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Fat :

An animal or vegetable oil which will combine with an alkali to saponify and form a soap.

Fiber grease :

A grease with a distinctly fibrous structure, which is noticeable when portions of the grease are pulled apart.

Filler (lubricants) :

Any substance, such as talc, mica, or various powders, which may be added to a grease to make it heavier in weight or consistency, but which serves no useful function in making the grease a better lubricant. (Editor's note: Starch filler may also be added to certain lubricating oil or other lubricants).

Film Strength :

The property of an oil which enables it to maintain an unbroken film on lubrIcated surfaces under operatIng conditions, where other otherwise there would be scuffing or scoring of the surfaces.

Fire Point :

The lowest temperature at which an oil or other product vaporizes sufficiently rapidly to form above its surface an air-vapor mixture which when subjected to a source of ignition or a flame, will ignite and continue to burn. Typically for most Petroleum products the Fire Point is about 50°F above the Flash Point.

Flash Point :

The lowest temperature at which vapors arising from the oil will ignite momentarily, when subjected to a flame. (i.e., will flash or "poof"). The vapors will ignite and then go out.

Floc Point :

The temperature at which wax or solids separate in an oil.

Fluidizer :

High boiling-point, thermally stable organic liquid used as an additive in gasoline to reduce deposits on the undersides of intake valves; also called solvent oil.

Foam :

An agglomeration of gas bubbles separated from each other by a thin liquid film which is observed as a persistent phenomenon on the surface of a liquid.

Foaming :

Occurrence of frothy mixture of air and a petroleum product (e.g., lubricant, fuel oil) that can reduce the effectiveness of the product, and cause sluggish hydraulic operation, air binding of oil pumps, and overflow of tanks or sumps. Foaming can result from excessive agitation, improper fluid levels, air leaks, cavitation, or contamination with water or other foreign materials. Foaming can be inhibited with an anti-foam agent. The foaming characteristics of a lubricating oil can be determined by blowing air through a sample at a specified temperature and measuring the volume of foam, as described in test method ASTM D 892.

Foam inhibitor :

A substance introduced in a very small proportion to a lubricant or a coolant to prevent the formation of foam due to aeration of the liquid, and to accelerate the dissipation of any foam that may form.

Four-Ball Tester :

This name is frequently used to describe either of two similar laboratory machines, the Four-Ball Wear Tester and the Four-Ball EP Tester. These machines are used to evaluate a lubricant's anti-wear qualities, frictional characteristics or load carrying capabilities. It derives its name from the four 1/2 inch steel balls used as test specimens. Three of the balls are held together in a cup filled with lubricant while the fourth ball is rotated against them.

Friction :

a) a rubbing, esp. of one object against another.
b) Mechanics: The resistance to motion of two moving objects or surfaces that touch.
c) Tribology: The resisting force encouraged at the common boundary between two bodies when, under the action of an external force, one body moves or tends to move relative to the other.

Friction is the resistance to the motion of one surface over another. The amount of friction is dependent on the smoothness of the contacting surfaces, as well as the force with which they are pressed together.

Friction between unlubricated solid bodies is independent of speed and area.

The coefficient of friction is obtained by dividing the force required to move one body over a horizontal surface at constant speed by the weight of the body.

Coefficients of rolling friction (e.g., the motion of a tire or ball bearing) are much less than coefficients of sliding friction (back and forth motion over two flat surfaces).

Sliding friction is thus more wasteful of energy and can cause more wear.

Fluid friction occurs between the molecules of a gas or liquid in motion, and is expressed as shear stress. Unlike solid friction, fluid friction varies with speed and area.

In general, lubrication is the substitution of low fluid friction in place of high solid-to-solid friction.

Fretting :

Form of wear resulting from small-amplitude oscillations or vibrations that cause the removal of very finely divided particles from rubbing surfaces (e.g., the vibrations imposed on the wheel bearings of an automobile when transported by rail car, or on the fifth wheel on tractor trailers). With ferrous metals the wear particles oxidize to a reddish, abrasive iron oxide, which has the appearance of rust or corrosion, and is therefore sometimes called fretting corrosion; other terms applied to this phenomenon are false Brinelling (localized fretting involving the rolling elements of a bearing) and friction oxidation. Fretting can be controlled with lubricants containing molybdenum disulfide.

Fretting Corrosion :

A special case of fretting in which one or more of the surfaces, or the wear particles therefrom, react with their environment. Mechanical wear initiates fretting, then chemical action or "corrosion" results from the exposure of virgin metal surface to the to the air.

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Fuel-economy Oil :

Engine oil specially formulated to increase fuel efficiency. A fuel-economy oil works by reducing the friction between moving engine parts that wastefully consumes fuel energy.

There are only three known and proven means of accomplishing this goal:

1. by reducing the viscosity of the oil to decrease fluid friction
2. by using friction-reducing chemical additives in the oil to prevent metal-to-metal contact, or rubbing friction, between surface asperities
3. by introducing solid colloidal particles between surface asperities

Fuel Injection :

Method of introducing fuel into the combustion process as a finely divided spray under pressure through a small nozzle. Fuel injection is essential to the compression-ignition process of the diesel cycle.

In the majority of newer-model gasoline-powered cars fuel injection has replaced carburetion, largely due to EPA exhaust emission standards: fuel injection improves combustion efficiency, resulting in lower emissions.

The location and design of fuel injectors is somewhat different between diesel and gasoline engines.

In the diesel engine fuel is injected directly into the cylinder or the pre-combustion chamber. Since the injector nozzle intrudes into the cylinder it must be durable and relatively insensitive to deposit formation in the injector passages.

In most gasoline engines, the fuel is injected into the intake manifold leading to the cylinder, either by a single throttle-body injector or by multiple port injectors (one for each cylinder). Gasoline engine port injectors are highly deposit sensitive, due to their extremely narrow passage clearances of only two-thousandths of an inch and their proximity to high combustion temperatures. This deposit sensitivity required gasoline suppliers to develop a new generation of gasoline additives that could keep these passages deposit-free. Diesel engine manufacturers have begun to express interest in diesel fuel additives that can reduce deposits, thereby increasing combustion efficiency and improving emissions control.

Fuel injection offers a number of advantages over carburetion, including:

1. more precise metering of fuel in the cylinders for improved combustion
2. more positive delivery of fuel to the cylinder (hence, easier starting and faster acceleration)
3. higher power output because of improved volumetric efficiency
4. reduced exhaust emissions.

Full-fluid-film Lubrication :

presence of a continuous lubricating film sufficient to completely separate two surfaces, as distinct from boundary lubrication. Full-fluid-film lubrication is normally hydrodynamic lubrication, whereby the oil adheres to the moving part and is drawn into the area between the sliding surfaces, where it forms a pressure, or hydrodynamic, wedge. See ZN/P curve. A less common form of full-fluid-lubrication is hydrostatic lubrication, wherein the oil is supplied to the bearing area under sufficient external pressure to separate the sliding surfaces.

FZft Test :

A German gear test for evaluating EP properties.