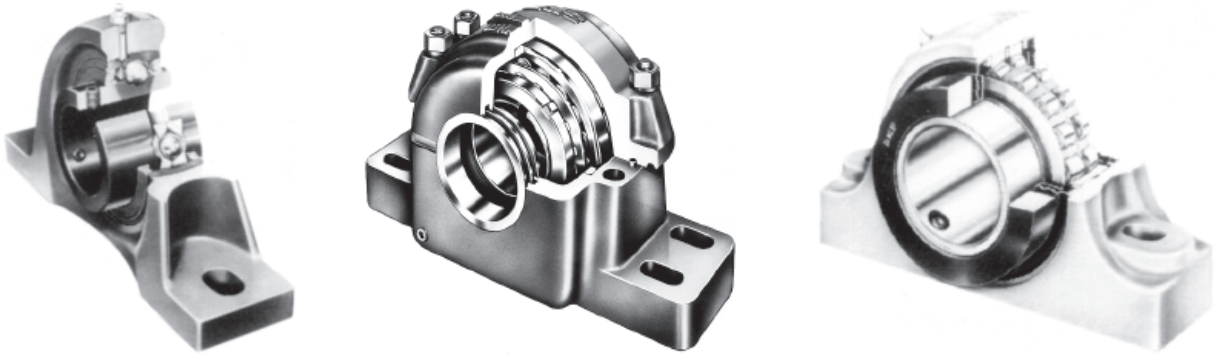




Bearing Lubrication

OPERATION & MAINTENANCE

Revised: 08/24/15



IMPORTANT!

READ BEFORE PROCEEDING!

The information contained herein is, to the best of our knowledge, accurate and applicable for proper operation and installation of the specified equipment at the time this document entered service. Before proceeding, it is recommended that you check for a more current version of this Installation Operation Manual (IOM) on our website at www.johnsoncontrols.com.

Read carefully before attempting to assemble, install, operate or maintain the product described. Protect yourself and others by observing all safety information. Failure to comply with instructions could result in personal injury and/or property damage! Retain instructions for future reference.

INTRODUCTION & LUBRICATION

BEARING TYPES

YORK® by Johnson Controls typically furnishes one of three basic bearing types for centrifugal, axial, and propeller fans - ball bearing, spherical roller bearing, spherical roller bearing with split housing. The bearing type and manufacturer are indicated on each bearing.

OPERATING CONDITIONS

Bearings should not be located in the airstream or an environment with a heavy concentration of abrasive elements. YORK® by Johnson Controls does not recommend grease lubricated bearings for ambient temperatures above 200°F. For information on water or oil-cooled bearings contact factory.

GREASE SELECTION

Various types and brands of grease are suggested for your specific bearing type and application to be used. In all cases one should avoid mixing different brands of grease.

INITIAL GREASING

All standard bearings provided by YORK® by Johnson Controls should be purged and relubricated before operation. Using the approved grease or an equivalent, lubricate the bearing and housing reservoir through the pressure lubrication fitting. Complete greasing is assured if grease is worked in on one side of the bearing until grease appears on both sides. If the bearing will be operated at less than 150 RPM, and in dirty conditions, more grease is desirable. The bearing will discharge excess

grease through seals after a short period of operation. It is not necessary to replace this initial discharge because leakage will cease when the excess grease is worked out.

RELUBRICATION

The initial greasing interval can be determined by the conditions or bearing instructions which follow. By carefully observing the condition of the grease expelled from bearings at the time of relubrication, it can be determined whether the maintenance schedule should be altered. When regreasing, avoid mixing different brands of grease.

CHART 1: TEMPERATURE RANGES FOR RECOMMENDED TYPES OF GREASE

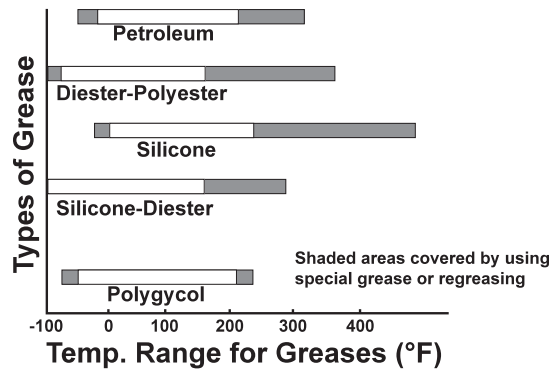


TABLE 1: GREASE LUBRICATION

Operating Condition		Bearing Operating Temperature	Greasing Interval	Use Grease Equivalent to These Grades	Remarks
Dirt	Moisture				
Fairly Clean	None	32°F to 120°F 120°F to 160°F 160°F to 200°F	6 to 12 Months 1 to 2 Months 1 to 4 Weeks	Phillips Petroleum Co. - Philube L #1 Master Lubricants Co. - Lubrike M-3 Spec Atlantic Refining Co. - Atlantic 62 Imperial Oil Ltd. - Andok 280 Standard Oil Co. (Ind.) - Amelith #1 Sun Oil Co. - Sunoco 844 - X New York & New Jersey Lubricant Co. - F- 925 Mobil Oil Co. - Mobilux #1	Customer should provide flinger or place a hood over bearing housing and fasten a disc to shaft just inside of hood shaft opening. Consult Link-Belt.
Moderate to Extremely Dry	None	32°F to 160°F 160°F to 200°F	1 to 4 Weeks 1 Week		
Fairly Clean	Heavy Moisture & Direct Water Splash	32°F to 200°F	1 Week		
		32°F to 200°F	Determined by Frequent Inspection of Installation	Shell Oil Co. - Alvania EP2 Texas Co. - Sovarex grease L-1	-
	None	32°F to -40°F	Consult Link-Belt Application Eng.	Mobil Oil Co. - Mobilgrease BRB Zero Texas Co. - 2324 Uni Temp Ep	Cold Storage Room.
	None	Over 200°F or -40°F	Consult Link-Belt Application Eng.	Special lubrication may be required. Consult Link-Belt.	A different Link-Belt bearing may be required using oil as a lubricant, etc.

Note: Frequency of regreasing will vary, depending on the hours of operation, temperature, and surrounding conditions.

STORAGE, PRECAUTIONS, AND HIGH TEMPERATURE APPLICATIONS

STORAGE

All fan bearings must be relubricated soon as they arrive from the factory. To prevent corrosion, all bearings should receive grease and be rotated the first of every month. Turn the wheel by hand while greasing bearings. A clean 1/16" bead of grease must appear on each side of each bearing. Refer to specific bearing lubrication instructions on the fan.

Bearings which are to be stored or idle for an extended period of time should be wrapped in a neutral grease proof paper, foil or plastic film. Compounds can be recommended by the bearing manufacturer to provide protection for several months to several years.

After long-term storage, grease should be purged from the bearings and fresh purged from the bearings an grease injection prior to start-up.

INSTRUCTIONS FOR SPECIFIC BEARINGS

Below and on the following pages are copies of the lubrication instructions labels similar to those for the standard bearings provided on YORK® by Johnson Controls products. If additional information is required for these or other bearings provided by YORK® by Johnson Controls, contact the bearing manufacturer directly.

TABLE 2: GREASE LUBRICATION SCHEDULE

Link-Belt © Ball Bearings - Series 300
SKF Ball Bearings - SY
Sealmaster Ball Bearings - MP
Dodge Ball Bearings for use on horizontal shaft equipment.

Shaft Size (Inches)	Operating Speed (RPM)									
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
	Lubrication Cycle (Months)									
5/8 thru 1	6	6	6	6	4	4	4	4	2	2
1 1/8 thru 1 1/2	6	6	6	4	4	4	2	2	2	1
1 5/8 thru 1 15/16	6	6	6	4	4	2	2	1	1	*
2 thru 2 1/2	6	6	4	4	2	1	1	*	*	*
2 11/16 thru 3 3/16	6	4	2	2	1	1	1/2	*	*	*
3 7/16 thru 3 15/16	6	4	2	1	*	*	*	*	*	*

* Consult the manufacturer or specific recommendations.

Lubricate with the following greases or their equivalent:

Shell *Alvania EP Grease No. 2*
Gulf *Gulfcrown Grease No. 2 Texaco*
Molytex *Grease No. 2*
American *Amolith Grease No. 2*
Mobil *Mobilux EP2*

BEARING PRECAUTIONS

1. The bearing manufacturer's warranty requires proper periodic lubrication to avoid erosion. Refer to label on housing for proper instructions.
2. Grease lubricated bearings are not recommended for ambient temperatures above 200°F.
3. Bearings which are to be stored or idle for more than one (1) month should be wrapped in neutral grease proof paper, foil or plastic film. During storage bearings should be rotated monthly to prevent corrosion. Fresh grease should be injected prior to start-up.

HIGH TEMPERATURE APPLICATIONS

Bearings are lubricated with high temperature grease. The grease is water-resistant and has good corrosion protective properties. If fans are to be stored for a period of time, lubricate bearings and rotate shaft monthly to prevent moisture contamination. Lubrication frequency after startup must be based on the condition of the old grease being purged during lubrication. The grease should be relatively clean. The lubrication frequency will vary depending on the fan speed, bearing operating temperature and cleanliness of the application.

1. If fans are to be stored after arrival at the job site, bearing should be immediately relubricated and shaft rotated monthly for corrosion protection.
2. Normal conditions are defined as a clean, dry atmosphere at temperatures between -20°F and 180°F. Greater temperatures, moisture or dirt content will require more frequent lubrication cycles.
3. Use sufficient volume of grease to purge the bearing seals. Rotate bearings during relubrication where good safety practice permits.

GREASE LUBRICATION SCHEDULES

TABLE 3: GREASE LUBRICATION SCHEDULE

Link-Belt © Spherical Roller Bearings - Series B22400 and B22500 for use on horizontal shaft equipment.

Shaft Size		Amount of Grease		Operating Speed (RPM)									
				500	1000	1500	2000	2200	2700	3000	3500	4000	4500
IN	MM	IN ³	CM ³	Lubrication Cycle (MONTHS)									
3/4 - 1	25	0.39	6.4	6	6	6	4	4	4	2	2	1	1
1 1/8 - 1 1/4	30	0.47	7.7	6	6	4	4	2	2	1	1	1	1
1 7/16 - 1 1/2	35	0.56	9.2	6	4	4	2	2	1	1	1	1	1/2
1 5/8 - 1 3/4	40	0.8	13.1	6	4	2	2	1	1	1	1	1/2	-
1 15/16 - 2	45-50	0.89	14.6	6	4	2	1	1	1	1	1/2	-	-
2 3/16 - 2 1/4	55	1.09	17.9	6	4	2	1	1	1	1/2	-	-	-
2 7/16 - 2 1/2	60	1.3	21.3	4	2	1	1	1	1/2	-	-	-	-
2 11/16 - 3	65 - 75	2.42	39.7	4	2	1	1	1/2	-	-	-	-	-
3 3/16 - 3 1/2	80 - 85	3.92	64.2	4	2	1	1/2	-	-	-	-	-	-
3 11/16 - 4	90 - 100	5.71	93.6	4	1	1/2	-	-	-	-	-	-	-
4 3/16 - 4 1/2	110 - 115	6.5	106.5	4	1	1/2	-	-	-	-	-	-	-
4 15/16 - 5	125	10	163.9	2	1	1/2	-	-	-	-	-	-	-

These guidelines are for usage on applications approved by FMC. Lubricate with a multipurpose roller bearing NLGI Grade 1 or 2 grease having rust inhibitors, antioxidant additives, and minimum oil viscosity of 400 SSU at 100°F. For operation requiring a monthly or less cycle the grease should also be suitable for temperatures up to 250°F continuous, dynamically stable and must not churn or whip.

Some greases having the desired properties are:

American - Rykon Grease No. 2, Mobil - Mobilgrease® 28, Texaco - Molytex EP2 grease.

If bearings are subjected to temperatures below 32°F or above 200°F, consult equipment manufacturer for proper lubrication. Conditions of vibration exceeding 1 to 2 mils, moisture or dirt will require a more frequent lubrication cycle or special lubricant selection. Rotate bearings during relubrication where good safety practice permits. Lubricate bearings prior to extended shutdown or storage and rotate shaft monthly to aid corrosion protection.

GREASE LUBRICATION SCHEDULES

TABLE 4: GREASE LUBRICATION SCHEDULE

FYR and SYR Unit Pillow Blocks with SKF Spherical Roller Bearing - Relubrication Interval Hours.

Shaft Dia.	Pillow Block Number	Speed (RPM)										Grease To Be Added (OZ.)	
		300	500	700	900	1100	1300	1500	1800	2400	2700		3000
1 7/16	107	7220	4265	3000	2300	1850	1545	1315	1070	760	660	580	0.33
1 11/16	111	6775	3995	2800	2140	1715	1425	1210	980	690	595	515	0.35
1 15/16	115	6400	3760	2630	2000	1600	1325	1120	900	625	535	460	0.37
2 3/16	203	6070	3555	2475	1800	1495	1230	1040	830	565	480	410	0.45
2 7/16	207	5530	3215	2220	1670	1320	1075	900	705	465	385	320	0.67
2 11/16	211	5090	2935	2010	1495	1170	945	780	600	375	300	-	0.72
2 15/16	215	5090	2935	2010	1495	1170	945	780	600	375	300	-	0.72
3 7/16	307	4560	2590	1750	1280	980	775	625	460	200	-	-	1.15
3 11/16	311	4265	2400	1600	1155	875	675	535	380	-	-	-	1.50
3 15/16	315	4265	2400	1600	1155	875	675	535	380	-	-	-	1.50

Notes: Lubricate with a Grade 2 lithium or non-soap base grease having oil viscosity of 500-1000 SUS at 100°F. Some suggested greases are: Amoco Rykon Premium Grease No. 2, Texaco Premium RB, Mobil Mobilith AW2, Shell Alvania Grease 2, Gulfcrowne Grease No. 2, Shell Alvania #2. Should bearing operating temperature be below -20°F or above 180°F, consult fan manufacturer for lubrication recommendations. If fans are to be stored after arrival at job site, bearings should be immediately relubricated and shaft rotated monthly for corrosion protection.

GREASE LUBRICATION SCHEDULES

TABLE 5 : GREASE LUBRICATION SCHEDULE

SAF 225/226 Split Housing Pillow Blocks with SKF Spherical Roller Bearings

Shaft Dia.	Pillow Block Number	Relubrication Interval (Hours)	SPEED (RPM)										Grease To Be Added (OZ.)		
			300	500	700	900	1100	1300	1500	1800	2400	2700	3000	225	226
09	1 7/16		6775	3995	2800	2140	1715	1425	1210	980	690	595	515	0.35	0.52
10	11 1/16		6400	3760	2630	2000	1600	1325	1120	900	625	535	460	0.37	0.79
11	11 5/16		6070	3555	2475	1880	1495	1230	1040	830	565	480	410	0.45	0.93
13	2 3/16		5530	3215	2220	1670	1320	1075	900	705	465	385	320	0.67	1.21
15	2 7/16		5090	2935	2010	1495	1170	945	780	600	375	300		0.72	1.58
16	2 11/16		4900	2810	1915	1420	1105	885	725	550	330	260		0.83	1.77
17	2 15/16		4720	2700	1830	1345	1040	830	670	505	295			0.97	1.94
18	3 3/16		4560	2590	1750	1280	980	775	625	460				1.15	2.19
20	3 7/16		4265	2400	1600	1155	875	675	535	380				1.49	2.82
22	3 15/16		4010	2230	1465	1045	775	585	450	300				1.91	3.45
24	4 3/16		3780	2075	1385	940	680	505	370					2.24	4.02
26	4 7/16		3575	1935	1235	845	595	425	300					2.65	4.68
28	4 15/16		3385	1805	1130	755	515	350						3.06	5.5
30	5 3/16		3210	1685	1035	670	440	280						3.54	6.21
32	5 7/16		3050	1575	940	590	365							4.17	6.97
34	5 15/16		2900	1470	855	515	295							4.79	7.77

Notes: Lubricate with a Grade 2 lithium or non-soap base grease having oil viscosity of 500-1000 SUS at 100°F. Should bearing operating temperature be below 32°F or above 200°F, consult fan manufacturer for lubrication recommendations. Clean and repack annually. If fans are to be stored after arrival at job site, bearings should be immediately relubricated and shaft rotated monthly for corrosion protection.

GREASE LUBRICATION SCHEDULES

TABLE 6 : GREASE LUBRICATION SCHEDULE

Link-Belt ® Split Housing Pillow Blocks
 Dodge Split Housing Pillow Blocks
 Adapter Mounted Split Housing Pillow Blocks

Operating Condition	Bearing Operating Temperature	Greasing Interval
Fairly clean. No moisture.	32°F to 120°F	6 to 12 mo.
	120°F to 160°F	1 to 2 mo.
	160°F to 200°F	1 to 4 wk.
Moderate to extremely dirty. No moisture.	32°F to 160°F	1 to 4 wk.
	160°F to 200°F	1 wk.

Oil: Use only highest quality mineral when operating temperature is: 32°F to 150°F. Use SAE oil: 150°F to 200°F. Use SAE 50 oil. Add oil until level reaches middle of bottom roller. Maintain this level. Keep dirt and grit out of bearing.

Grease: Pack bearing by hand, working grease into all cavities. Fill housing reservoir to bottom of shaft.

Lubricate with:

- Texaco Molytex #2
- Imperial Oil Molub-Alloy #2
- Standard Oil (Ind.) Amolith #2
- Mobil Oil-Mobilux #2
- Gulf Crown #2

High Speed Operation Lubricate with:

- Texaco Molytex #2
- Imperial Oil Molub-Alloy #2*

**Use of an alternate grease will require more frequent lubrication cycles*

Notes: If fans are to be stored after arrival at job site, bearings should be immediately relubricated and shaft rotated monthly for corrosion protection. Normal conditions are defined as a clean, dry atmosphere at temperatures between -20°F and 180°F. Greater temperatures, moisture or dirt content will require more frequent lubrication cycles. Use sufficient volume of grease to purge the bearing seals. Rotate bearings during relubrication where good safety practice permits.



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