

Lubricant and grease additiveness essay sample



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BUSTER**

OMG has long been a leader in the production of high-performance additives for lubricant oils and greases. We are a global producer of metal organics for use in a variety of industrial applications; most recently, for the lubricant and fuel additive industries. We are a leader in the development of high-performance additives that comply with stringent new FDA and NSF regulations. Calciplex™ and FRIC-SHUN®

Sulfur-free and Phosphorus-free Additives

OMG's proprietary overbased carboxylate technology leads the industry in performance and quality. Through a unique patented process, we provide a wide variety of markets with environmentally friendly products formulated to meet their specific needs. Calciplex™ is a line of overbased Calcium Oleate/Carbonate blends specially formulated for use in the manufacture of high-performance greases. * For food-grade greases, OMG Calciplex™ provides:

- * Improved low-temperature performance
- * High dropping points
- * Anti-wear and extreme friction properties
- *

The FRIC-SHUN® line consists of clear emulsions of overbased organic/inorganic blends dispersed in oil. The FRIC-SHUN® line is an all-natural alternative to current additive systems, and is both non-toxic and biodegradable. *

- * For industrial lubricants, OMG FRIC-SHUN® provides:
- * Anti-wear properties

- * Improved friction modification
- * Corrosion resistance
- *
- * For engine oil, OMG FRIC-SHUN® provides:
 - * Improved deposit control and friction modification
 - * Good TBN retention
 - * Beneficial detergent action
 - *
 - * Additional overbased Calcium carboxylates are recommended when multi-functional, sulfur-free packages are required. *
- * Tackifiers
 - * E858 and E857
 - * General-purpose Additives
 - * OMG has more than 20 years of experience in the production of tackifiers for the lubricant and grease markets. E858 Tackifier and our light-colored version E857 Tackifier are widely used general-purpose additives. Product applications include: *
 - *
 - * Providing grease products with non-drip and tack properties * Viscosity improver additive for engine and gear box oils * Improving adherence in way oils and chain lubricants
- * Additive for rust and corrosion inhibitor packages
- *
- * New! Food Grade Tackifier
 - * Complementing our line of food-grade Calciplex™ additives for grease is

our new Food Grade Tackifier, specially designed to meet strict regulations as well as the demands of modern food-processing facilities. 10% Zinc Nap-All® Lube Grade

Anti-wear Agent, Rust Inhibitor

Formulated specifically for the lubricant industry, our 10% Zinc Nap-All® has an oil carrier rather than the conventional solvent carrier usually contained in Zinc Naphthenate solutions. 10% Zinc Nap-All® is widely used as a rust-inhibiting additive in lubricants and undercoatings. Another common application is in petroleum lubricants for compressors and refrigerator systems, where the product acts to inhibit the formation of sludge and reduce wear scar. 14. 5% Zinc Nap-All® Lube Grade

Anti-wear Agent, Rust Inhibitor

This product is a pure naphthenate containing a maximum of Zinc without a carrier. While it performs the same basic functions as our 10% Zinc Nap-All®, it is highly resistant to oxidation, and it offers advantages in certain areas of use. 14. 5% Zinc Naphthenate has also been used as a replacement for 30% Lead Naphthenate. 22% Zinc Hex-Cem®

Anti-wear Agent, Rust Inhibitor

12% Copper Cem-All®

18% Copper Cem-All®

Antioxidant

Our 12% Copper Cem-All® and other Copper carboxylates have been incorporated in lubrication formulations to improve their antioxidation characteristics. In many formulations, the Copper is more effective than

some traditional amine antioxidants. This product has a very wide solubility range in numerous oils. It can be successfully combined with most other oil additives. Naphthenic Acids

Various Grades

Corrosion and Rust Inhibitor

* 20% Bismuth Ten-Cem®

* 16% Bismuth Ten-Cem®

* 28% Bismuth Hex-Cem®

* 14% Bismuth Nap-All®

* EP Additive

Bismuth Naphthenate is now available as an environmentally compatible substitute for Lead Naphthenate as an EP additive for lube oils and greases. As with Lead Naphthenate, the Bismuth Naphthenate should be formulated with organic sulfur compounds to improve its EP characteristics.

Lubricating Oil Additives

Lubricating oil additives (LOAs) are used to enhance the performance of lubricants and functional fluids. Each additive is selected for its ability to perform one or more specific functions in combination with other additives. Selected additives are formulated into packages for use with a specific lubricant base stock and for a specified end-use application. The largest end use is in automotive engine crankcase lubricants. Other automotive applications include hydraulic fluids and gear oils. In addition, many industrial lubricants and metalworking oils also contain LOAs. The major functional additive types are dispersants, detergents, oxidation

inhibitors, antiwear agents, extreme-pressure additives and viscosity index improvers. Government regulations have had a major impact on the LOA business in the past and are likely to remain important in the future, as upgrading lubricants is part of the effort to improve fuel economy and to meet more stringent emission-control requirements. The following pie chart shows world consumption of lubricating oil additives:

Price increases in recent years have largely reflected higher raw material prices, tied to tight supplies of some of these materials and the general impact of higher crude oil prices. The revenues of the industry increased slightly during 2008-2011 despite the economic difficulties. The LOA business is dominated by four multinational companies, some of which are or were linked to the major oil companies. They are Chevron Oronite Company LLC (owned by Chevron Corp.), Afton Chemical Corporation, The Lubrizol Corporation and Infineum (a joint venture of ExxonMobil and Shell). They account for over 85-90% of the business on a worldwide basis. The split between demand for lubricants (the end-use market for LOAs) in the automotive and industrial sectors varies widely across the world. Lube oil for automotive applications depends on automotive production as well as on automotive possession. In some Asian countries, especially in India, Indonesia and Thailand, lube oil for motorcycles plays an important role because of high motorcycle production and possession in these countries. For industrial uses, economic development and industrialization usually result in lube oil consumption growth. The past decade's improvements in automotive sector consumption efficiency have resulted in a sharp drop in the automotive sector's share in Europe. Given the outlook for economic and

fuel consumption growth in the individual regions and anticipated trends in lubricant consumption efficiencies, global demand for lubricants is expected to grow at average annual rates of approximately 2–3% through 2016. This growth is due partly to demand increases in developing countries and partly to demand recovery in industrialized countries. However, the recent slowdown of the world economy may lower the growth rate through 2016.

The best growth

opportunities for LOAs are in the rapidly growing Asia Pacific market—especially China, India and the ASEAN countries. Based on improvements in political and economic stability, growth should also be better in Central and Eastern Europe, including the countries of the former USSR. Brazil is leading the growth in South America. Companies that are well established in these locations are in the strongest position to take advantage of these opportunities. Growth rates for the LOA business in the developed world, where the market is highly mature, will remain minimal. The most important considerations in the most economically developed regions are the changing technology in the end-use industries (e. g., automotive engine design), government regulations (e. g., lower emissions and lower fuel consumption) and the need to provide the attributes the end-use industries or lubricant manufacturers wish to promote in their marketing strategies (e. g., longer drain intervals and lower maintenance costs).

Additives in lubricating oils

Dr. Dmitri Kopeliovich

Additives are substances formulated for improvement of the anti-friction, chemical and physical properties of base oils (mineral, synthetic, vegetable or animal), which results in enhancing the lubricant performance and extending the equipment life.

Combination of different additives and their quantities are determined by the lubricant type (Engine oils, Gear oils, Hydraulic oils, cutting fluids, Way lubricants, compressor oils etc.) and the specific operating conditions (temperature, loads, machine parts materials, environment). Amount of additives may reach 30%.

- * Friction modifiers
- * Anti-wear additives
- * Extreme pressure (EP) additives
- * Rust and corrosion inhibitors
- * Anti-oxidants
- * Detergents
- * Dispersants
- * Pour point depressants
- * Viscosity index improvers
- * Anti-foaming agents

Friction modifiers

Friction modifiers reduce coefficient of friction, resulting in less fuel consumption. Crystal structure of most of friction modifiers consists of molecular platelets (layers), which may easily slide over each other.

The following Solid lubricants are used as friction modifiers: * Graphite;

- * Molybdenum disulfide;
- * Boron nitride (BN);
- * Tungsten disulfide (WS₂);
- * Polytetrafluoroethylene (PTFE).

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Anti-wear additives

Anti-wear additives prevent direct metal-to-metal contact between the machine parts when the oil film is broken down. Use of anti-wear additives results in longer machine life due to higher wear and score resistance of the components. The mechanism of anti-wear additives: the additive reacts with the metal on the part surface and forms a film, which may slide over the friction surface.

The following materials are used as anti-wear additives:

- * Zinc dithiophosphate (ZDP);
- * Zinc dialkyldithiophosphate (ZDDP);
- * Tricresylphosphate (TCP).

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Extreme pressure (EP) additives

Extreme pressure (EP) additives prevent seizure conditions caused by direct metal-to-metal contact between the parts under high loads. The mechanism of EP additives is similar to that of anti-wear additive: the additive substance form a coating on the part surface. This coating protects the part surface from a direct contact with other part, decreasing wear and scoring.

The following materials are used as extra pressure (EP) additives: *

Chlorinated paraffins;

* Sulphurized fats;

* Esters;

* Zinc dialkyldithiophosphate (ZDDP);

* Molybdenum disulfide;

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Rust and corrosion inhibitors

Rust and Corrosion inhibitors, which form a barrier film on the substrate surface reducing the corrosion rate. The inhibitors also absorb on the metal surface forming a film protecting the part from the attack of oxygen, water and other chemically active substances.

The following materials are used as rust and corrosion inhibitors: * Alkaline compounds;

* Organic acids;

* Esters;

* Amino-acid derivatives.

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Anti-oxidants

Mineral oils react with oxygen of air forming organic acids. The oxidation reaction products cause increase of the oil viscosity, formation of sludge and varnish, corrosion of metallic parts and foaming. Anti-oxidants inhibit the oxidation process of oils.

Most of lubricants contain anti-oxidants.

The following materials are used as anti-oxidants:

- * Zinc dithiophosphate (ZDP);
- * Alkyl sulfides;
- * Aromatic sulfides;
- * Aromatic amines;
- * Hindered phenols.

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Detergents

Detergents neutralize strong acids present in the lubricant (for example sulfuric and nitric acid produced in internal combustion engines as a result of combustion process) and remove the neutralization products from the metal surface. Detergents also form a film on the part surface preventing high temperature deposition of sludge and varnish. Detergents are commonly added to Engine oils.

Phenolates, sulphonates and phosphonates of alkaline and alkaline-earth elements, such as calcium (Ca), magnesium (Mg), sodium (Na) or Ba (barium), are used as detergents in lubricants.

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Dispersants

Dispersants keep the foreign particles present in a lubricant in a dispersed form (finely divided and uniformly dispersed throughout the oil). The foreign particles are sludge and varnish, dirt, products of oxidation, water etc.

Long chain hydrocarbons succinimides, such as polyisobutylene succinimides are used as dispersants in lubricants.

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Pour point depressants

Pour point is the lowest temperature, at which the oil may flow. Wax crystals formed in mineral oils at low temperatures reduce their fluidity. Pour point depressant inhibit formation and agglomeration of wax particles keeping the lubricant fluid at low temperatures.

Co-polymers of polyalkyl methacrylates are used as pour point depressant in lubricants.

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Viscosity index improvers

Viscosity of oils sharply decreases at high temperatures. Low viscosity causes decrease of the oil lubrication ability. Viscosity index improvers keep the viscosity at acceptable levels, which provide stable oil film even at increased temperatures. Viscosity improvers are widely used in multigrade oils, viscosity of which is specified at both high and low temperature.

Acrylate polymers are used as viscosity index improvers in lubricants.

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Anti-foaming agents

Agitation and aeration of a lubricating oil occurring at certain applications (Engine oils, Gear oils, Compressor oils) may result in formation of air bubbles in the oil - foaming. Foaming not only enhances oil oxidation but also decreases lubrication effect causing oil starvation.

Dimethylsilicones (dimethylsiloxanes) is commonly used as anti-foaming agent in lubricants.

LUBE OIL ADDITIVE

Major components of products Chlorine (Cl), Zinc (Zn), Phosphors (P), Calcium (Ca), Nitrogen (N), Hydrogenates (hydride), Polyalphaolefin Ester (Polymer), Magnesium (Mg)

1. The scope of application: The usages can effectively double the oil life. 2.

Related modification: To be effective to enhance oil pressure, oil temperature to lower.

3. Acidification at high temperature metamorphism of oil is not easy. 4. Used Cars, Trucks: Increased horsepower, good torque performance as motivation to resume the performance like new vehicle.

5. Four-wheel drive SUV: Maintain horsepower, smooth torque performance.

6. Heavy-duty Locomotive: A smooth low-speed, high-speed fumigant. 7.

Buses, Trucks: Smoke reduced, horsepower upgrade, strong climbing. 8.

Heavy Machinery and Equipment: To reduce the mechanical friction noise.

Product Features:

a) Enhance the lubricating effect

b) Reducing the friction coefficient

c) Maintains constant temperature of oil and maintains the best engine oil lubrication to reduce oil loss by lubricating bearings, chains & gear system.

d) Makes engine running more smooth so that horsepower is not lost because of high lubricity.

e) The use of a new generation of nanotechnology process of anti-friction

metal, there has been noticeable improvements, effectively in engine performance, horsepower & torque.

- f) Retards acidification of oil due to high temperatures and thereby: i) Effectively extending the oil life expectancy by two times. ii) Prevents engine and engine parts from corrosion, oil sludge and engine valve damage caused by carbon deposition.
- g) Reduce frictional coefficient by avoiding contacts with metal surface gap, if large, drains cylinder oil pressure which is serious.
- h) Improves viscosity index, effectively extending the service life of engine oil.
- i) Also suitable for industrial use.

The Ratio Used: 125 ml to treat 4 ~ 5 liters of lube oil.

Cost-effectiveness to add lube oil additives, the economic benefits stated in the following areas:

1. Due to a significant reduction in the frictional resistance and prolongs engine life, one can save on fuel consumption, especially during highspeed long-distance travel.
2. Can greatly extend the life of lubricants.
3. Can achieve almost zero maintenance because of less wear and tear of engine and engine parts, free long-term engine maintenance & engine overhaul.
4. Increase the driving force, a significant reduction in noise.
5. Experience the pleasure of driving from low-end cars to luxury cars. The principle role of the chemicals added to lubricating oil, the inert particles present gets evenly distributed quickly - at the micro level, so that the original mechanical components of the sliding friction will be rapidly

replaced by rolling friction, a significant reduction in frictional resistance, lower noise, increased power, saving fuel, lubricants to extend life expectancy.

When the engine oil is changed it comes out along with the oil without formation of any coating or layer.

Super oil additive (LOA) anti-wear experiment, the result is amazing! By testing certain well-known brands of lubrication oil, when loaded to the end of weight lever, the resistance increase in ear-piercing noise, a significant increase in current and overloads the electric motor to stop. Without changing the external conditions, in the proportion of lubricating oil by adding lube oil additive (LOA), by stacking more load/weights, motor still runs as usual, almost no noise, the current is maintained at a relatively low level. With no load/weight is almost of any difference.

Wear and tear on/of the face (billets):

Billet left side by using general/normal lubricating oil with the load/pressure of two weights for 10 - 15 seconds.

Billet right side by adding oil additive (LOA) in lubricating oil with the load/pressure with more weights for 20 - 40 seconds.

In particular, please note the extent of wear and tear on smooth surface.

Given below is a small setup to show the working of TOPFUEL Lube Oil Additive and its advantage.

This set up consist of a 1 hp motor working on single phase (230 V AC, 50 ± 10% Hz).

A belt driven arrangement is made to rotate a small bearing which is dipped in lube oil bath.

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A cantilever arrangement is provided to hold and apply load on the steel billet.

The amount of wear and tear on the steel billets under load is seen with the help of change in ammeter reading.

1. Normal Lube Oil
2. Lube Oil with TOPFUEL Additive (35% Reduced)

Experiment Conclusion: This study was verified from the intuitive TOPFUEL LUBE OIL ADDITIVE (LOA) will be replaced by rolling friction than sliding friction, a significant reduction in frictional resistance, reducing mechanical wear and prolong the efficacy of mechanical life.

Can work with any type of lube oil (synthetic or mineral oil based) Allowed in the framework of liquid lubricants, lubricant does not exceed the volume of cases, using (LOA) with lube oil addition the more the better. Steel

Billet

LOAD (1)

LOAD (2)

1 2TF Lube Oil Additive (LOA) can be mixed any time. During oil change is much more beneficial.

TF Lube Oil Additive (LOA) is flame-retardant and has cooling function.

Comparison of similar products:

At present, more use of Teflon lubricant additive material in the engine for the principle of giving a coating to metal surface, long-term use, the thickness of the coat, covering an area which is difficult to identify /control, it is difficult to certify through any National Standards. Blind can be combined with the so-called oil-free travel information, complaints of accidents have occurred on many occasions.

TF Lube Oil Additive (LOA) will never create a coating on the metal surface of the engine, so no worries.

TF Lube Oil Additive (LOA) increases the life expectancy of lube oil by minimum two times and at the same time reduces the fuel consumption, smoke and vibration with good economic benefits.

TF Lube Oil Additive (LOA) reduces coefficient of engine friction - so that engine runs smoothly, extends engine life, reduces the dry sound, saving on fuel and reduce maintenance cost.

Haris Sensor Technologies Private Limited

Oil additive

From Wikipedia, the free encyclopedia

Oil additives are chemical compounds that improve the lubricant performance of base oil (or oil " base stock"). The manufacturer of many different oils can utilize the same base stock for each formulation and can choose different additives for each specific application. Additives comprise up to 5% by weight of some oils.[1] Nearly all commercial motor oils contain additives, whether the oils are synthetic or petroleum based. Essentially,

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only the American Petroleum Institute (API) Service SA motor oils have no additives, and they are therefore incapable of protecting modern engines.[2]

The choice of additives is determined by the application, e. g. the oil for a diesel engine with direct injection in a pickup truck (API Service CJ-4) has different additives than the oil used in a small gasoline-powered outboard motor on a boat (2-cycle engine oil). Contents [hide] * 1 Types of additives * 1. 1 Controlling chemical breakdown * 1. 2 For viscosity * 1. 3 For lubricity * 1. 4 For contaminant control * 1. 5 For other reasons * 2 Additives in the aftermarket and controversy * 3 See also * 4 External links * 5 References|

Types of additives

Oil additives are vital for the proper lubrication and prolonged use of motor oil in modern internal combustion engines. Without many of these, the oil would become contaminated, break down, leak out, or not properly protect engine parts at all operating temperatures. Just as important are additives for oils used inside gearboxes, automatic transmissions, and bearings. Some of the most important additives include those used for viscosity and lubricity, contaminant control, for the control of chemical breakdown, and for seal conditioning. Some additives permit lubricants to perform better under severe conditions, such as extreme pressures and temperatures and high levels of contamination.

Controlling chemical breakdown

* Detergent additives, dating back to the early 1930s,[3] are used to clean and neutralize oil impurities which would normally cause deposits (oil sludge) on vital engine parts. Typical detergents are magnesium sulfonates. *

Corrosion or rust inhibiting additives retard the oxidation of metal inside an

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engine. * Antioxidant additives retard the degradation of the stock oil by oxidation. Typical additives are organic amines and phenols. * Metal deactivators create a film on metal surfaces to prevent the metal from causing the oil to be oxidized.

Chemical structure of a zinc dialkyldithiophosphate, a typical antiwear agent found in many motor oils.

For viscosity

* Viscosity modifiers make an oil's viscosity higher at elevated temperatures, improving its viscosity index (VI). This combats the tendency of the oil to become thin at high temperature. The advantage of using less viscous oil with a VI improver is that it will have improved low temperature fluidity as well as being viscous enough to lubricate at operating temperature. Most multi-grade oils have viscosity modifiers. Some synthetic oils are engineered to meet multi-grade specifications without them. * Pour point depressants improve the oil's ability to flow at lower temperatures. [edit]For lubricity

* Friction modifiers or friction reducers, like molybdenum disulfide, are used for increasing fuel economy by reducing friction between moving parts.[4] Friction modifiers alter the lubricity of the base oil. Whale oil was used historically.[5] * Extreme pressure agents bond to metal surfaces, keeping them from touching even at high pressure. * Antiwear additives or wear inhibiting additives cause a film to surround metal parts, helping to keep them separated. Zinc dialkyldithiophosphate [6] or zinc dithiophosphates are typically used. * Wear metals from friction are unintentional oil additives, but most large metal particles and impurities are removed in situ using either

magnets or oil filters. Tribology is the science that studies how materials wear. [edit]For contaminant control

* Dispersants keep contaminants (e. g. soot) suspended in the oil to prevent them from coagulating. * Anti-foam agents (defoamants) inhibit the production of air bubbles and foam in the oil which can cause a loss of lubrication, pitting, and corrosion where entrained air and combustion gases contact metal surfaces. * Antimisting agents prevent the atomization of the oil. Typical antimisting agents are silicones.[1] * Wax crystal modifiers are dewaxing aids that improve the ability of oil filters to separate wax from oil. This type of additive has applications in the refining and transport of oil, but not for lubricant formulation. [edit]For other reasons

* Seal conditioners cause gaskets and seals to swell so that the oil cannot leak by.

Additives in the aftermarket and controversy

Although motor oil is manufactured with numerous additives, aftermarket oil additives exist, too. A glaring inconsistency of mass-marketed aftermarket oil additives is that they often use additives which are foreign to motor oil. On the other hand, commercial additives are also sold that are designed for extended drain intervals (to replace depleted additives in used oil) or for formulating oils in situ (to make a custom motor oil from base stock).

Commercial additives are identical to the additives found in off-the-shelf motor oil, while mass-marketed additives have some of each. Some mass-market oil additives, notably the ones containing PTFE/Teflon (e. g. Slick 50) [7] and chlorinated paraffins (e. g. Dura Lube),[8]have caused a major

backlash by consumers and the U. S. Federal Trade Commission which investigated many mass-marketed engine oil additives in the late 1990s. Although there is no reason to say that all oil additives used in packaged engine oil are good and all aftermarket oil additives are bad, there has been a tendency in the aftermarket industry to make unfounded claims regarding the efficacy of their oil additives.

These unsubstantiated claims have caused consumers to be lured into adding a bottle of chemicals to their engines which do not lower emissions, improve wear resistance, lower temperatures, improve efficiency, or extend engine life more than the (much cheaper) oil would have. Many consumers are convinced that aftermarket oil additives work, but many consumers are convinced that they do not work and are in fact detrimental to the engine. The topic is hotly debated on the Internet. Although PTFE, a solid, was used in some aftermarket oil additives, users alleged that the PTFE clumped together, clogging filters. Certain people in the 1990s have reported that this was corroborated by NASA[9] and U. S. universities.[10] One thing to note, in defense of PTFE, is that if the particles are smaller than what was apparently used in the 1980s and 1990s, then PTFE can be an effective lubricant in suspension.[11] The size of the particle and many other interrelated components of a lubricant make it difficult to make blanket statements about whether PTFE is useful or harmful. Although PTFE has been called “ the slickest substance known to man”,[12][13] it would hardly do any good if it remains in the oil filter.