



UNDERSTANDING MOLY IN LUBRICANTS



Moly - Molybdenum disulfide is commonly found in a variety of Industrial lubricant applications. It is used in <u>specialty lubricants</u> like - greases, gear oils and also in solid film lubricants including <u>low friction coatings</u>. Here, we will review the physical, chemical, electrical properties of MoS2 used in <u>Industrial lubricants</u>.

PROPERTIES

MoS2 is dark grey to black powder which exists in two crystalline forms, hexagonal and rhombohedral. The <u>low friction coating</u> properties of Moly is due to the large spacing between S - Mo - S sandwich layers and in part of the favorable distribution of electrons on the constituent atoms. Moly is most useful in the boundary lubrication regime where metal to metal contact exists over the hydrodynamic regime where sufficiently thick fluid film exists to prevent asperity contact. High operating temperatures, low sliding speed, oscillatory or shock loading motion are the important factors that contribute to the existence of boundary lubrication.



Besides temperature and humidity, the particle size of moly can significantly affect the rate of oxidation. Smaller particles of moly have a much higher oxidation rate compared to larger particles. The oxidation behavior of moly has a practical importance because the following reasons:

- Oxidation of Moly can cause corrosion.
- Products of moly oxidation can increase friction.
- Oxidation determines the shelf life of Moly.
- Oxidation of Moly determines the life of bonded films.







The electrical properties of Moly are significant for implementation in electrical brushes. There is a strong correlation between Moly conductivity and temperature. Despite the fact that absolute values of conductivity could be different it is well stated that with an increase in temperature Moly demonstrates a gradual decrease in resistivity and increase in conductivity.

LUBRICATING GREASES

Greases containing moly are used in a wide variety of applications in nearly all industries. Moly grease market includes transportation, construction, mining and agricultural sectors. It is used as <u>solid lubricants</u> in the thickener ranging from 1 to 2 % proportion. Paste like products containing high moly percentage (up to 50-70%) is typically used as problem-solvers for applications such as engine re-builds, and as anti-seize pastes for threaded connections.

GEAR OILS

Moly can be effectively used to reduce friction in gear oils under boundary conditions to provide increased loadcarrying capacity and prevent catastrophic seizure. In the dispersions, the concentration of MoS2 could be between 0.1 to 3%. Fluid lubricants are highly viscous, they may be able to utilize small 1-2 μ m moly particles. Gears having sliding contacts such as worm gears, helical gears, or hypoid gears are responsive to the presence of Moly in the gear oils.



<u>SOLID LUBRICANTS</u>

Solid lubricants decrease friction from the sliding surfaces without the presence of a fluid film of grease or oil. Solid lubricants are materials with inherent lubricating properties by which they are firmly bonded to the surface of the metal forming a lubricating film of 1 to 5 μ m. Overall if the films are fully and properly consolidated, they are capable to provide high load carrying capacity, very low friction, and low wear rate. Also, it is the best technique used for lubrication of bearings with very small clearances in the air.







BONDED COATING

Bonded lubricant coating is the most common coating product for achieving a dry, self-lubricating film on metal surfaces. These are solid lubricant dispersed in a continuous matrix of a binder and attached to a surface. A typical formulation is composed of moly up to 80% and other lubricating additives, binder and a carrier liquid. <u>Bonded lubricant</u> coatings can be applied by several methods like by spray machine or in a convenient aerosol form. Coating thickness and uniformity is critical to optical performance, typical thickness ranges from 8 to 18 µm.



LEARN MORE

The Moly used in <u>lubricants</u> is the purified form of the mineral molybdenite. Moly is having high load carrying capacity of about 2,50,000 psi (ASTM 2625 B) and wear life of 250 min (ASTM 2625 A) which provides coefficient of friction of 0.19 as static and 0.16 as kinetic (ASTM D 1894). Most of Moly coatings include additional high performance resins and additives to enhance bonding to the base metal of the coated part.

SCOPE FOR MOSIL

We at MOSIL have a wide range of products having Moly as a special additive and we sell the exact application based lubrication solution. We have a variety of <u>Specialty Lubricants</u> which are running through the equipments of different industries across the India and the world.

To know more about the product and product range kindly visit our website - <u>www.mosil.com</u> OR write us at - enquiry@mosil.com