

Engine Filtration and Maintenance

Engine Wear

Automotive experts agree dirt is the number-one cause of engine wear. Analysis by Federal-Mogul Corporation reports that 43.4 percent of all engine bearing distress is caused by dirt.

Engine dirt particles are so small – mere dust specks – and an engine is a highly sophisticated piece of machinery, crafted from the most durable metal alloys. How, then, can these minute particles bring down such a high-tech giant?

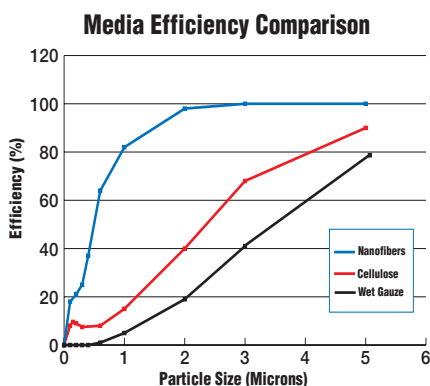
The answer lies in that dirt particles are extremely abrasive. They consist of razor-like flakes of road dust and airborne grit drawn into the engine through the intake manifold, as well as manufacturing scarf and wear-metal particles generated inside the engine. These particles are carried by the oil into the precision clearances between bearings and other moving parts. Once they work in between these parts, they grind and gouge surfaces, altering clearances and generating more abrasive debris. This wear cycle continues, making precision components sloppy and fatigued until they fail altogether.

Filtration is the key to preventing costly engine repairs caused by dirt. Filtration removes contaminants by trapping and holding them outside the system of oil circulation. In order for a filter to be truly effective, it must be able to capture contaminants of all types and sizes. AMSOIL has developed a complete line of sophisticated filtration products designed to offer the best protection available against virtually all harmful engine contaminants.

Air Filtration

An engine “breathes” air to mix with fuel for combustion – about 9,000 gallons of air for every gallon of gas. All that air contains more than 400 tons of suspended dirt in one cubic mile over a typical city, and the concentration is much higher in rural areas where travel frequently is over unpaved roads.

The air filter is the first line of defense against the abrasive airborne



grit that gets into an engine. In order to do the job right, the air filter must effectively filter the dangerous particles without obstructing the vital flow of air that sustains the engine.

Conventional air filters quickly become obstructed with dirt, reducing vital engine air intake, leading to poor engine performance and low fuel efficiency. They require frequent replacement.

AMSOIL Filters Last Longer

When properly cleaned at 25,000-mile intervals, **AMSOIL Ea Air Filters** are guaranteed for 100,000 miles or four years, whichever comes first. The use of synthetic nanofiber media allows AMSOIL Ea Air Filters to provide unsurpassed filtration protection for 25,000 miles or one year between cleanings.

AMSOIL Ea Air Filters rank among the most efficient filters available to the auto/light truck market. Ea Air Filters’ synthetic nanofiber media removes five times more dust than traditional cellulose filter media alone and 50 times more dust than wet gauze filter media. AMSOIL Ea Air Filters have a much higher capacity and lower restriction than competing filters.

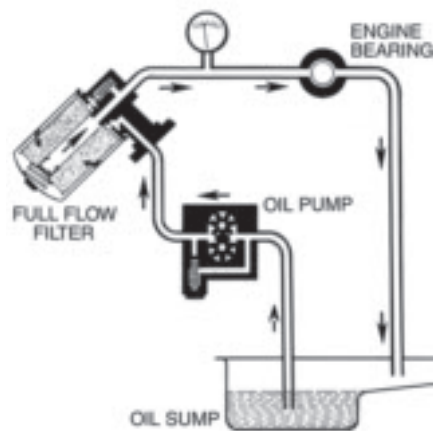
Oil Filtration

Full-flow oil filters install directly into the line of oil circulation. The “full flow” of oil passes through the filter as the oil journeys between the oil pump and the engine.

A full-flow filter must be able to remove and hold contaminants without obstructing oil flow to the engine.

Most filters on the market compromise the filtration of finer particles by using a thin layer of porous filter paper. These filters have almost no extended cleaning ability since they have a low capacity for storing dirt.

These “surface-type” paper filters quickly become restricted as debris builds up on the paper surface. When this happens, the filter by-pass valve opens and allows unfiltered oil into the engine.



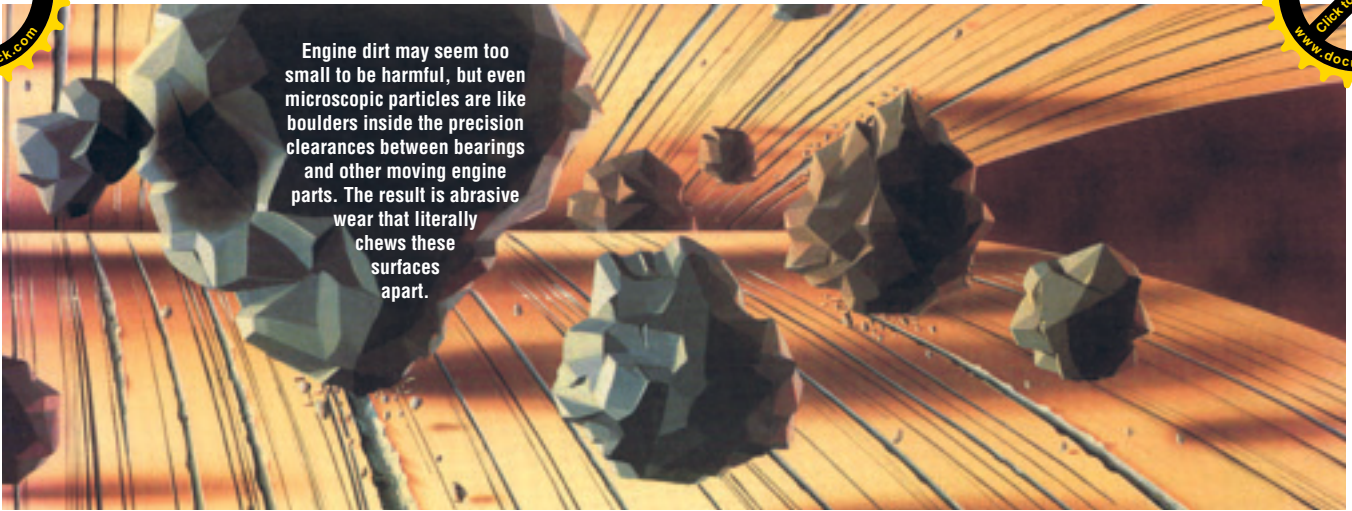
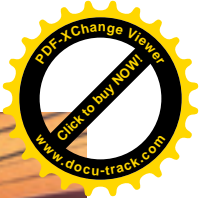
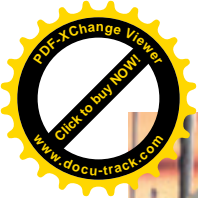
Normal oil circulation in an internal combustion engine.

AMSOIL Ea Oil Filters are made with premium-grade full-synthetic media. The strictly controlled processing of this media ensures accurate filter construction, and is what allows Ea Oil Filters to deliver higher capacity and efficiency along with better durability.

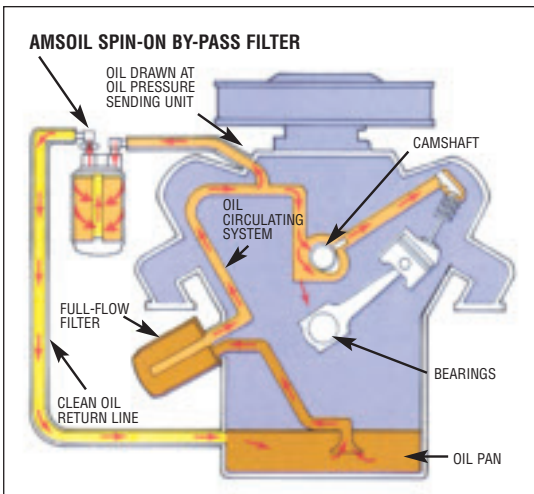
AMSOIL Ea Oil Filters have significantly lower restriction than conventional cellulose media filters. Their small synthetic nanofibers trap smaller particles and hold more contaminants, resulting in lower restriction. During the engine warm-up period, an Ea Oil Filter allows the oil to flow through the filter at a colder temperature than a typical cellulose filter. The additional filtering time decreases engine wear.

By-Pass Oil Filtration

An average full-flow filter traps particles as small as 20 microns. The filter can’t remove finer particles because the oil must be filtered quickly while removing most of the particles in the oil.



Engine dirt may seem too small to be harmful, but even microscopic particles are like boulders inside the precision clearances between bearings and other moving engine parts. The result is abrasive wear that literally chews these surfaces apart.



Oil circulation system using an AMSOIL Spin-On By-Pass Oil Filter.

By-pass oil filtration uses a secondary filter with the purpose of eliminating nearly all contaminants in engine oil. By-pass filters have high capacities and eliminate much smaller particles than full-flow filters, including those in the two to 20 micron range, soot and sludge.

By-pass filters operate by filtering oil on a “partial-flow” basis. They draw approximately 10 percent of the oil pump’s capacity at any one time and trap the extremely small, wear-causing contaminants that full-flow filters can’t remove. By-pass filters have a high pressure differential, causing the oil to flow through them very slowly and allowing for the removal of smaller contaminants. It is called by-pass filtration because the oil flows from the by-pass filter

back to the sump and bypasses the engine. This continual process will eventually make all of the oil analytically clean, reducing long-term wear and can extend drain intervals.

AMSOIL Ea By-Pass Filters use a two-stage pleated and layered cellulose/full-synthetic media to provide an efficiency rating of 98.7 percent at two microns.

Dual Remote: Patented Protection

Available only from AMSOIL, the **Dual Remote Oil Filtration System** replaces conventional full-flow filters, mounting in any convenient location in the engine, and gives full-flow and by-pass oil filtration protection. With Dual Remote, filter changes are quick, clean and easy. It also increases an engine’s oil capacity, helping oil work better, not harder.

Oil Analysis

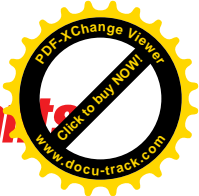
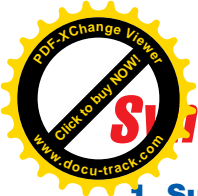
By analyzing used engine oil, a qualified lab can determine the degree of protection the oil is delivering and make certain the oil has not been contaminated. Oil analysis also can detect impending engine failure.

OIL ANALYZERS INC. provides state-of-the-art oil analysis testing and is a perfect complement to AMSOIL synthetic motor oils. The combination of superior lubrication and reliable oil analysis provides peace of mind over extended drain intervals.

OIL ANALYZERS testing kits (KIT01, KIT02, KIT03) are available from AMSOIL. Oil analysis helps motorists derive the longest life from AMSOIL synthetic motor oil and from their engines.

For more information on oil analysis and OIL ANALYZERS INC. go to www.oaitesting.com or call (715) 392-0222.

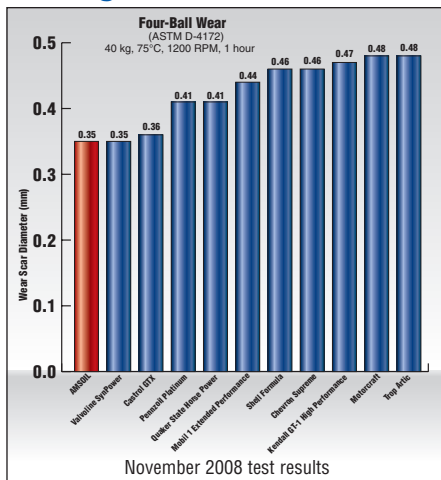




Synthetic Motor Oils Outperform Conventional Lubricants

1. Superior Wear Protection ... Engines Last Longer

In the Four-Ball Wear Test (ASTM D 4172) AMSOIL Synthetic 10W-30 Motor Oil (ATM) outperforms the leading synthetic and petroleum 10W-30 motor oils.



2. Improves Fuel Economy

AMSOIL synthetic lubricants have been credited with significant fuel economy improvement.

3. Easier Cold Starts

AMSOIL synthetic motor oils stay fluid at remarkably low temperatures.



60 percent of engine wear occurs during initial start-ups. AMSOIL motor oils flow freely for fast delivery to critical engine parts.

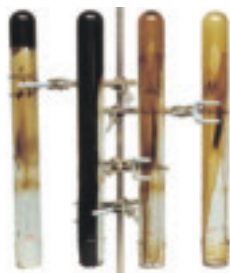
4. Superior High-Temperature Performance

Reduced friction means cooler operating temperatures. Excessive oil temperatures can be significantly reduced when using AMSOIL motor oils.

5. Reduces Deposits on Critical Engine Parts

Engines run cleaner, perform better.

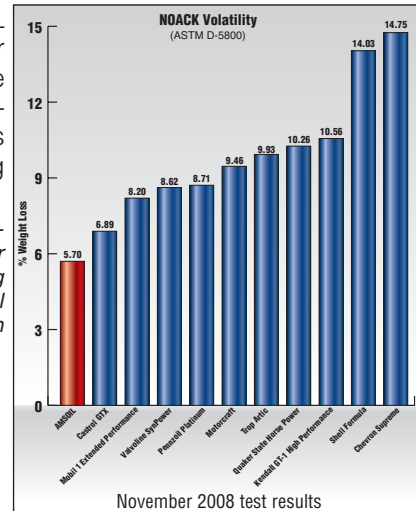
Results of high-temperature test. AMSOIL, on the right, was the only oil that did not show formation of sludge or deposits.



6. Reduces Oil Consumption

Tests show the superior thermal stability of AMSOIL Synthetic 10W-30 Motor Oil (ATM) withstands the higher operating temperatures of today's engines better than competing 10W-30 oils.

With AMSOIL, only 5.70% vaporizes, compared to much higher percentages with competing motor oils. The result: better fuel economy and wear protection with AMSOIL 10W-30 Motor Oil.



7. Lower Cost, More Convenience

Motorists value savings. With AMSOIL synthetic motor oils, 25,000-mile/one-year oil changes save time and money. With all the added performance benefits of AMSOIL synthetics, fuel economy, reduced oil consumption and better wear protection, your savings add up every mile you are on the road.



8. Jet-Age Technology

Only synthetics can stand up to the extreme performance demands of a jet engine. Every jet engine in the world uses synthetic engine oil.

9. The First in Synthetics

In 1972, AMSOIL formulated the world's first American Petroleum Institute-certified synthetic motor oil. With almost 40 years' experience manufacturing and marketing synthetic motor oils, AMSOIL has been a consistent leader on the forefront of lubricant technology.

10. Environmental Benefits, Too!

Fewer oil changes means less waste oil, fewer filters, less packaging to dispose of, and a better future for our children.



Contact your AMSOIL Dealer for more information on AMSOIL products or to place an order. You may also order direct by calling AMSOIL INC. at 1-800-956-5695 and providing the referral number listed here. ➔

Referral # _____

