

# AMSOIL provides top-quality filters for every application.

## How Motor Oil Becomes Contaminated

Motor oil becomes unfit for service after a period of use. Two main reasons for this are the accumulation of contaminants in the oil and chemical changes (additive depletion and oxidation) in the oil itself.

These factors cause deterioration of the oil and prevent it from doing the job of lubricating and cooling engine parts.

## Abrasives

### Road Dust and Dirt

Design limitations of air cleaners, some oil fill caps, and crankcase ventilation systems allow some dust and dirt to enter the engine. Leaks in the intake system also permit unfiltered air to enter the engine. However, proper maintenance of the engine and its accessories can minimize the amount of contaminants entering the lubrication system and extend engine life.

### Metal Particles

Normal wear of parts in an engine produces very small metal particles that are picked up and circulated by the oil. Particles of road dust and dirt increase the rate of wear and generate larger metal particles, that in turn are quite abrasive. These, too, are circulated through the engine by the oil.

While oil filters help keep these particles at a minimum, they can't remove them entirely.

## Combustion By-Products

### Water

Combustion produces water vapor, or steam. When engine temperatures are high, most of the water remains in vapor form and goes out through



EaO filter family



Donaldson filter family



WIX filter family



MANN filter family

the exhaust. However, when engine temperatures are low, such as at start-up, warm-up and short-trip operation in low ambient temperatures, the water vapor condenses (turns into a liquid) on cylinder walls and is picked up in the crankcase oil. Here it leads to the formation of sludge, rust and corrosion.

## Acids

The combustion process produces acidic gases which, like water vapor, condense on cylinder walls at cold engine temperatures and also find their way into the crankcase oil. These combine with water to cause rust and corrosion.

## Soot and Carbon

Incomplete combustion produces soot, carbon and other deposit-forming materials. An engine running too "rich," or with too much fuel, increases the amount of contaminants. In gasoline engines, light-load and low-speed operations increase these combustion by-products more than high-load, high-speed operations. Diesel engines produce more of these by-products with low-speed, high-load operations.

## Dilution

When an engine is started or running abnormally, some unburned fuel in liquid form is deposited on cylinder walls. That means raw fuel leaks past the rings into the crankcase, where it reduces the viscosity of the oil. Dilution lowers the film strength of the oil and increases oil consumption. Usually this is a minor problem when engine operation is at high-speed or high-temperatures, but it can be a problem in vehicles consistently used for short-trip driving.

While all of the processes by which a motor oil is contaminated are not fully defined, the use of high-quality motor oils such as AMSOIL synthetic motor oils allows motorists continued protection of their engines along with extended drain intervals, all while limiting the contaminants in the oil and prolonging engine life.