Dodge® mounted bearings: re-lubrication intervals

The correct Re-lubrication Interval is essential in achieving the maximum life of a bearing. An incorrect Re-lubrication Interval can decrease the life of the bearing in several ways.

1. **Infrequent Re-Lubrication Interval:**
   a. Bearing can fail due to lubrication breakdown causing premature metal to metal contact between the rollers and raceways.
   b. Grease acts as a barrier/seal and aids in decreasing the incursion of contaminates into the bearing. When sufficient lubricant is not present the sealing ability of the bearing is decreased and contaminates can more easily enter the bearing.

2. **Excessive Re-Lubrication Interval:**
   a. In a high speed application, the bearing could actually over heat due to the amount of grease being pumped into the bearing. All Dodge® mounted bearing products have seals that will purge excess lubrication, but this purging is spread out over time. If the amount of grease pumped into the bearing is greater than the amount that can be purged from the bearing the additional grease will begin to accumulate. At this point, due to the additional grease, the bearing will begin to generate excess heat. If this Re-lubrication Interval continues to be followed, the bearing will continue to fill with grease and eventually overheat and fail.

To determine the correct Re-lubrication Interval, we must first obtain the following information.

Needed Information:

1. Identify the Type of Bearing i.e.: Ball, Tapered or Spherical
2. Determine the Bearing Factor (kf):
   - Ball Bearings kf = 0.9 – 1.1
   - Tapered Roller Bearings kf = 4
   - Spherical Roller Bearings kf = 7 – 9
3. Calculate the Mean Bearing Dia.: dm = (D+d)/2
4. Determine the Operating RPM
5. Determine the Grease Service Life (gl)

Once the above information is known the Grease Service Life (gl) of a lubricant can be determined using the following diagram. Below an Example is given.

Example: Fan Application
22220 Spherical Roller Bearing
RPM = 1000
Operating Temperature 140° Fahrenheit

Step #1 Identify the Type of Bearing
22220 Spherical Roller Bearing

Step #2 Determine the Bearing Factor (kf)

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Given: Spherical Roller Bearing
Therefore kf = 7 – 9 we will choose a nominal value of 8

Step #3 Calculate the Mean Bearing Diameter
dm = (D+d)/2
dm = (180 + 100)/2
dm = 140 mm

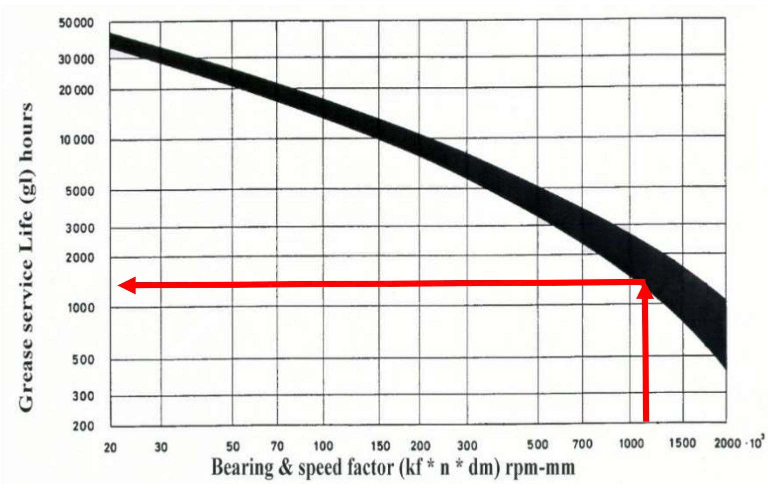
Where D = O.D. of bearing in mm
d = I.D. of bearing in mm

Step #4 Determine Operating RPM
Given: Operating RPM (n) = 1000

Step #5 Determine the Grease Service Life (gl)
To complete Step #5 you must first calculate the Bearing & Speed Factor. This calculated value will be used in the following diagram to determine the Grease Service Life (gl).
Bearing & Speed Factor = kf x n x dm = 8 x 1000 rpm x 140 mm
Bearing & Speed Factor = 1,120,000 rpm-mm = 1120 x 10^3 rpm-mm

You now have all the information you need to use the following diagram, and determine the Grease Service Life (gl). First draw a vertical line from the (1120 x 10^3) rpm-mm Bearing & Speed Factor axis until it intersects the Grease Service Life curve. From this intersection draw a horizontal line until it intersects with the Grease Service Life (gl) axis. Record this value, Grease Service Life (gl) = 1,500 hrs, because you will need it to determine the correct Re-lubrication Interval.

NOTE: The Grease Service Life is defined as the life of the grease from the start up until the bearing fails due to a lubrication failure. The Re-lubrication Interval will always be less than the Grease Service Life.



Using the Grease Service Life (gl), determined from the above diagram, the Re-lubrication Interval can now be calculated. Depending on the operating conditions there are two ways to calculate the Re-lubrication Interval. If the operating and environmental conditions are favorable use the equation in Case #1. If operating and environmental conditions are poor, then reduction factors (f1, f2, f3, and f4) must be used. If this is the case use the equation in Case #2. The example will be calculated using both cases with chosen values for the reduction factors.

CASE #1 Under Favorable Conditions:

Relube Interval = gl
Relube Interval = 1500 hrs
This equates to a Re-lubrication Interval of roughly every 18 weeks assuming the bearing is operating 12 hrs/day and 7 days a week.

CASE #2 Under Poor Operating and Environmental Conditions

Relube Interval = f1 x f2 x f3 x f4 x gl

f3: Effect of Temperature
f3 = 0.7 – 0.9 Up to 170F
f3 = .04 -- .07 170 to 185F
f3 = 0.1 – 0.4 185 to 240F

f2: Effect of Shock Load & Vibration
f2 = 0.7 – 0.9 Moderate
f2 = 0.4 – 0.7 Strong
f2 = 0.1 – 0.4 Very Strong

f1: Effect of Dust and Moisture
f1= 0.7— 0.9 Moderate
f1 = 0.4— 0.7 Strong
f1 = 0.1 – 0.4 Very Strong

f4: Effect of High Loads
f4 = 0.7 – 1 When P/C = 0.1 to 0.15
f4 = 0.4 – 0.7 When P/C = 0.15 to 0.25
f4 = 0.1 – 0.4 When P/C = 0.25 to 0.35

For our example's purpose let's use: f1 = 0.7
f2 = 0.9
f3 = 0.9
f4 = 1

Therefore:
Relube Interval = f1 x f2 x f3 x f4 x gl
Relube Interval = 0.7 x 0.9 x 0.9 x 1 x 1500 = 850 hrs

This equates to a Re-lubrication Interval of roughly every 10 weeks assuming the bearing is operating 12 hrs/day and 7 days a week.

NOTE: These calculations are based on a Lithium base grease. If a synthetic grease is being used a good rule of thumb is to multiply the Re-lubrication Interval by 4.
Remove all brackets or the torque arm and mounting hardware from the reducer. Support the reducer from the bottom

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