

# Tribology Guide for

- **Conveyor Plumber Blocks**
- **Electrical Motors**
- **Water Pumps**

AND



***simply superior!***

**Automatic Lubricators**

**GreaseMax South Africa CC**

Company Registration: 2007/213689/23

Vat Registration: 4820242594

Email: [sales@greasemaxsa.com](mailto:sales@greasemaxsa.com)

Phone us: 013-697-1010

Fax: 013-697-1010

Web: [www.greasemaxsa.com](http://www.greasemaxsa.com)

*GreaseMax SA is BBBEE empowered*



***simply superior!***  
**Automatic Lubricators**

## GreaseMax South Africa CC

Company Registration: 2007/213689/23

Vat Registration: 4820242594

Email: [sales@greasemaxsa.com](mailto:sales@greasemaxsa.com)

Phone us: 013-697-1010

Fax: 013-697-1010

Web: [www.greasemaxsa.com](http://www.greasemaxsa.com)

*GreaseMax SA is BBBEE empowered*

## INDEX

| <b><u>DOCUMENT</u></b>                            | <b>:</b> | <b><u>ATTACHMENT NO:</u></b> |
|---------------------------------------------------|----------|------------------------------|
| Conveyor Plumber Blocks VS Grease Max Types       | :        | 1                            |
| Electrical Motors VS Grease Max Types             | :        | 2                            |
| Warman Pump Maintenance Instruction VS Grease Max | :        | 3                            |



***simply superior!***

**Automatic Lubricators**

## **GreaseMax South Africa CC**

Company Registration: 2007/213689/23

Vat Registration: 4820242594

Email: [sales@greasemaxsa.com](mailto:sales@greasemaxsa.com)

Phone us: 013-697-1010

Fax: 013-697-1010

Web: [www.greasemaxsa.com](http://www.greasemaxsa.com)

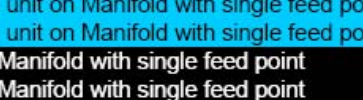
*GreaseMax SA is BBBEE empowered*

*Conveyor Plumber Blocks*

*VS*

*Grease Max Types*

## Conveyors

| <u>P/block Nr.</u>             | <u>SHAFT SIZE</u> | <u>PRE-SCRIBED GREASEMAX TYPE</u>                                       | <a href="http://WWW.GREASEMAXSA.COM">WWW.GREASEMAXSA.COM</a>                         |
|--------------------------------|-------------------|-------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <b><u>Standard Range</u></b>   |                   |                                                                         |                                                                                      |
| SNL 505                        | 20mm              | 12 MONTH (GREY)                                                         |    |
| SNL 506-605                    | 25mm              | 12 MONTH (GREY)                                                         |                                                                                      |
| SNL 507-606                    | 30mm              | 12 MONTH (GREY)                                                         |                                                                                      |
| SNL 508-607                    | 35mm              | 6 MONTH (PIENK)                                                         |    |
| SNL 509                        | 40mm              | 6 MONTH (PIENK)                                                         |                                                                                      |
| SNL 510-608                    | 45mm              | 6 MONTH (PIENK)                                                         |                                                                                      |
| SNL 511-609                    | 50mm              | 6 MONTH (PIENK)                                                         |  |
| SNL 512-610                    | 55mm              | 6 MONTH (PIENK)                                                         |                                                                                      |
| SNL 513-611                    | 60mm              | 3 MONTH (BLUE)                                                          |                                                                                      |
| SNL 515-612                    | 65mm              | 3 MONTH (BLUE)                                                          |  |
| SNL 516-613                    | 70mm              | 3 MONTH (BLUE)                                                          |                                                                                      |
| SNL 517                        | 75mm              | 3 MONTH (BLUE)                                                          |                                                                                      |
| SNL 518-615                    | 80mm              | 3 MONTH (BLUE)                                                          |  |
| SNL 519-616                    | 85mm              | 3 MONTH (BLUE)                                                          |                                                                                      |
| SNL 520-617                    | 90mm              | 3 MONTH (BLUE)                                                          |                                                                                      |
| SNL 522-619                    | 100mm             | 1 MONTH (WHITE)                                                         |  |
| SNL 524-620                    | 110mm             | 1 MONTH (WHITE)                                                         |                                                                                      |
| SNL 526                        | 115mm             | 1 MONTH (WHITE)                                                         |                                                                                      |
| SNL 528                        | 125mm             | 1 MONTH (WHITE)                                                         |  |
| SNL 530                        | 135mm             | 1 MONTH (WHITE)                                                         |                                                                                      |
| SNL 532                        | 140mm             | 1 MONTH (WHITE)                                                         |                                                                                      |
| <b><u>Heavy Duty Range</u></b> |                   |                                                                         |                                                                                      |
| SNL 3134                       | 150mm             | 1 MONTH (WHITE)                                                         |  |
| SNL 3136                       | 160mm             | 1 MONTH (WHITE)                                                         |                                                                                      |
| SNL 3138                       | 170mm             | 1 MONTH (WHITE)                                                         |                                                                                      |
| SNL 3140                       | 180mm             | 1 MONTH (WHITE)                                                         |  |
| SNL 3144                       | 200mm             | 1 OneMonth unit + 1 Three month unit on Manifold with single feed point |                                                                                      |
| SNL 3148                       | 220mm             | 1 OneMonth unit + 1 Three month unit on Manifold with single feed point |                                                                                      |
| SNL 3152                       | 240mm             | 1 OneMonth unit + 1 Three month unit on Manifold with single feed point |  |
| SNL 3156                       | 260mm             | 1 OneMonth unit + 1 Three month unit on Manifold with single feed point |                                                                                      |
| SNL 3160                       | 280mm             | x2 One Month GreaseMax's on a Manifold with single feed point           |                                                                                      |
| SNL 3164                       | 300mm             | x2 One Month GreaseMax's on a Manifold with single feed point           |  |



***simply superior!***

**Automatic Lubricators**

## **GreaseMax South Africa CC**

Company Registration: 2007/213689/23

Vat Registration: 4820242594

Email: [sales@greasemaxsa.com](mailto:sales@greasemaxsa.com)

Phone us: 013-697-1010

Fax: 013-697-1010

Web: [www.greasemaxsa.com](http://www.greasemaxsa.com)

*GreaseMax SA is BBBEE empowered*

*Electrical Motors*

*VS*

*Grease Max Types*

## Electrical Motors vs. GREASEMAX® type Guide

| KW  | R/min | Pole | Frame | Shaft Dia | GreaseMax Type                  |
|-----|-------|------|-------|-----------|---------------------------------|
| 37  | 2950  | 2    | 200L  | 55        | 12Month Type (color code: GREY) |
|     | 1475  | 4    | 225S  | 60        | 12Month Type (color code: GREY) |
|     | 980   | 6    | 250S  | 70        | 06MonthType (color code: RED)   |
|     | 720   | 8    | 250M  | 70        | 06MonthType (color code: RED)   |
| 45  | 2950  | 2    | 225M  | 55        | 12Month Type (color code: GREY) |
|     | 1475  | 4    | 225M  | 60        | 12Month Type (color code: GREY) |
|     | 980   | 6    | 250M  | 70        | 06MonthType (color code: RED)   |
|     | 735   | 8    | 280S  | 80        | 06MonthType (color code: RED)   |
| 55  | 2965  | 2    | 250S  | 60        | 12Month Type (color code: GREY) |
|     | 1475  | 4    | 250S  | 70        | 12Month Type (color code: GREY) |
|     | 985   | 6    | 280S  | 80        | 06MonthType (color code: RED)   |
|     | 735   | 8    | 280M  | 80        | 06MonthType (color code: RED)   |
| 75  | 2970  | 2    | 250M  | 60        | 12Month Type (color code: GREY) |
|     | 1475  | 4    | 280M  | 70        | 12Month Type (color code: GREY) |
|     | 985   | 6    | 315S  | 80        | 06MonthType (color code: RED)   |
|     | 740   | 8    | 315M  | 85        | 06MonthType (color code: RED)   |
| 90  | 2970  | 2    | 280S  | 65        | 12Month Type (color code: GREY) |
|     | 1480  | 4    | 280S  | 80        | 12Month Type (color code: GREY) |
|     | 985   | 6    | 315S  | 85        | 06MonthType (color code: RED)   |
|     | 740   | 8    | 315M  | 85        | 06MonthType (color code: RED)   |
| 110 | 2970  | 2    | 280M  | 65        | 12Month Type (color code: GREY) |
|     | 1480  | 4    | 280M  | 80        | 12Month Type (color code: GREY) |
|     | 985   | 6    | 315M  | 85        | 06MonthType (color code: RED)   |
|     | 740   | 8    | 315L  | 90        | 06MonthType (color code: RED)   |
| 132 | 2980  | 2    | 315S  | 65        | 12Month Type (color code: GREY) |
|     | 1485  | 4    | 315S  | 85        | 12Month Type (color code: GREY) |
|     | 985   | 6    | 315L  | 90        | 06MonthType (color code: RED)   |
|     | 740   | 8    | 315LX | 90        | 06MonthType (color code: RED)   |
| 160 | 2980  | 2    | 315M  | 65        | 12Month Type (color code: GREY) |
|     | 1485  | 4    | 315M  | 85        | 12Month Type (color code: GREY) |
|     | 985   | 6    | 315LX | 90        | 06MonthType (color code: RED)   |
| 185 | 2980  | 2    | 315L  | 70        | 12Month Type (color code: GREY) |
|     | 1485  | 4    | 315L  | 90        | 12Month Type (color code: GREY) |
|     | 985   | 6    | 315LX | 90        | 06MonthType (color code: RED)   |
| 200 | 2980  | 2    | 315L  | 70        | 12Month Type (color code: GREY) |
|     | 1485  | 4    | 315L  | 90        | 12Month Type (color code: GREY) |
|     | 985   | 6    | 315LX | 90        | 06MonthType (color code: RED)   |
| 225 | 2975  | 2    | 315LX | 70        | 12Month Type (color code: GREY) |
|     | 1485  | 4    | 315LX | 90        | 12Month Type (color code: GREY) |
| 250 | 2935  | 2    | 315LX | 70        | 12Month Type (color code: GREY) |
|     | 1485  | 4    | 315LX | 90        | 12Month Type (color code: GREY) |

*Significantly Larger Frame sizes / 400 KW+ motors you can start using a 03Month Type GreaseMax*

**The True Automatic Lubricator with Fail-Proof Design**



[www.greasemaxsa.com](http://www.greasemaxsa.com)





***simply superior!***

**Automatic Lubricators**

**GreaseMax South Africa CC**

Company Registration: 2007/213689/23

Vat Registration: 4820242594

Email: [sales@greasemaxsa.com](mailto:sales@greasemaxsa.com)

Phone us: 013-697-1010

Fax: 013-697-1010

Web: [www.greasemaxsa.com](http://www.greasemaxsa.com)

*GreaseMax SA is BBBEE empowered*

*Warman Pump Maintenance Instruction*

*VS*

*Grease Max Types*

## **GreaseMax International's Tribologist Reference Notes to the Water Pump Maintenance Manual Pages attached:**

Warman's are used around the world, and no doubt also in SA. Attached is a copy of the Warman maintenance procedures. My comments on these procedures:

The bearing grease given – Lithium EP2 means 001 is fine for the job. It exceeds the performance requirements set out in that it is quite water resistant – more so than a Li grease which is an advantage on pumps.

### **PAGE 1:**

Comments re bearing greasing: *'careful attention paid to grease purging of the pump end labyrinth in particularly {refer to section on Labyrinth Grease Purging} will provide extra protection against ingress of dirt and prolong bearing life'*. That certainly makes the case for GreaseMax pretty clear.

### **PAGE 2:**

Excess Grease: The immediate effect of excess grease within a bearing is increased temperature due to churning of the grease. – Again a plus for GreaseMax use.

### **Lubrication intervals:**

Example: a 'D' frame, 1000RPM, would need 2 x 3 month units {see discharge chart in Technical Notes}. In practice the simple solution is to do what is already done and use a 1 month unit – the small extra amount will not be an issue.

### **PAGE 3:**

See Labyrinth Grease Purging – again a plus for GreaseMax, continuing on to Page 4: *The Standard labyrinth grease purging nipple can be replaced with an automatic grease feeder say three months capacity on smaller frames and one month capacity on larger frames.* This no doubt was written with 1 and 3 month units in mind {that is indeed the history}. You can't get a better proposition for the use of GreaseMax than these instructions from Warman.

See recommend intervals for pump end and drive end labyrinth: - Basically you need **1 month units** for frames for A-F, CC- EE, N-R and you ideally need 2 of GreaseMax 1 month units on F-G, H, FF-GG, S-V.

I hope this assists. **GreaseMax use is all there in the Warman maintenance instructions.**

This information can be applied to other brands also.





## **INTRODUCTION**

Supplement 'BA2' should be read in conjunction with the appropriate Assembly and Maintenance Instruction Manual Supplement for the particular type of Warman Pump.

## **PARTS IDENTIFICATION**

Every Warman part has a name and a three-digit Basic Part Number. Parts with the same name, irrespective of size, have the same Basic Part Number. Thus the shaft of every Warman Pump has the Basic Number 073.

Additional letters and digits are added before and after a given Basic Number to identify a specific component part of a particular pump. This then becomes the part number of that component. Every part has its part number cast or otherwise marked on.

For example: F073M = Shaft for F005M Bearing Assembly.

For full description and part number identification, refer to the appropriate Warman Components Diagram. Names and Basic Numbers are used in assembly instructions in this manual. The relevant Warman Basic Numbers are listed at the end of this supplement.

In all correspondence with Warman International Ltd. or their representatives, and especially when ordering spare parts, it is advisable to use correct names as well as full part numbers to prevent misunderstandings or wrong deliveries. When in doubt, the pump serial number should be quoted as well.

## **BEARING LUBRICATION**

It is recommended that lubricating grease used in rolling bearings should have the following characteristics:

A lithium complex soap thickener grease with EP additives and oxidation inhibitors.

N. L. G. I. Consistency No .....2

Drop Point ..... $\geq 260^{\circ}\text{C}$

Work penetration @  $25^{\circ}\text{C}$  (ASTM) .....265 to 295

### **RECOMMENDED BEARING GREASE:**

MOBIL HP or equivalent.

A correctly assembled and pre-greased bearing assembly, (see Assembly Instructions) will have a long trouble free life, provided that it is protected against ingress of water or other foreign matter and that it is adequately maintained. Careful attention paid to grease purging of the pump end labyrinth in particular (refer to section on Labyrinth Grease Purging) will provide extra protection against ingress of dirt and prolong bearing life.

It must be left to the good judgement of maintenance personnel, to open the bearing housing at regular intervals (not longer than twelve months) to inspect bearings and grease and to then determine each time the course of action for the period up to the next inspection. This is the preferred method.

If a regular addition of grease is judged necessary, or for unusual circumstances where extreme conditions warrant additional lubricant to be supplied, the plugs on the bearing assembly maybe replaced with grease nipples. Grease nipples must be cleaned prior to use, to prevent ingress of dirt into the bearings whilst greasing. It is preferable to lubricate often and sparingly, than to add large amounts at long intervals. Bearings should not be over greased.

The frequency and amount of lubricant to be added periodically depends upon a number of factors and a combination of them, including speed and size of bearing, duration and extent of on-off operation, and the usual environmental conditions such as ambient and operating temperatures, splash from the shaft seal and the presence of contaminants.

**Excess Grease:** The immediate effect of an excess of grease within a bearing is increased temperature due to the churning of the grease. This particularly is to be avoided. If bearings run too hot after a change of grease, the trouble is likely to be due to over greasing. Adding more lubricant to correct the overheating could make the problem worse.

There is always some risk of damage due to over-lubricating especially in the case of the frame sizes of D and smaller. Such cautionary measures to avoid over-lubrication, however, do not warrant neglecting the bearings completely. Therefore, judgement and experience should be the final determining factors in establishing routine lubrication procedures. Consequently it is advisable to observe the bearing frequently at the outset of operations taking careful note of any unusual conditions regarding temperature and cleanliness.

#### Use only recommended clean grease.

For ordinary conditions of continuous operation where bearing operating temperatures do not exceed the temperature where the grease loses its ability to lubricate and seal, the guidelines tabulated below can be used.

#### SUGGESTED LUBRICATION INTERVAL FOR BOTH PUMP AND DRIVE END BEARINGS (Hours)

| FRAME | BEARING | ADD g<br>PER<br>BRG | PUMP SPEED |       |      |      |      |      |      |      |      |      |      |      |      |
|-------|---------|---------------------|------------|-------|------|------|------|------|------|------|------|------|------|------|------|
|       |         |                     | 200        | 300   | 400  | 600  | 800  | 1000 | 1200 | 1500 | 2000 | 2500 | 3000 | 3500 | 4000 |
| A     | A009    | 5                   | -          | -     | -    | -    | -    | -    | 2100 | 1700 | 1300 | 1000 | 800  | 650  | 500  |
| B     | B009    | 10                  | -          | -     | -    | -    | -    | 2200 | 1800 | 1400 | 1050 | 800  | 650  | 500  | 370  |
| C     | C009    | 15                  | -          | -     | -    | -    | 2200 | 1750 | 1400 | 1200 | 800  | 580  | 460  | 350  | -    |
| D     | D009    | 25                  | -          | -     | -    | 2500 | 1750 | 1450 | 1100 | 850  | 650  | -    | -    | -    | -    |
| E     | E009    | 40                  | -          | -     | 3300 | 2050 | 1500 | 1100 | 850  | 650  | 500  | -    | -    | -    | -    |
| F     | F009    | 65                  | -          | 3900  | 2900 | 1700 | 1200 | 850  | 650  | 500  | -    | -    | -    | -    | -    |
| G     | G009    | 120                 | 5000       | 3100  | 2300 | 1400 | 850  | 650  | -    | -    | -    | -    | -    | -    | -    |
| H     | H009    | 325                 | 4000       | 2400  | 1600 | 1000 | 650  | -    | -    | -    | -    | -    | -    | -    | -    |
|       | H009D   | 155                 | 20000      | 13000 | 8500 | 5500 | -    | -    | -    | -    | -    | -    | -    | -    | -    |

### QUALIFICATION

The above table is based on normal operating conditions and intended to be a guideline. Normal operating conditions include:

- Clean environment - Pump gland correctly adjusted.
- Pump indoors.
- Normal ambient temperatures (10 to 35°C).
- Minimal spray from either badly maintained gland or from heavy washing down.
- Pump running below full power or speed rating.
- Tabulated figures are based on bearing temperatures of 70°C measured on the bearing housing. Intervals should be halved for every 15°C increase above 70°C. The maximum permissible operating temperature for the grease should not be exceeded.

Very dirty or damp atmospheric conditions or conditions that varied from those listed above would require that the recommendations be stepped up to a level that prevents contaminants from entering the bearings.

### INITIAL GREASE FILL

The recommended initial quantities of grease to be used for each bearing is given on the attached Basic Bearing Assemblies information sheet.

### IMPORTANT

1. During assembly, fill the space between the bearing and end cover with grease. This assists with subsequent labyrinth grease purging.
2. Pump grease into each labyrinth end cover seal until it emerges on the outside before starting the pump for the first time.

### LABYRINTH GREASE PURGING

Less contaminants entering the Bearing Assembly will result in longer bearing life and ultimately a cost saving. Consequently, careful attention paid to labyrinth grease purging is an essential maintenance requirement.

#### **Type '-10' Bearing Assembly Sealing Arrangement**

Type '-10' is Warmans' standard Bearing Sealing Arrangement and is patented world-wide. The design uses a V-ring seal and larger flinger-labyrinth arrangement for added protection against grit and moisture penetrating to the bearing cavity. To improve the sealing of the pump and drive ends of bearing assemblies, a radially drilled hole in the end covers allows grease to be fed into the space between the piston rings to form a pressurised barrier between the two piston rings. A small groove in the end cover allows the majority of the purging grease to enter the labyrinth seal and hence purge away contaminants. The small amount of grease that enters the bearings will assist in their lubrication and the grease that escapes outwards together with the centrifuging effect when the pump is running will keep the labyrinth purged of grit and moisture. To

improve the purging, particularly on the pump end of the bearing assembly, the standard labyrinth grease purging nipple can be replaced with an automatic grease feeder (say three months capacity on smaller frames [smaller than F or EE, R frame] and one month capacity on the larger frames [F or EE, R frame and larger]).

**The type of grease used for labyrinth sealing should be the same as that used for lubricating the bearings.**

If an automatic grease feeder is used it will only be necessary to check at regular intervals that it has not fully discharged. If grease nipples are utilised, the guidelines as tabulated below should be followed.

Grease purging of the end cover labyrinth seals only adds minor amounts of grease to the bearings. Consequently, bearing maintenance and greasing should not be neglected, and the recommendations (Bearing Lubrication) need to be followed.

#### **RECOMMENDED INTERVALS FOR "10" LABYRINTH GREASE PURGING**

##### **Important**

1. Always pump grease into each labyrinth end cover seal until it emerges on the outside before starting the pump for the first time.
2. Labyrinth grease purging is normally carried out when the pump is running.
3. Pump labyrinth end cover greasing is best carried out by installing an automatic greaser. If a reliable automatic feeder is used the grease quantities can be reduced to half of the values tabulated below.

|                     | FRAMES                    |                              |
|---------------------|---------------------------|------------------------------|
|                     | A - F<br>CC - EE<br>N - R | F - G, H<br>FF - GG<br>S - V |
| Pump End Labyrinth  | 8 shots daily             | 16 shots daily               |
| Drive End Labyrinth | 8 shots weekly            | 16 shots weekly              |

\* Shots are from a standard hand operated grease gun (1 shot = 1 gram).

#### **ASSEMBLY INSTRUCTIONS**

When bearing assemblies have been dismantled for complete overhaul, all parts should be closely inspected and new parts checked for correct identification.

Used parts being replaced should be thoroughly cleaned and repainted where required. Mating faces and spigots should be free of rust, dirt and burrs and given a coat of grease before they are fitted together to assist future overhaul.



