KLÜBER LUBRICATION

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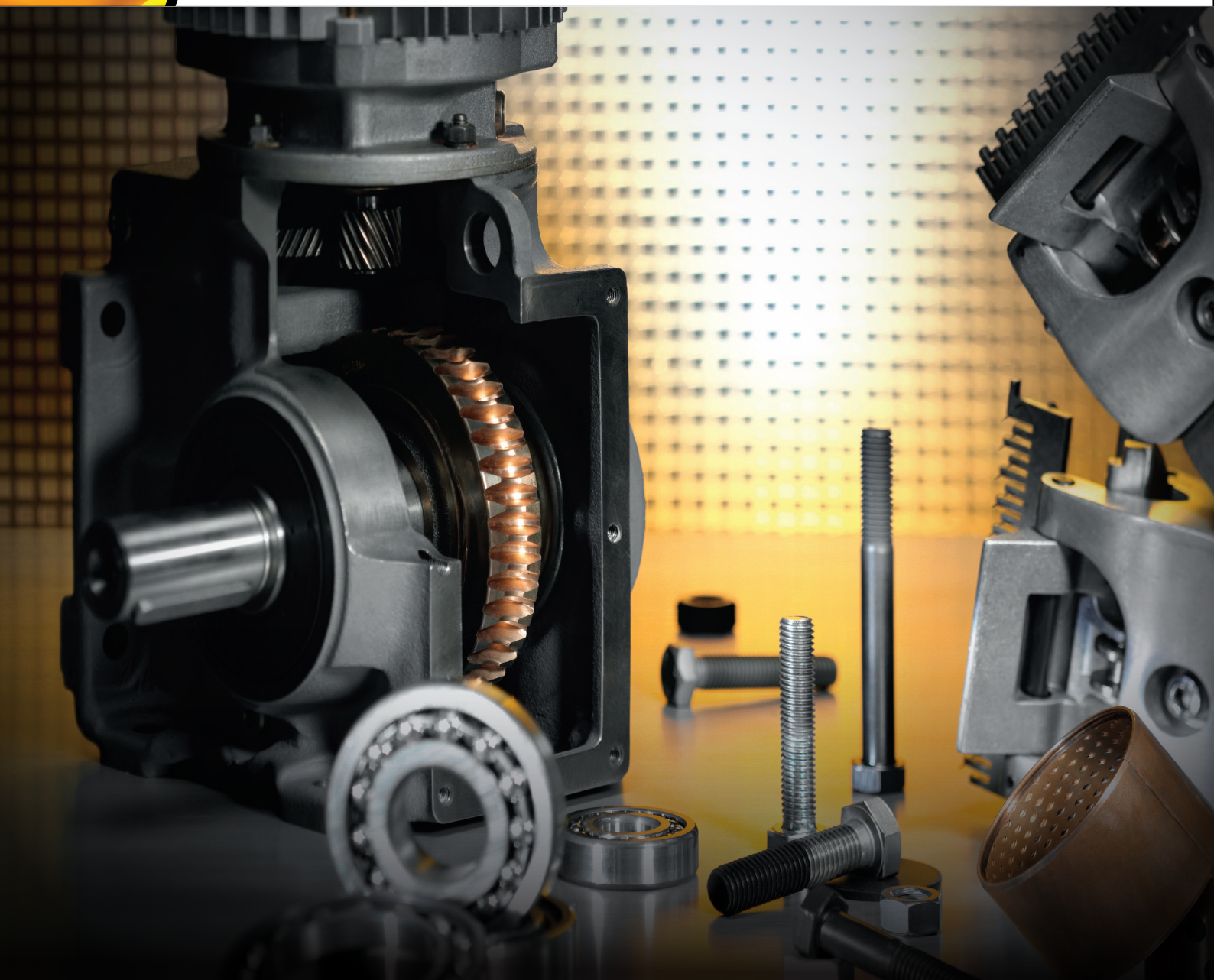
Recommended lubrication practices after unplanned stoppage.



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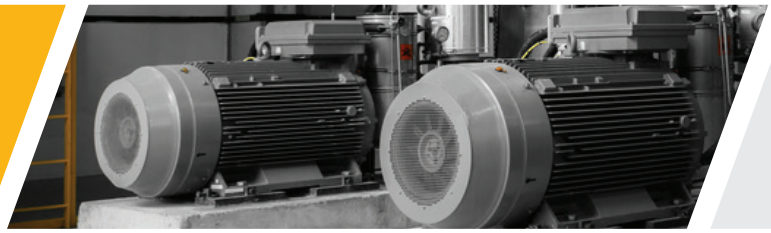


This document is a handy reference for starting the machines after a temporary / long shutdown, in case the user has not been able to follow standard shutdown procedures. Starting the machines or machine elements without proper start-up procedures could lead to irreversible wear, machine breakdown or safety hazards in the plant. This quick guide is not an all-encompassing list, it offers a few general suggestions. Specific machine manual recommendations should be used wherever available.

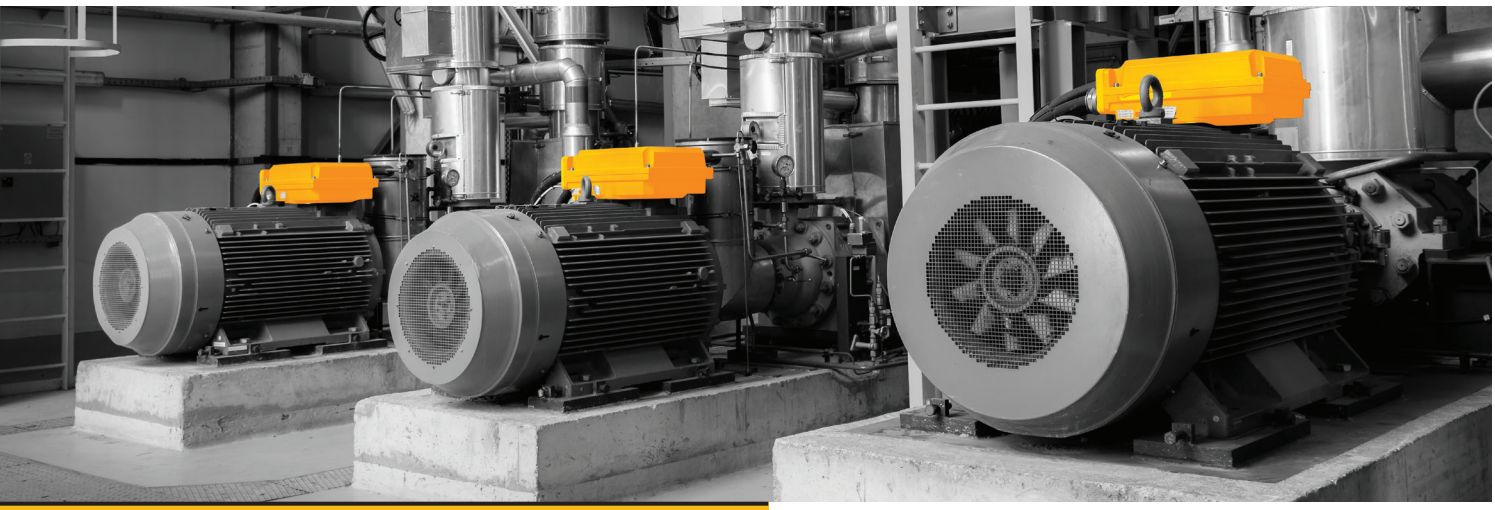
Circulation systems filter resistance

Issue

Machines which have forced lubrication systems or wet sump lubrication systems have the oil being circulated through a filter. These filters normally provide an obstruction to the flow of lubricants. During the start of the machines, the viscosity of the oil would be higher (due to cold start). This creates resistance to flow of lubricants, even leading to oil filter ruptures. These ruptures not only let immediate impurities enter the lubricated zone, but may also cause previously captured impurities in the filter to enter the lubricated zone. This could bring the machine to an immediate stop or lead to permanent damage.

Suggested Procedure

Replace filter if you expect the probability of a filter rupture. Check the condition of the oil before start; if the oil has deteriorated in its condition, replace the oil. If there is an inbuilt heater system in the machine, increase the temperature of the oil before starting circulation of the oil.



Enclosed gear drives

Issue

Enclosed gearboxes generally do not tend to get much affected during short shutdowns. However, care should be taken to check for corrosion and clutch misalignment, if it is a clutch type of gearbox.

Suggested Procedure

It is suggested to check for corrosion, oil level depletion, oil condition and clutch misalignment. Corrosion if any, should be removed before start. In case of oil level depletion, oil top-up up to advisable levels are mandated before start. If oil condition has depleted both on visual check and the oil has thickened during storage, it is advisable to remove the oil and fill fresh oil before machine start-up. In case of gear drive which has clutch systems, alignment and clutch positioning should be done before gearbox start-up.

Big sump gearboxes

Issue

Generally, big gearboxes have splash lubrication or oil circulating lubrication systems. If stopped for a prolonged period of time, it can result in oil being drained off from meshing zones leading to dry start.

Suggested Procedure

If gearboxes have circulating systems, it is important to switch on the circulation system before the gearbox is put to a start. This will ensure that other elements like bearings are also lubricated well before start. All big sump gearboxes should be started in no load conditions and if possible with auxiliary drive. With this practice, the wear on the gear drives can be reduced to a great extent.

If big sump gearboxes are kept idle for long durations, the contaminants, condensate water and fine particles do tend to settle at the bottom of the oil tanks. Check for the possibility to drain out water and the sediment layer from the bottom outlet (which will be carrying maximum percentage of fine particles with it). Top-up should be done to advisable oil level before start. This procedure would also help in improving the overall oil quality.

Open gears where lubricant is manually applied

Issue

The lubricant applied on these gear drives tend to get dried or could also accumulate dust, if kept open or stays static for longer durations.

Suggested Procedure

It is suggested to clean the lubricant from the gear teeth using cleaning agents like OKS 2601 or OKS 2650. Post cleaning, apply fresh lubricant before starting the gear drive in no-load conditions. Special care should also be taken to ensure that there are no corrosion on these gears before the application of fresh lubricant

Bearings

Issue

The lubricant inside the bearings generally tend to ooze out oil and could also get dried during long stops. This could result in bearing failures during the start of the machine.

Suggested Procedure

Check for oil oozing out of the bearings. If this has occured, clean the surface and re-lubricate the bearings to desired level. Start bearings on no-load conditions and make sure there is no abnormal noise or vibration originating from the bearings. Once this is ensured, apply the load on the bearings and continue normal operation.

Spray system lubrication-gears and chains

Issue

If open gears or chains with spray lubrication stay still for prolonged periods, the lubricant film on these elements might disappear or dry-up depending upon the type of lubricant used. This might lead to rust or irreversible wear during the start of the machine element.

Suggested Procedure

Check for rust on the machine elements before the machine is put to start. If there is rust, proper rust cleaning procedures need to be followed for the removal of rust and OKS 641 can be used for this process. Once inspection and correction is completed for rust, then spray system should be started with minimum lubricant dosing. Lubricant availability to the spray system and the spray pattern needs to be visually ascertained before starting the machine in no-load conditions. Gear drive can be run on auxiliary drive, if available. Ensure that there won't be any lubricant film dry-out situation from the starting hours. This will help prevent irreversible damage to the gear or chain elements.

If previously applied lubricant film has completely hardened and is hindering the entry of fresh lubricant into the gear or chain links, this should be manually cleaned before start. Cleaning agents like OKS 2601 or OKS 2650 could be used for the conduct of the same.

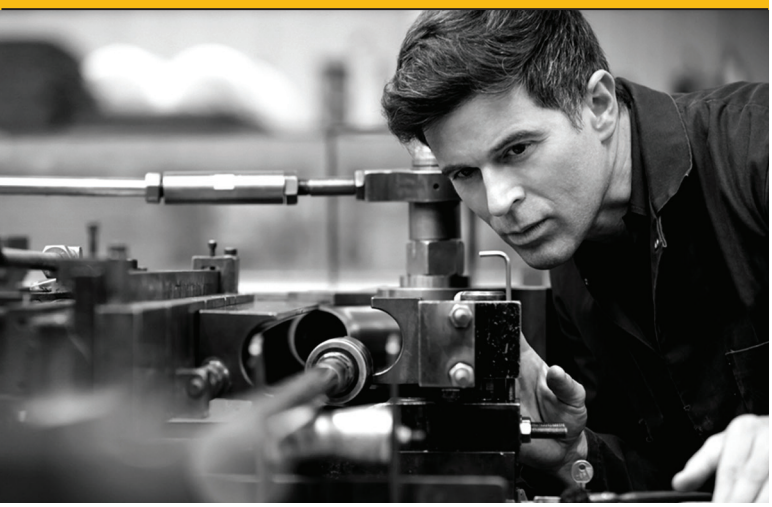
Heavily loaded bearings with loss lubrication

Issue

Lubricant on heavily loaded bearings with loss lubrication systems might get dry, or bearings could get corroded if the system is brought to an abrupt stop for longer durations. Abrupt start could also lead to permanent damage to the bearings.

Suggested Procedure

If possible, visual checks should be conducted for the presence of corrosion or hardening of lubricant inside the bearings. If corrosion or dried lubricant is observed, manual cleaning needs to be conducted. The bearings should be started in no-load conditions and visual check should be mandated to determine whether it is grease or oil seeping out of the bearings, before the load is added to the bearings.



Air compressor

1.1 Issue

On prolonged stoppage, moisture in the atmosphere and oil sludge get accumulated in the air compressor resulting in reduction of efficiency, subsequent wear or breakdowns.

1.2 Suggested Procedure

Before the start of the compressor, open the drain valve and the FRL's to drain away the condensed water and oil sludge from the compressor.

2.1 Issue

Oxidation of the oil during shutdown or prolonged stoppage / standby

2.2 Suggested Procedure

The rate of oxidation of the oil depends upon the quality of the oil used. Before the start of the compressor, it is important to check the quality of the oil. If the compressor has been on stoppage / standby only for a few days, then before start of the compressor, look for visual change in the colour of the oil and also do check if the viscosity of the oil has increased. If these parameters are more than the acceptable limits, change the oil completely before start. If the compressor has been in stoppage/ standby for longer durations, it is suggested to change the oil completely and also do a proper service to check for corrosion, oxidation and sludge hardening in the compressor. Use of Klüber Summit Varnasolv is also recommended for flushing activity before the oil is changed in the compressor.

3.1 Issue

Leaking compressor lines lead to drop in efficiency and energy wastage.

3.2 Suggested Procedure

Check for air leakage on the compressed air lines with the help of leak detectors to ensure that the compressor operates on full efficiency. Products like OKS 2801 could also be used for leak detections.

Sliding mechanism lubrication

Issue

The lubricant applied on slide tracks and wheels tends to get dried or could also attract and accumulate dust, if kept open and not in use.

Suggested Procedure

It is suggested to clean the previously applied lubricant from the slide tracks and wheels using cleaning agents like OKS 2601 or OKS 2650. Apply fresh lubricant before starting, on no-load conditions. Special care should also be taken to ensure that there is no corrosion on these slide tracks and wheels before the application of lubricants. If possible, try to check for free movement before start.

Seal assembly during start-up

Issue

Seals on machine elements might get damaged or become brittle due to prolonged shutdown. The lubricant layer on the labyrinth seals might also go off on prolonged storage.

Suggested Procedure

If cracks or seal damages are observed, it is suggested to replace seals and use new seals before the start of the machines. Specific speciality lubricants can be applied on the seals to ensure proper assembly and smoother operations. Labyrinth seals should be re-lubricated before start. Lubricants like STABURAGS NBU 12 can also be used for the same.

Hydraulic systems

Issue

Unattended and unsupervised start of hydraulic system could lead to permanent damage.

Suggested Procedure

Check the condition and level of the hydraulic oil. Top-up or change the oil, based on the condition of the oil.

Machine elements which have got seized / stuck and are difficult to dismantle / remove

Issue

Some of the machine elements like bolts / nuts, bearings and shaft assemblies tend to get seized / stuck and are difficult to dismantle. Applying higher torque / force for removal could lead to breakage of components.

Suggested Procedure

Apply rust loosening solutions or sprays like OKS 641 on these nuts and bolts and wait for these liquids to penetrate and creep through. The use of these solutions will help loosen the bolts / nuts faster and effortlessly. Before refitting of these bolts and nuts, apply anti-seize compounds like OKS 246 or OKS 240 for preventing seizures or such failures to occur in the future. For the fitting and assembly of bearings on the shafts, it is also recommended to apply a thin layer of assembly paste to avoid fretting corrosion and seizing during the dismantling activity. Products like ALTEMP Q NB 50 can be used for the same. New bearings on assembly need to be lubricated with the specified lubricants at recommended quantities before start of the machines.

When in doubt, contact Klüber Lubrication!

V-belt drives

Issue

On prolonged stoppage, the V- belts tend to get brittle and damaged faster than during normal operations.

Suggested Procedure

Have a visual check for brittleness or cracks on the V-belts. If the belts show brittleness or damage to a great degree, consider replacing the same. If the belts are in operating condition, then before the start of machines, apply a considerable amount of belt dressing spray like OKS 2901 (on the sides and underside of the V-belts). Allow the contents of the spray for curing on the belt surface for about 20 minutes before starting. Conduct the activity of belt tensioning only after one day of operation

Electrical contacts or electrical panels

Issue

Corrosion / carbonization / blackening of electrical contacts are a common phenomenon during machine shutdowns. This could lead to improper current flow and even occurrence of spark-overs / flashes which are safety hazards.

Suggested Procedure

Clean the electrical contacts with safe electrical contact cleaners like OKS 2621 or OKS 92621 safe LC cleaner before starting the machines. Tighten the electrical connections / assemblies to ensure no loose connections exist on the system.

Stored grease handling

Issue

Grease stored in containers on prolonged storage might show signs of oil separation on the top surface.

Suggested Procedure

Signs of oil separation are a normal phenomenon in greases. The degree of oil separation is attributed to the chemistry of the greases. You are advised to mix / stir the grease thoroughly (with the oil separated on the top surface) with a clean spatula before usage of the lubricant on the machine elements.

Notes

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Klüber Lubrication – your global specialist

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