

LUBRICATION FILM STRENGTH



IMPORTANCE OF FILM STRENGTH OF A LUBRICANT !!

Film strength of a lubricant is influenced by base stock and additives. Film strength is very important property of lubricant as it protects machine's (internal) components from wear and degradation .

In this blog we will study which factors impact film strength and its performance.

FILM THICKNESS

Film thickness is result of balance between various factors. The first thing that comes to mind is the base oil which creates a film thickness to separate metal surfaces. But the base oil serves its purpose only when there is balance between three factors, those are relative velocity , base oil viscosity and load. Additives and base oil are properly blended together to produce either oil or grease. This formulation helps to protect to maintain adequate lubrication film.



FILM STRENGTH

It can be defined as ability of lubricant to control wear, lessen the effect of friction by means other than film thickness. Additive and base oil chemistry work together when base oil viscosity alone is not sufficient to overcome metal to metal surface contact. However the boundary conditions are also influenced by environmental factors, chemical and physical properties of the mechanical surfaces.



WEAR GENERATION

When there is inadequate film of lubricant, cold welding occurs due to contact of asperities which results into adhesive wear. The tip of asperity is broken as an abrasive particle and small crack propagates on the surface or layer under the surface .High stresses on such areas lead to fatigue failure.



REDUCE SURFACE INTERACTION

Friction and wear additives have polar properties due to which they get adhered to metal surface and when interaction occurs they react chemically with surface and form initial molecular level on metal layer surface. This layer formed reduces friction .



FRICITION MODIFIERS

Fatty acids when added to the oil lowers friction at slow sliding speed. They are used in such application where there is low speed and stick slip phenomenon needs to be avoided. They also acts as an anti wear additives and are effective at lighter loads. However at higher temperature the film breaks down .



ANTI WEAR ADDITIVES

These additives react with metal surface only at boundary condition. One of it is ZDDP type of additive, Anti wear additives become more activated at higher temperature and create a good barrier film,



EXTREME PRESSURE ADDITIVES

Anti wear additives and friction modifiers break down when surface temperature goes high. During such operating conditions sulfur and phosphorous based extreme pressure additives are used.



CONCLUSION

MOSIL Lubricants studies your application thoroughly, understands what should be the composition of lubricant to be offered to you and then offers the best lubrication solution. We are an Experienced and Progressive Specialty Lubricant & Coatings Manufacturing (ISO 9001:2015 Certified) Organization dedicated to provide quality products and services to its customers globally.