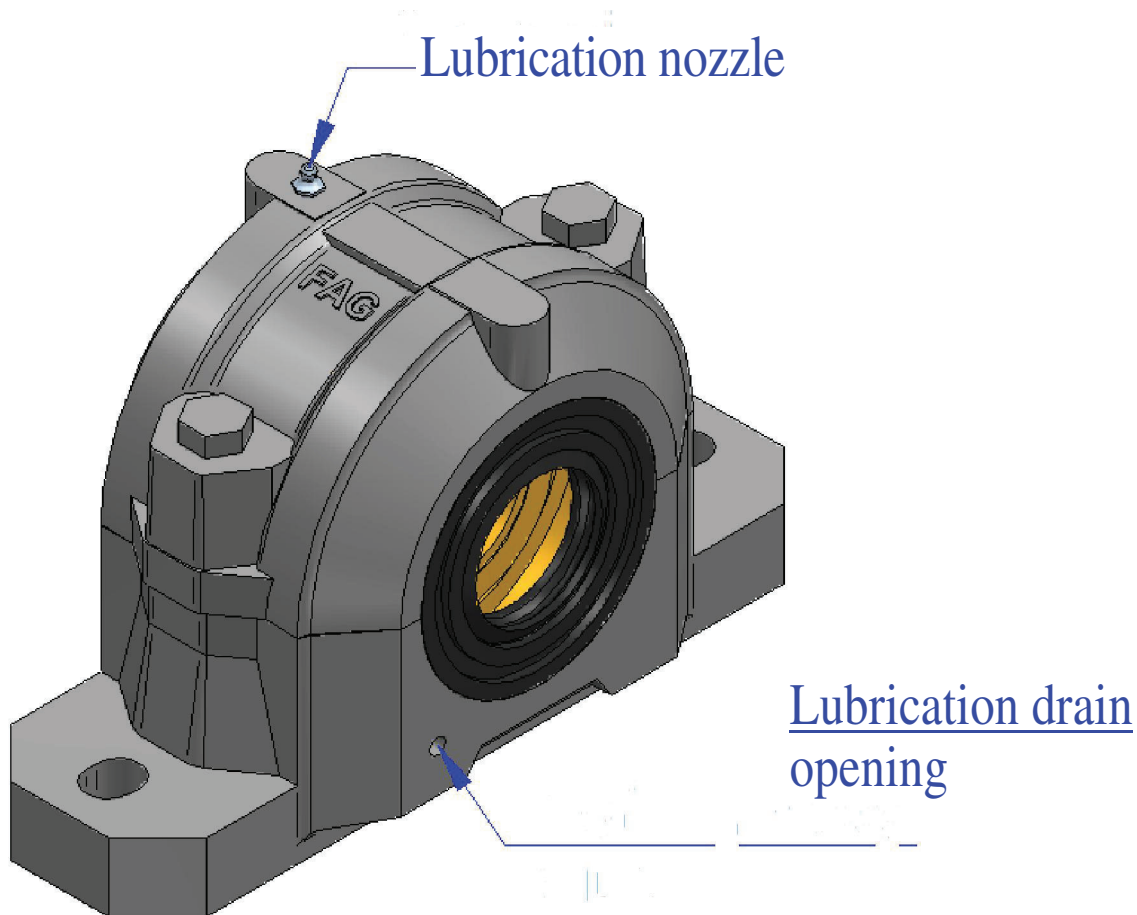


In case defects cannot be removed on its own, contact Nyborg-Mawent S.A., specifying the rated details of the fan (type, serial no., and year of production), operational conditions, malfunctions that occurred and circumstances in which the malfunctions occurred.



Before starting any lubrication operations, lubrication nozzle and area around bearing mounting unit shall be well cleaned. Never use high pressure cleaning jets for that purpose.

Roller bearing shall be lubricated during the operation through M10x1 lubrication inlet from the impeller's side and from the drive's side with the specified quantity and type of lubricant.



Top up lubrication schedule, quantity and quality of lubricant are specified in the Table 4.

Waste lubricant shall be disposed of in accordance with relevant environment protection laws and regulations.

Temperature of a bearing increases after the top up lubrication and drops to normal value after the lubricant reaches operational consistency.

Table 4. Schedule of top up lubrication of bearings

Roller bearing	Housing	Top up lubrication schedule (manhours)			Quantity of lubricant ¹ (g)	Amount of top up lubricant per a roller bearing (g)	Lubricant
		n=3000rpm	n=1500rpm	n=1000rpm			
1307K-C3	080	2640	3120	3240	80	10	Arcanol MULTI3 FAG
1309K-C3	100	1680	2000	2080	180	15	
1311K-C3	120	1260	1440	1560	270	20	
1315K-C3	160	1080	1320	1440	650	40	
22218-E1-K-C3	160	800	1320	1800	650	40	Arcanol
22318-E1-K-C3	190	-	1400	1760	950	60	MULTITOP FAG

¹ Quantity of lubricant at the first installation or top up lubrication.



In order to ensure fresh lubricant to reach all rolling components of a bearing during the top up lubrication, it is necessary to use the amount of lubricant specified in the table.

Always perform top up lubrication:

- on a warmed up and rotating bearing,
- before downtime,
- before long idle periods.

11.3.1. Notes to the top up lubrication schedule

The schedule of top up lubrication depends on the degree of lubricant degradation through bearing friction, rotational speed, load and bearing’s temperature.

The presented top up lubrication schedule applies to bearing’s temperature of 75°C. In case of any deviations, adjust the top up lubrication schedule in accordance with the table.

Table 5. Change of top up lubrication schedule depending on the bearing’s temperature

Bearing’s temperature	Coefficient of top up lubrication schedule
75°C	x1.00
80°C	x0.8
85°C	x0.63
90°C	x0.5
95°C	x0.4
100°C	x0.32

Because of their diverse chemical composition, lubricants must not be mixed together.

Roller bearings used in Nyborg-Mawent SA’s fans are factory filled with adequate amount of lubricant and ready for use. The above mentioned types of lubricant are of standard type, if any other type of lubricant has been used, it is indicated on the fan’s nameplate.

For the type of lubricant used, see “Maintenance of bearings” plate located on the fan.



In general, different lubricants shall not be mixed. In case any non-compatible lubricants are mixed together, their composition may significantly change. Moreover, mixture of lubricants can possibly result in significant softening; thus, lubrication conditions may deteriorate.

In general, the applied lubricant can be stored for three years, in the following conditions:

- closed room (warehouse),
- temperature from 0°C through +40°C,
- relative air humidity below 65%,
- no exposure to chemicals (vapours, gasses, liquids),
- sealed bearings.

Lubricants are subject to aging as a result of environmental impact and operation.



Use of lubricants of any types other than recommended by Nyborg- Mawent S.A. is unacceptable in the warranty period.

11.3.2. Limit values of bearings temperature

- **warning at 80°C** – reduce the intervals between top up lubrication by applying the coefficient specified in the table "Change of top up lubrication schedule depending on the bearing's temperature"
- **tripping at 100°C.**

Temperature is a "life cycle indicator" for machine load. Overload of bearing, interrupted lubrication film, changes of rotational speed cause bearing's temperature increase. Constant bearing's temperature will be kept in constant operational conditions, if a roller bearing is used in compliance with its intended use and in accordance with design assumptions. If temperature changes without any change of rotational speed or load, it means that a bearing is improperly lubricated. Any change of load as a result of disturbed operation of loose bearing can be diagnosed based on bearing's temperature chart. Temperature control allows for early diagnosis of any bearing damage caused by interrupted lubrication film. Damages caused by ageing and fatigue cannot be detected this way.

Temperature shall be measured using electrical temperature sensor directly at the bearing's external ring.

11.3.3. Total replacement of lubricant

In general, during the installation the bearing shall be fully filled with lubricant and any free space in the housing shall be equal to amount specified in the table "Top up lubrication schedule of bearings" which corresponds to approx. 50% of free space in the housing.

The whole amount of lubricant in a bearing shall be replaced when free space in housing cannot embrace additional lubricant, which corresponds to filling of more than 75% of free space of the housing.

Excessive amount of lubricant causes quick increase of bearing's operational temperature, especially at high rotational speeds. When starting operation at maximum speed, wait until excess lubricant settles in the housing. When the process of lubricant "running-in" is finished, the bearing's temperature decreases which confirms that the lubricant has properly settled in a bearing mounting.

During the lubricant replacement after the calculated period of operation or after a defined number of top up lubrication operations, waste lubricant shall be totally removed and then replaced with a fresh lubricant.

The replacement of lubricant requires easy access to the housing and its opening. Covers of split housings can be easily removed to reveal the bearing. Removable upper part of split housing which is aligned with the lower part using expansion pins facilitates installation and maintenance. Upper parts

shall not be swapped with each other. After removal of waste lubricant, fresh lubricant shall be applied between rolling elements first. Pay attention not to let any contaminations to penetrate inside the bearing and keep lubricant free of any contaminations. Use of protective gloves is recommended to avoid possible allergic skin reactions to the lubricant.