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Perspective

Types of Lubricant Additives and its Technical Uses in Nano-Materials

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DESCRIPTION

In order to increase fuel efficiency, minimize friction, and enhance wear and tear characteristics of engine components, new additives are now being developed. Modern engine oils must have low levels of sulphate, phosphorus, and sulphur in order to preserve the effectiveness of exhaust automobile emission control devices and to extend their lifespan. The effect of lubricant additives on the viscoelastic and thermo physical characteristics of engine oils. One of the most frequently used consumable items is engine oil, which is used in the automotive industry. The demand to improve the performance of engine oil lubricants has been rising constantly.

Since a few decades ago, performance-improving additives have been added to engine oil lubricants for that reason. As a result, there is a growing need to demonstrate the contribution that lubricant additives provide to the automobile industry, consumers, and the environment. These additives are used in lubricants for passenger cars (diesel and gasoline engines), trucks, coaches, and buses, as well as heavy duty engine oil. With their capacity to maximize desired lubricant qualities while inhibiting undesirable ones, it illustrates the contribution provided by lubricant additives in these applications to the customer, industry, and environment.

During the past ten years, scientists have been closely following the fast emerging field of nanoparticle lubrication technology. Although for a while the production of nanoparticles was constrained by the technologies available, today's synthesis methods have been improved to such a level that it is possible to produce large quantities relatively cheaply and efficiently. Nano lubrication offers a solution to many issues associated with traditional lubricants that contain phosphorus and sulphur. When suspended in a lubricant, nanoparticles have the ability to pass through tiny gaps between abrasive surfaces in contact and change the tribological performance of the contact.

As a result, nanoparticles provide an alternate method of lubricating by bringing third body entities into the contact directly. The features of nanoparticles, such as size, shape, and concentration, are what determine the friction-reduction and anti-wear behaviours. To enhance tribological capabilities, only a small amount of nanoparticles (1%) are required. Different lubricating oils and Nano phases have various optimum concentrations. For interactions with the surface irregularities of the sliding materials to generate an anti-wear surface protection coating, a smaller size appears to be more suitable.

Types of lubricant additives

Many different kinds of chemical additives are added to base oils to improve their properties, reduce their bad qualities, and potentially even give those new ones. Depending on the intended use of the lubricant, additives typically make up between 0.1 and 30 percent of the finished lubricating oil. Chemicals used in lubricant additives are expensive, and it takes a very sophisticated science to mix or formulate the right blend.

Turbine oil is distinct from hydraulic oil, gear oil, and engine oil due to the choice of additives.

They are also chosen for their low cost, compatibility with other formulation additions, and ease of mixing with the chosen base oils. Antioxidants are an example of an addition that works within the oil's body, while others work on the metal's surface (e.g., anti-wear additives and rust inhibitors).

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