Lubrication – Preventative Maintenance

Greasing Intervals

The longest bearing service life is achieved when grease is added in small amounts at short time intervals. This optimal form of greasing is achieved via automated greasing and cannot be practically achieved via manual greasing.

Bearings which operate in harsh environments will demand the shortest re-greasing intervals. Conditions such as high temperatures, vibrations, high loads and high levels of contaminants such as dirt and water demand the most frequent greasing.

CHART 1: Manual Greasing

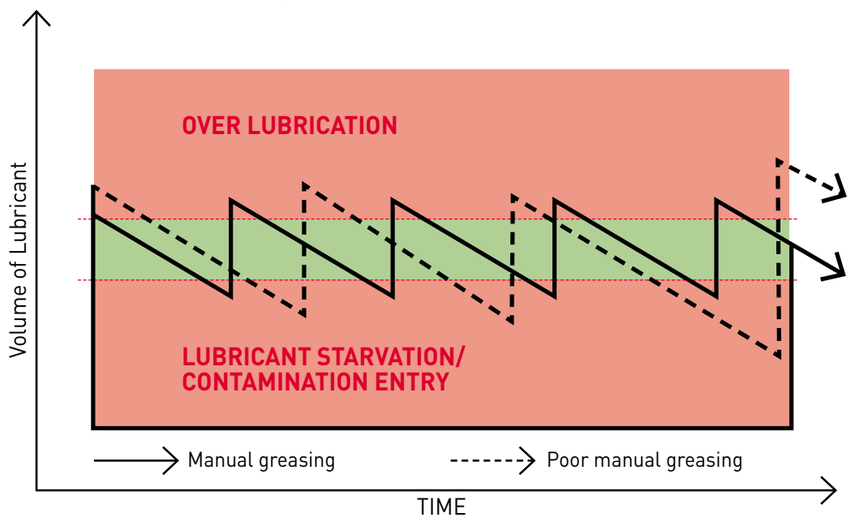
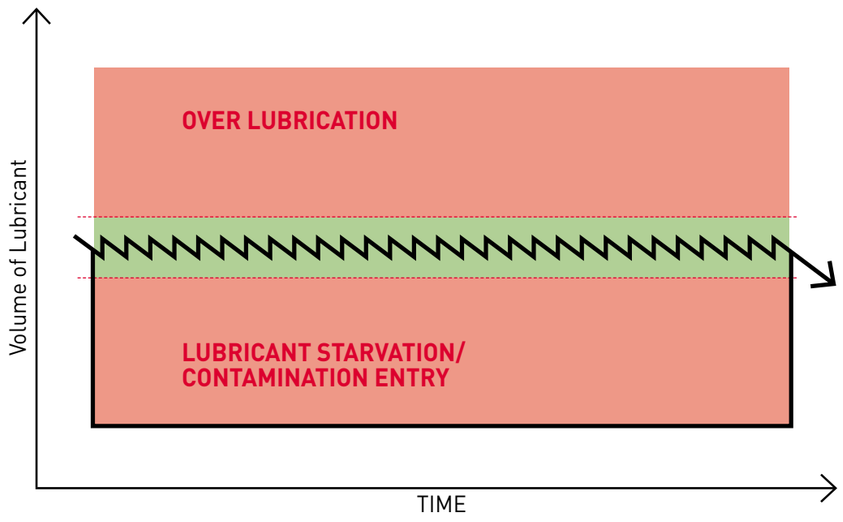


CHART 2: Automatic Greasing



Greasing Interval Reduction Factors[1]

Greasing interval "reduction factors" can be estimated according to operating conditions. For example "very strong" dust and moisture has a reduction factor of between 0.4 and 0.1, as does "very strong" shock loads and vibration. Reduction factors are multiplied together to provide an overall reduction factor.

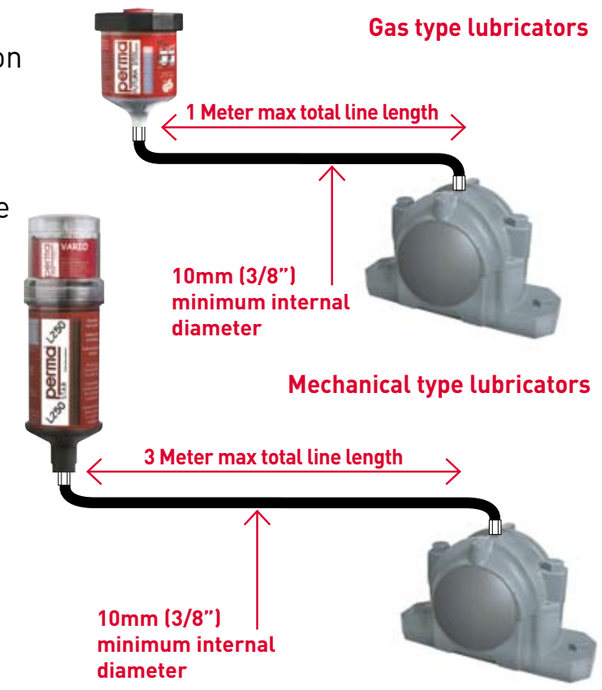
The reduction factor for a conveyor belt pulley bearing is less than 0.1 as a result of the "very strong" effect of dust / moisture and the "moderate" effect of heavy load. A reduction factor of 0.1 means that the greasing interval should be reduced by a factor of 10.

Safety – Direct Versus Remote Greasing

Where practical, direct mounting is preferred as this presents maximum pressure to the lubrication point. However, many points will demand remote mounting to ensure safe and convenient access.

Remote installations are recommended under the following circumstances:

- When the bearing is subject to high vibration or temperature which may damage the lubricator
- Where it is difficult or unsafe to access the lubrication point while equipment is running
- When the lubrication point exposed to excessive amounts of water or impact from solid material
- When protective guards or safety cages have to be removed to access the bearing



Grease Pumpability

The pumpability of grease depends on many factors but the most influential are grease type, ambient temperature and line dimensions.

Grease Type – The lower the NLGI rating (thickness) the easier it is to pump. So NLGI 1 greases are easier to pump than NLGI 2 greases. Thickener type and base fluid viscosity also have an effect.

Ambient Temperature – Grease is much easier to pump in warm climates than it is in cold climates.

Grease Line Dimensions – Small diameter fittings and small internal hose diameters have a dramatic effect on the resistance to grease flow.

The Effect of Solid Contaminants

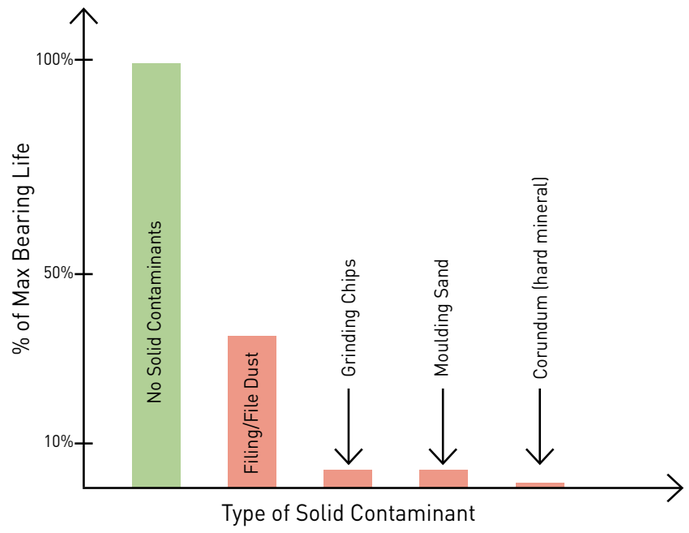
Solid contaminants in rolling element bearings cause noise, accelerated wear and the early onset of fatigue.

Wear rates increase with the size, concentration and hardness of contaminants. Smaller particles lead to abrasive wear whilst larger particles cause raceway indentations which later become sites of premature fatigue wear.

Greasing practices which prevent the ingress of contaminants will provide long term benefits of longer bearing service life and reduced downtime.

CHART 3 demonstrates the effect that solid contaminants have bearing service life[2].

CHART 3: Bearing Life Reduction due to Solid Contaminants



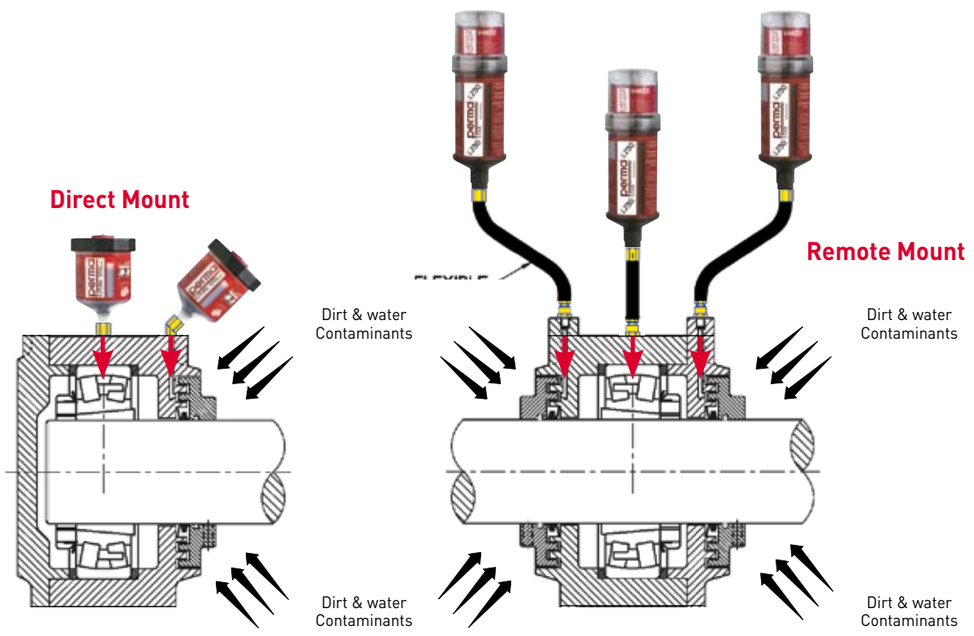
Contamination Prevention – for high contamination sites

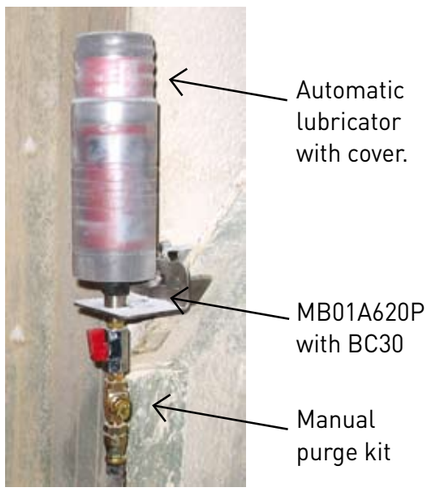
Different bearing configurations have different greasing requirements[3]. The examples shown here demonstrate the importance of preventing the ingress of contaminants such as dirt and water.

For sites where contamination levels are high it is common to apply grease directly to taconite or labyrinth type seals, as well as grease to the bearing.

An alternative to this is to apply a higher greasing rate to the bearing in order to supply sufficient grease for the bearings and the seal. This method of greasing can be effective for low to medium speed bearings, but should not be employed for high speed bearings. Nor is it likely to be effective for large bearings as the volume of grease is unlikely to be adequate.

Yet another alternative is to utilise automatic lubricators for taconite and labyrinth seals and to continue a manual greasing program to bearings.





For the harshest conditions the combination of manual purge and steady, consistent grease flow from an automated system provides maximum protection against the entry of contamination.

Notes–
1. From Publication No. WL 81 115/4 EF by FAG Australia Pty Ltd.
2. Derived from data obtained from Publication No. WL 81 115/4 EF by FAG Australia Pty Ltd - example for a 7205B angular contact ball bearings.
3. Rarely is there a categorically correct answer when it comes to the grease lubrication of bearings. Greasing decisions should take into account the recommendations of original equipment manufacturers, site based maintenance experience and good maintenance practices in general.

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