in its center equivalent to the amount that the pulley width exceeds 36". Radius crowns work, but may take a few minutes longer to stabilize.

With the advent of CNC Machining, we see more use of radial crowns, but the same rule regarding maximum crown should apply. **Special Note:** The belt must stretch to conform to the crown or it will not be effective.

Equipment Induced Camber

Camber can be induced into a perfectly straight belt by the roll or rolls preceding the camber. If the roll is cocked, the belt will react and will move toward that end of the roll which it contacts first. This, of course, throws the belt off-center. If now, subsequent structural adjustments center that roll, the belt installation will be left with a cambered appearance. This camber may be removed by simply aligning the roll or rolls which are cocked.

Specific Training Sequence

Emergency

If the conveyor system, including the belt, has been designed, built and installed according to good engineering and manufacturing practice, the belt should track at start-up. There may be minor variations from the ideal because of manufacturing tolerance–thiswill simply result in a system in which the belt is not tracking absolutely perfectly, but one in which the belt can be operated without belt damage long enough for the tracking sequence to take place. Normally belt width is less than pulley face width and a small amount of belt movement will not cause any damage.

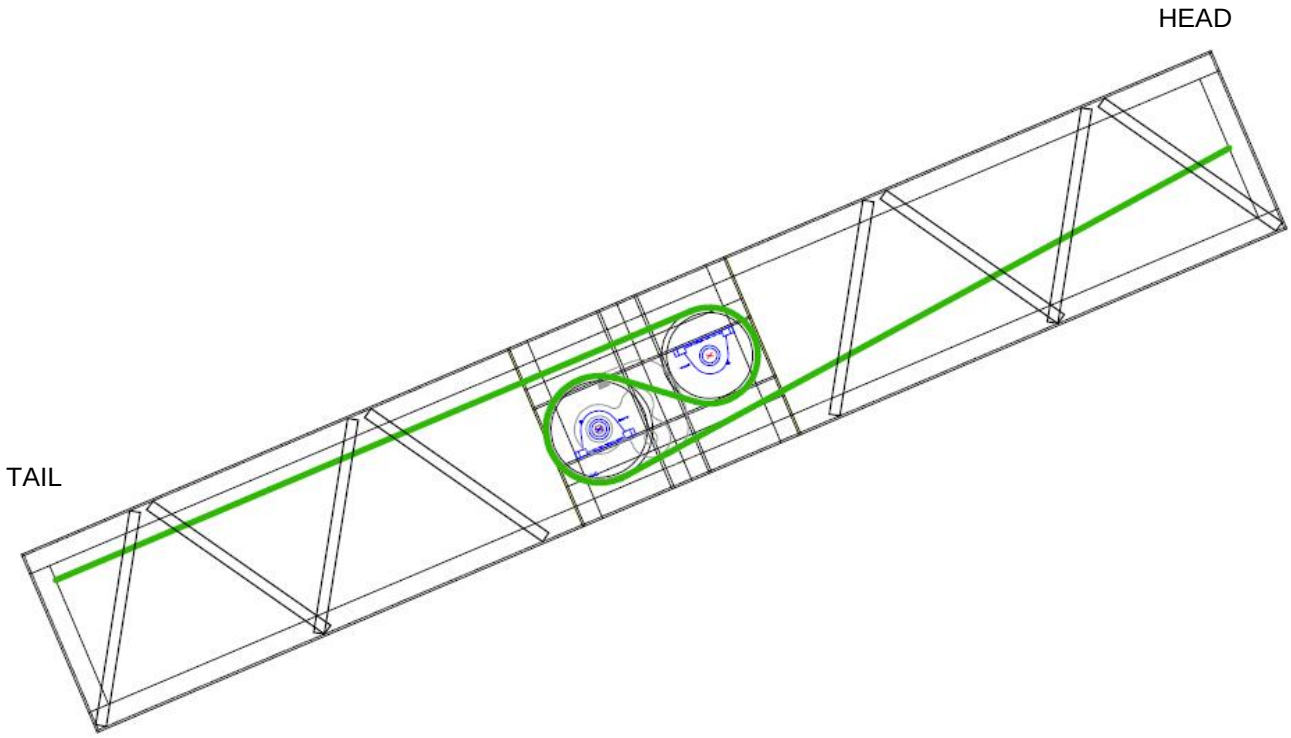
Occasionally, there may be a serious maladjustment or defect in the system which will throw the belt of to such a degree as to threaten belt damage. It may actually be necessary to station men at each end of the conveyor and physically force the belt back in line by means of a smooth, steel bar. In extreme cases it may even be necessary to shut the conveyor down, make any adjustment indicated, and then restring and reposition the belt before start-up. In any case, it is extremely important to avoid belt damage. Once a belt is damaged, it will not necessarily recenter itself.

If the conveyor structure has been checked, appears to be true, and all rolls appear to be perpendicular to the system center line and severe belt tracking problems still persist, it is advisable to shut the system down and establish **a belt center line** as a frame of reference. (Use the technique outlined previously in this discussion.) Now that a belt center line has been established. Use this line as the reference for the adjustment of each individual pulley, snubber, roll, etc. Once all rolls are perpendicular to the belt center line, the belt will track well enough so that the specific training sequence can commence.

(If it was necessary to establish the belt center line, double-check the system structure. Normally, the system center line and belt center line are equivalent. A variance suggests that something has been overlooked in examination of the structure, pulleys, idlers, etc.)

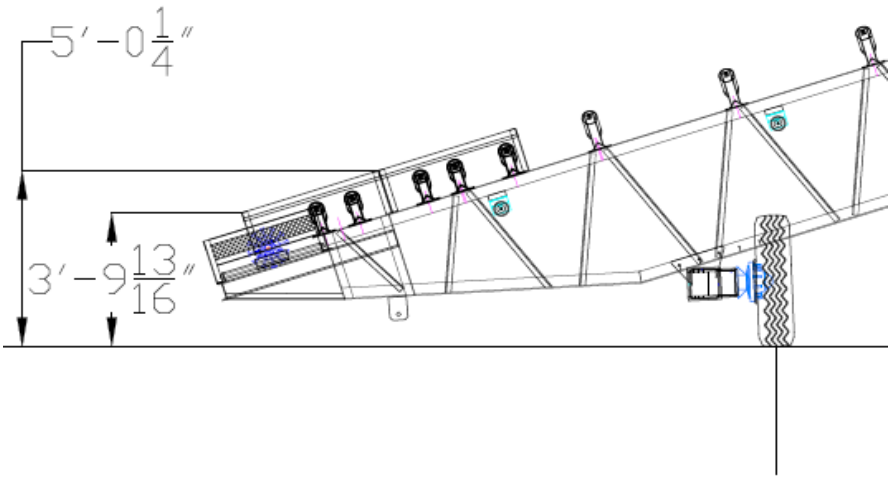
APPENDIX B

WRAP DRIVE SCHEMATIC



APPENDIX C
Grain Stacker Load Zone/Idler Arrangement

Grain Stacker Second Axle Placement



APPENDIX D

BOLT TORQUE RECOMMENDATIONS

Size	Recommended Torque											
	Grade 2		Grade 5		Grade 8		18-8 S/S		Bronze		Brass	
	Coarse	Fine	Coarse	Fine	Coarse	Fine	Coarse	Fine	Coarse	Fine	Coarse	Fine
#4*	-	-	-	-	-	-	5.2	-	4.8	-	4.3	-
#6*	-	-	-	-	-	-	9.6	-	8.9	-	7.9	-
#8*	-	-	-	-	-	-	19.8	-	18.4	-	16.2	-
#10*	-	-	-	-	-	-	22.8	31.7	21.2	29.3	18.6	25.9
1/4	4	4.7	6.3	7.3	9	10	6.3	7.8	5.7	7.3	5.1	6.4
5/16	8	9	13	14	18	20	11	11.8	10.3	10.9	8.9	9.7
3/8	15	17	23	26	33	37	20	22	18	20	16	18
7/16	24	27	37	41	52	58	31	33	29	31	26	27
1/2	37	41	57	64	80	90	43	45	40	42	35	37
9/16	53	59	82	91	115	129	57	63	53	58	47	51
5/8	73	83	112	128	159	180	93	104	86	96	76	85
3/4	125	138	200	223	282	315	128	124	104	102	118	115
7/8	129	144	322	355	454	501	194	193	178	178	159	158
1†	188	210	483	541	682	764	287	289	265	240	235	212

* Sizes from 4 to 10 are in lb-in.
Sizes from 1/4 up are in lb-ft.
† Fine thread figures are for 1-14.
Grade 2, 5, and 8 values are for plated bolts.

APPENDIX E

Lubrication Guide

Jones ...Since 1890

Spherical Roller Bearings
Collar Mounted Units
JA, JE, JYR, JYRP, JN, JT

Method

All Jones Mounted Units are shipped pre-lubircated with enough grease for initial operation. Units are also supplied with a grease fitting for relubrication. It is recommended that bearings be lubricated while running. Caution should be used with high pressure grease guns or automatic lubrication equipment where high pressure could blow out or damage seals.

Type of Grease

All mounted units come with a lithium soap based grease, NLGI 2 consistency. In general, this type of grease is good for temperatures up to 200° F. This type of grease is very common and readily available from local suppliers. Consult Jones for high temperature or special application lubrication. Both frequency and quantity of lubrication are very important and can vary depending on speed or environment. Consult charts below for specific application information.

Speed	Temperature	Environment	Frequency
100 Rpm	- 125 F	Clean	4 Months
500 Rpm	- 150 F	Clean	2 Months
1000 Rpm	- 200 F	Clean	2 Weeks
1500 Rpm	+150 F	Clean	Weekly
All Speeds	- 150 F	Dusty	1 to 4 Weeks
All Speeds	+150 F	Dusty	Daily to Weekly
All Speeds	All	Very Dirty	Daily to Weekly
All Speeds	All	Hostile	Daily to Weekly

Lubrication Frequency Guidelines

The frequency of lubrication depends on the application and envisionment. This chart provides general guidelines for the lubrication rate of Jones bearings. Although it is generally an adequate guide for grease lubrication, these rates can vary depending on other circumstances like moisture or chemicals present, or with the type of grease selected for various applications.

Recommended Relubrication

The table at right gives the rate of relubrication for Jones mounted bearings as supplied with NLGI grade 2 grease and operating within the temperature range of -30°F to +200° F. Bearings should be relubricated while running for even distribution. Seals are designed to be grease purge able under low pressure application. Excess grease should be allowed to collect at the seasl for extra protection against contaminants. Consult Jones for special seals or applications where excess moisture, corrosion, or extreme conditions exist .

Shaft Size (inches)	Grease Rate (ounces)
1 3/8 to 1 7/16	.22
1 ½ to 1 11/16	.32
1 ¾ to 2	.50
2 to 2 3/16	.55
2 ¼ to 2 ½	.65
2 11/16 to 3	.85
3 3/16 to 3 ½	1,25
3 15/16 to 4	2.50
4 7/16 to 4 ½	3.10
4 ½ to 4 15/16	4.00

NOTICE

AFTER 8 HOURS OF OPERATION – RETIGHTEN BOLTS

- Head & Tail Pulley Bushings (Taperlocks)
- Sheave Bushings (Taperlocks)
- Bearings
    - Including Set Screws
- Drive
- Motor
- Guards
- Check Belt Alignment

SPECIAL NOTE:

- CHECK OIL LEVEL IN GEARBOX
- GREASE BEARINGS