



Oil lubrication of high precision ball bearings

Oil lubrication

Oil lubrication should be provided, if ...

- high speeds do not permit the use of greases.
- the lubricant must simultaneously serve to cool the bearing.

The most widely used lubricating methods are:

• Oil-mist lubrication

The oil mist is produced in an atomiser and conveyed to the bearings by an air current. The air current also serves to cool the bearings and the slightly higher pressure prevents contamination from penetration.

• Oil-air lubrication (minimized lubrication)

The oil is conveyed to the bearing in droplets by compressed air. The droplet size and the intervals between two droplets are controlled.

• Oil-jet lubrication (cooling lubrication)

Considerable amounts of oil are carried through the bearing by injection, the frictional heat generated in the bearing is dissipated. The cooling of the oil is achieved e. g. with an oil-to-air heat exchanger.

Frequently used oils are listed in the following table:

Oil grade	Setting point approx. [°C]	Flash point approx. [°C]	Kinematic viscosity for base oil [mm ² /s] approx.		Temperature range approx. [°C]	Spezifikation	Remarks / Application
			40°C	100°C			
Mineral	-33	+120	32.0	5.4	-25 ... +80		Good corrosion and ageing resistance. Oil-air lubrication
Mineral	-36	+98	3.1 at 20°C	2.1 bei 40°C	-		Stable against oxidation, non-corrosive. Oil injection lubrication
Ester	-70	+205	12	3.2	approx. -65 ... +100		Low-temperature and long-life oil, subjectionable to high pressure, oxidation stable with flat V/T diagram. Measuring technology, turbines, tape recorders.
Alkoxy-fluor	-30	non-flamable	190	22	-25 ... +220		Resistance to aggressive chemicals and organic solvents. Vacuum up to 1.33 x 10 ⁻¹⁰ bar, radioactive radiation up to 5 x 10 ⁶ J/kg.
Synthetic	-60	+220	12.2	3.2	up to +130	MIL-L-6085A AIR 3511A	Low degree of evaporation, particularly suitable for low temperature, resistant to oxidation and corrosion. Aircraft bearings, wick-feed lubrication.
Ester	-68	+220	14.3	3.7	-50 ... +120	MIL-L-6085A	Good resistance to ageing and corrosion, low degree of vaporization. Aircraft bearings, instrument bearings.
Mineral	-51	+150	10	7.4 at 50°C	-20 ... +80		Favourable viscosity/temperature relationship, high resistance to ageing. Grinding spindles, spindles in textile machines, oil-mist lubrication.
Mineral	-50	>150	10	8.5 at 50°C	-40 ... +80		Favourable viscosity/temperature relationship, high resistance to ageing. Grinding spindles, spindles in textile machines, oil-mist lubrication.
Silicon	-65	+280	60	20	-55 ... +200		High- and low-temperature oil. Space industry, aircraft industry, tape recorders etc. only when C/P > 40 and speed characteristic (n x d _m) > 200,000.