February 17, 2024

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Relubrication is not required as Solid Oil contains such a large reservoir of oil that it will outlast the life of the bearing.

It does not need seals
Seals are not needed to retain the lubricant in the bearing, for example on vertical shafts. However, if the arrangement already incorporates seals, they should be retained as extra protection against contamination.

From: Roman Wajda
Sent: Wednesday, February 7, 2024 8:14 AM
To: nickagius2014@gmail.com
Cc: 'russ dejesus'
Subject: RE: Poly-Oil for ACHE bearings

Nick, the Poly-oil lubrication does not impact the bearing L10 life which is based on a fatigue limit. I agree that using Poly-Oil for vertical shaft air coolers is a great idea as they are not high speeds (typically < 400rpm's). All manufactures offer this option but call it something else like Solid-Oil or Solid-Grease. We call it Poly-Oil. That one TCE site with heavy fans and lack of re-lubrication abilities would be an ideal test especially in your norther climate. Keep me posted Nick.

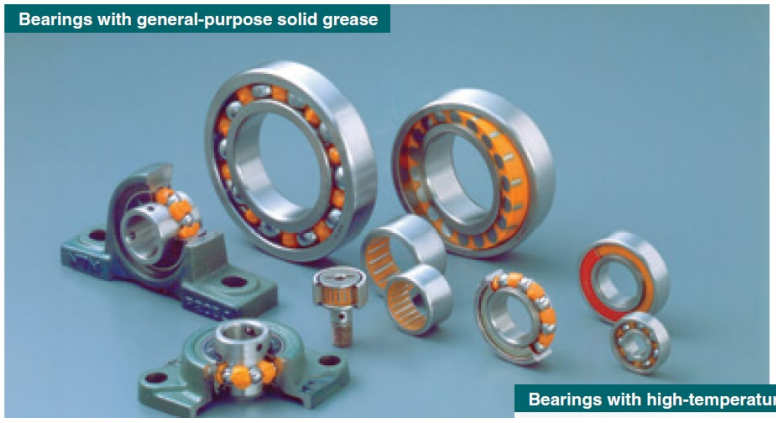
Hope that helps, talk soon.

DODGE

Roman Wajda

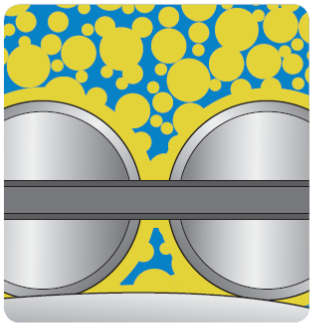
Bearing Application Engineering Manager

BEARINGS with SOLID GREASE



About solid oil

Solid oil is an oil-saturated, polymer matrix that completely fills the free space in the bearing, encapsulating both the rolling elements and cage. The polymer material has a porous structure, with millions of micro-pores, to hold the lubricating oil. The pores are so small that the oil is retained in the material by surface tension.



Solid oil forms a narrow gap around the rolling elements and raceways. The oil in the micro pores will seep into the gap.

As the oil-filled polymer material is pressed into the bearing, a very narrow gap forms around the rolling elements and raceways,

Use MPI-0779 for all vertical shaft air coolers.
Use MPI-2400 (as High-Temp option) on hot running ID fan ACHE, or on any extermely hot unit.

MicroPoly
The solid idea for lubrication

Cross Reference Guide

Product Code	Industrial Application	Food Processing H1	Food Processing H2	Wash Down Applications	Upper Temp. Limit	Lower Temp. Limit	Available as Solid Profiles	*E. P. Additive	Viscosity at 40°C cSt	Viscosity at 100°C cSt
MPI-0800	X			X	200°F	-10°F	X		139.7	14.2
MPI-0779	X			X	225°F	-49°F	X	X	150	19.1
MPI-2000	X				350°F	-10°F		X	305	27.95
MPI-2400	X			X	350°F	-15°F		X	550	48.2
MPI-2500	X			X	210°F	-32°F	X	X	482.5	43
MPI-S700	X			X	250°F	-49°F		X	149	19
MPF-0696	X	X	X	X	210°F	-49°F	X	X	150	19.1
MPF-1150	X	X	X	X	210°F	-38°F	X	X	232.3	25.6

MPI – Industrial Products MPF – Food Grade Products ***E. P. = Extreme Pressure**

The 4-digit suffix represents the viscosity of the oil in SUS at 100°F

MPI–0800
This is our standard and most requested MicroPoly® formula. This product contains corrosion inhibitors and anti-oxidants. If no formula is specified, bearings will be filled with MPI-0800.

MPI–0779
MPI-0779 contains corrosion inhibitors, anti-oxidants, and E. P. additives. It is the best product for low temperature applications.

MPI–2000
MPI-2000 is a high temperature product. It is recommended for applications between 200-350°F. It contains corrosion inhibitors, anti-oxidants, and E. P. additives.

MPI–2400
MPI-2400 can handle temperatures up to 350°F. It has better wash down capabilities than MPI-2000. It contains corrosion inhibitors, anti-oxidants, and E. P. additives.

MPI–2500
MPI-2500 contains corrosion inhibitors, anti-oxidants and extreme pressure additives. It is formulated with a high viscosity oil especially designed for heavily loaded roller bearings operating at lower speeds.

MPI–S700
MPI-S700 is a high-speed product that contains corrosion inhibitors, anti-oxidants, and E. P. additives. MPI-S700 is designed for higher rotation speeds. Ndm values are approximately 50% greater than our standard MicroPoly grades (see page 7 in catalog). Call for assistance to determine upper limits for your application.

MPF–0696
MPF-0696 is NSF registered for both H1 & H2 applications. The H1 designation indicates that the product may be used in applications where there may be incidental contact with food. The H2 designation indicates that the product may be used in food processing applications where there is no direct contact with food. This product contains corrosion inhibitors, anti-oxidants, and E. P. additives.

MPF–1150
MPF-1150 is a new food grade MicroPoly and is similar to MPF-0696, but the oil has a higher viscosity. It is NSF registered for H1 and H2 applications. This product contains corrosion inhibitors, anti-oxidants and E.P. additives.

This is a listing of our standard formulas.
Specialty formulas may be available upon request.

SKF bearings with Solid Oil

The third lubrication choice

SKF bearings with Solid Oil

The third lubrication choice

There are three ways to ensure good oil lubrication of a ball or roller bearing.

- Supply oil directly
- Supply oil in a thickened form as grease
- Solid Oil where the oil is retained in a polymer matrix. Solid Oil was developed for use in applications where the two traditional methods above cannot be used.

Solid Oil has unique advantages

- It keeps the oil in position
- It brings more oil to the bearing than grease
- It keeps contaminant out
- It makes maintenance unnecessary – no relubrication needed
- It does not need seals
- It is environmentally friendly
- It is resistant to chemicals
- It can withstand large 'g' forces

What is Solid Oil?

Solid Oil is a polymer matrix, saturated with a lubricating oil, which completely fills the internal space in a bearing and encapsulates the cage and rolling elements. Solid Oil uses the cage as a reinforcement element and rotates with it. By releasing the oil, Solid Oil provides good lubrication for the rolling elements and raceways during operation.

The polymer material has a porous structure with millions of micro-pores which hold the lubricating oil. The pores are so small that the oil is retained in the material by surface tension. Oil represents an average of 70% by weight of the material.

The oil-filled polymer material is pressed into the bearing. A very narrow gap will form around the rolling elements and raceways during the moulding process allowing the bearing components to rotate freely. The oil which seeps into the gap will provide good lubrication for the bearing right from the start.

When should Solid Oil be used?

In most applications, ordinary greases and lubricating oils will provide satisfactory lubrication to the bearing giving it an acceptable service life. However, there may be cases where lack of accessibility means that relubrication is virtually impossible, or where very good contaminant exclusion is required. Solid Oil may be the answer, as it provides 'lubrication for life' and good sealing.

Typical Solid Oil application areas

- Dirty or humid
- Aggressive chemicals
- Very cold
- Centrifugal forces
- Vertical shafts
- Hard to reach
- Oscillating movements
- High cleanliness demands

The Solid Oil advantages

It keeps the oil in position
A metallic surface sliding against Solid Oil is guaranteed an even and consistent film of oil. A moderate increase in temperature will cause oil to be pushed towards the surface of the polymer matrix as the thermal expansion of the oil is greater than that of the polymer matrix. The viscosity of the oil will also decrease with increasing temperature. When the bearing stops running, excess oil will be re-absorbed by the polymer matrix.

It brings more oil to the bearing
A bearing with Solid Oil contains two to four times more oil than a conventional grease-lubricated bearing. This is because the bearing is completely filled with the Soild Oil, whereas a grease-lubricated bearing normally operates with approximately one third of its free internal space filled with grease.

It keeps contaminants out
As the bearing is completely filled with the Solid Oil it is difficult for contaminants to penetrate. To reinforce this protection it is recommended, where appropriate, to fill the free space in the bearing housing with a suitable grease.

It makes maintenance unnecessary
Relubrication is not required as Solid Oil contains such a large reservoir of oil that it will outlast the life of the bearing.

It does not need seals
Seals are not needed to retain the lubricant in the bearing, for example on vertical shafts. However, if the arrangement already incorporates seals, they should be retained as extra protection against contamination.

It is environmentally friendly
Solid Oil is environmentally friendly as it will not leak from the bearing.

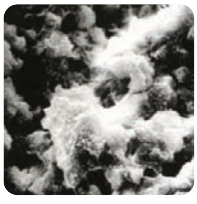
It is resistant to chemicals
The polymer matrix of the Solid Oil is unaffected by most chemicals. However, organic solvents, e.g. kerosene, will remove the oil from the polymer matrix.

It withstands large 'g' forces
The bearing with the Solid Oil forms a 'solid' unit from which the lubricant cannot be expelled even when subjected to considerable centrifugal force.

W64

Bearings with Solid Oil have suffix W64.

Limitations of Solid Oil
- *Temperature*
- *Speed*



Millions of micro-pores retain the oil in Solid Oil.

Solid Oil forms a narrow gap around the rolling elements and raceways. The oil in the micro pores will seep into the gap.

A Solid Oil bearing contains between two and four times more oil than a corresponding grease-lubricated bearing.

Technical Data

Composition of Solid Oil

Solid Oil is normally produced with a very high quality synthetic oil which is suitable for most applications.

Oil viscosity	140 $mm^{2/s}$	at 40 °C
	19 $mm^{2/s}$	at 100 °C

Oils having other viscosities can also be used successfully, as can special oils for the food industry. Additives, such as rust inhibitors, can be added to Solid Oil to provide extra protection.

Bearing types available

Most normal sizes of SKF ball and roller bearings can be supplied with Solid Oil. Bearings fitted with large-volume cages made of polyamide or machined brass are less favourable for Solid Oil (see speeds table). Bearings with Solid Oil are identified by the designation suffix W64.

Temperature limits

The temperature limits for bearings lubricated with Solid Oil, measured on the bearing outer ring, are:

Maximum continuous operating temperature	85 °C
Maximum intermittent operating temperature	95 °C
Minimum. start-up temperature (standard oil)	–40 °C

Bearings with Solid Oil can be heated to a maximum of 100 °C for mounting purposes.

Load carrying capacity

The basic dynamic load ratings for Solid Oil bearings are the same as for the corresponding standard bearings.

Limiting speeds

An indication of the limiting speeds is given below by the n x d_m factor – rotational speed (r/min) times the bearing mean diameter (mm). It is important to remember that the higher the speed, the higher the operating temperature. It may therefore be necessary to limit the bearing speed for high temperature operation so that the temperature limit for the Solid Oil is not exceeded. As with most lubricants, the theoretical bearing life is extended if the operating temperature is kept low.

SKF bearing type	n x d_m (max)
Single row deep groove ball bearings	300 000
Angular contact ball bearings	150 000
Self-aligning ball bearings	150 000
Cylindrical roller bearings	150 000
Spherical roller bearings	
– E-design	42 500
– other designs	85 000
Taper roller bearings	45 000
Ball bearings with polyamide cage (including Y-bearings)	40 000

$n \times d_m = n \times 0{,}5\ (d + D)$

where
n = speed, r/min
d = bearing bore diameter, mm
D = bearing outside diameter, mm

These speed limits apply to open (unsealed) bearings. For bearings with integral seals 80% of the quoted values should be used.

Generally, when bearings with Solid Oil are to operate under extreme conditions, it is advisable to contact SKF for advice and support.