



Manual Lubrication Procedure for Oven Conveyor Chains (USA)

Lubrication Required For:

Main product oven conveyor chains.

Quantity:

2 chain circuits (carrying the conveyor slats/grids).

Lubricant Type:

High Temperature Lubricant.

Lubricant specification:

Perfluorinated polyether (PFPE), high viscosity base fluid and sub-micron PTFE. See the lubricant product data for more details.

Lubricant Name:

PerFluoroLube CL1800F1.

Application Device:

Performance Fluids CL1800F1 Applicator.

PerFluoroLube CL1800F1 Product Quantity:

Typically, 35oz – 60oz of product are required for every 65 feet of chain (1 run of lubricant, 4 runs/pitch) However, do not over lubricate as the product may end up on the chain rail resulting in the rollers skidding.

Lubrication Points:

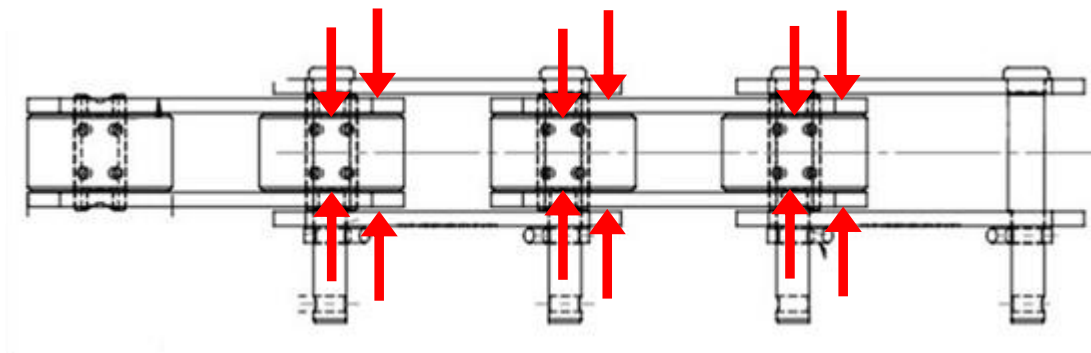
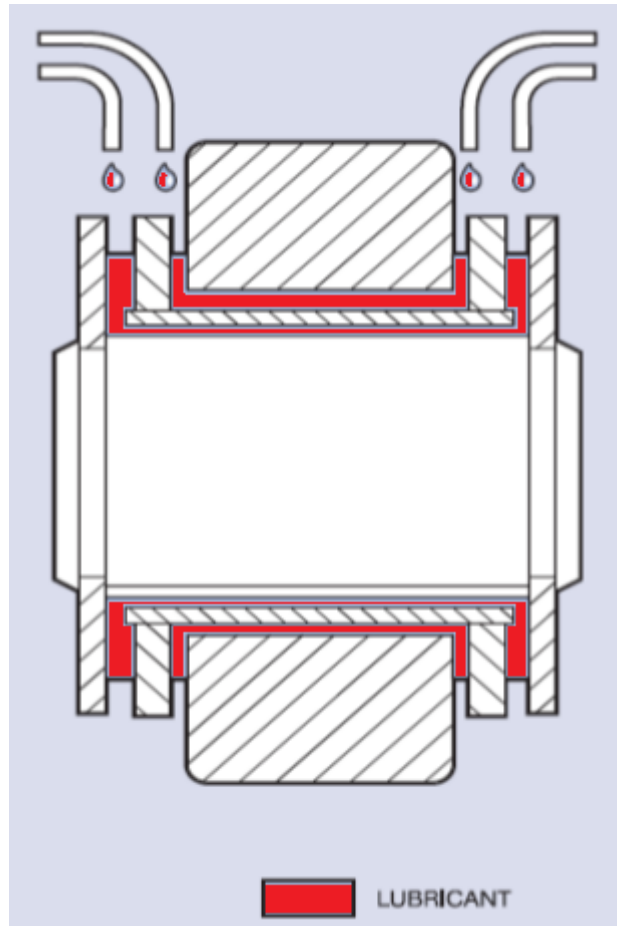
At the feed end on the working pass lubricate the complete chain circuit, when lubrication of the chain is complete repeat the procedure for the other chain. On an oven with external terminals remove the lubrication hatch from the top panel on the terminal to access the chain. On an oven with internal terminals access the chain from the internal walkway as close to the end of the static box as possible.

Application Method (Oven Chain Lubrication Points):

Using the Performance Fluids CL1800F1 Applicator apply 1 run of lubricant between the inner & outer link plates above the

point of articulation & between the inner link plate & the roller i.e., 4 places/pitch as per diagram. Use the applicator dispenser nozzle tip to move the roller side to side therefore giving the maximum clearance whilst lubricating. (Refer to the diagram below for additional understanding).

Oven Conveyor Chain Lubrication Points





First Lubrication:

- New Oven / First Lubrication, perform the first lubrication then lubricate again after "burn off" of the oven.
- Lubricate again after 150 hours of operation at working temperature.

Ongoing Lubrication Frequency:

After the first lubrication stage has been completed the following is provided as a guide however, continue to monitor your ovens performance in terms of (Current Draw Amps) and Oven bed surging, if either the Amps are on the increase or the oven bed is starting to surge perform you re lubrication straight away and base your ongoing lubrication frequency on this.

Our Lubrication Frequency Guide is as follows: -

- Every 500 running hours on chains with maximum chain temperatures of 482°F
- Every 600-750 running hours on chains with maximum chain temperatures of 446°F
- Every 1000 running hours on chains with maximum chain temperatures of 392°F
- Every 2000 running hours on chains with chain temperatures below 374°F

- For example; an oven with a chain temperature of 446°F running 6.5 days a week should be lubricated every $(750/(24*6.5))=4.8$ weeks.
- To summarise, the chain will be lubricated during start-up and then after burn off and must then be lubricated after 150 hours of running before commencing with the calculated frequency. It is advisable to round the calculated figure down, therefore 4 weeks in this example, until satisfied with the smooth running of the conveyor at which time the frequency can possibly be relaxed with reference to the recommendations in the following notes.
- These are initial frequencies, see recommendations in the following notes.

Notes:

1. To ensure low chain wear and the drive power stays within design limits, the frequency of lubrication must be scheduled so that the chain does not dry out completely between re-lubrication intervals. Imagine the spaces between the roller and the bush and pin and bush of the articulating joint as a reservoir (see the previous diagram). If the reservoir dries out before re-lubrication chain wear, higher drive power and conveyor pulsing will result.

2. The lubricant reaches the voids/reservoir by a combination of flowing in to and being drawn in by capillary action; only a finite amount of the lubricant applied will reach the voids and the excess will fall off - so if more than the recommended quantity is applied in one go more lubricant will be wasted.
3. It is therefore much better to re-lubricate with the correct amount of lubricant a week earlier in the schedule than with more lubricant a week later as with the latter method the chain will eventually dry out (the excess will drop off and the reservoir will get lower with each lubrication).
4. When re-lubricating a dry chain it is a good idea to re-lubricate every week for say 3 weeks or until the reservoir is replenished and the conveyor stops pulsing, then the original lubrication schedule can be resumed minus a week.
5. Ensure the excess lubricant falling off the chains is cleaned up on a regular basis – it is good practice to carry this out prior to each re-lubrication.
6. The lubrication frequency should be determined by oven running time; this should initially be to one of the set number of hours mentioned previously but due to differences in baking conditions from oven to oven, for instance; process temperature, product load, process time, products of baking, products of combustion and steam use, all of which can have a significant effect on lubricant lifespan. It is good practice to check the effectiveness of this schedule empirically.
7. The following methodology is set out to help determine the accuracy of the initial lubrication interval: -
 - a. Visually check for chain rollers skidding and/or if the conveyor is jerking. This may indicate that lubrication is required.
 - b. Listen to the noise the conveyor makes; excessive squealing or creaking may indicate that lubrication is required.
 - c. Check for increasing drive torque. Note down torque readings from the HMI every day and also before and after lubrication for several

lubrication frequencies. For consistency readings should always be taken with the oven in the same state, preferably fully loaded with the same product and matching process temperature; readings can then be compared like for like. If the readings are given as power, it is important that all the readings are taken at the same conveyor speed (i.e., bake time). If the chain is correctly lubricated the high torque warning should not be reached.

- d. When the conveyor is cold inspect the chain rollers locally (at the door positions). Leaver the chain off the chain rail slightly and manually turn several rollers checking if they rotate freely and smoothly and there is axial clearance, as this can become filled/caked with a mixture of lubricant and flour/debris. Check for axial clearance in between the side plates; if the chain has become excessively caked the important areas may not be adequately lubricated as the lubricant cannot penetrate these areas effectively.
8. After lubrication check points a, b and c again to confirm any issues prior to lubrication has been rectified. If the problem has not been corrected there may be another underlying problem causing the issue, for instance: -
- a. Other conditions may also cause roller skidding and conveyor jerking: rollers skid due to excessive lubricant on to the running rails and skidding rollers may induce conveyor jerking. Conveyors also jerk from time to time due to stick slip at certain speeds, loads and temperatures.
 - b. Squealing or creaking of the conveyor may indicate conveyor misalignment, damaged conveyor components or loose chain guides; if this is suspected it must be investigated as soon as possible.
 - c. Increasing drive torque may be caused by many issues for instance; sticking rollers and under lubricated chain articulation joints due to a caked-on mixture of lubricant and flour/debris, conveyor misalignment causing wear between the conveyor chain and chain rail angle vertical leg and or the drive and tail shaft sprockets, corrosion in the rotating/moving parts, main drive and tail shaft bearing under lubricated or



failure or drive gearbox problems (under lubrication, bearing failure).

- d. External factors may also need to be considered, for instance, excess airborne flour from flour depositors in the bakery can be drawn into the burner which is then burnt; the subsequent dust/ash is distributed around the oven by the main fan and forced convection system and mixes with the chain lubricant. This changes its viscosity and lubricity therefore reducing its effectiveness. Burnt flour dust can often be seen on top of the top pressure chamber nozzles and chambers.
9. If the same problem re-occurs between lubrication intervals it would be prudent to reduce the lubrication interval, and likewise if no problems re-occur it may be worth investigating increasing the lubrication interval, but the later should only be carried out with the upmost care and monitoring.

Important:

It is strongly recommended if a move away from the CL1800F1 lubricant once established Performance Fluids should be consulted to check for compatibility.