

MOTOR OIL BASICS.

Modern day oils are complex, chemically engineered compounds that have improved upon refined crude oil. Modern oils are designed and chemically manufactured to achieve specific traits and properties necessary for use in current automobiles. But many of the basics of lubricants and lubrication are as important today as they were fifty years ago.

To begin with, motor oils must perform some of the same basic functions today as they did years ago. All of these functions are considered when designing any motor oil, whether it will be a synthetic or mineral-based oil.

PERMIT EASY STARTING - Any motor oil must permit easy engine starting. Viscosity, a measure of an oil's resistance to flow, is taken into consideration when questioning, whether or not an oil will permit easy starting. An oil's ability to flow efficiently throughout an engine will be affected by air temperature. Therefore, an oil formulated for winter driving must have a low enough pour point for it to flow to all parts of an engine quickly when started, but also to provide adequate protection once the engine reaches normal operating temperatures.

LUBRICATE AND PREVENT WEAR - Motor oils must also lubricate and prevent wear. This can be more of a challenge in temperature extremes. Oil that does not flow well in cold temperatures will leave parts of the engine with no protection, and oil that burns off and becomes too fluid will leave little protection in high temperatures. The goal of an oil is to provide constant full-film lubrication to an engine's components. This type of lubrication occurs when the moving surfaces are continuously separated by a film of oil. Crankshaft bearings as well as connecting rods, camshafts and piston rings normally operate with full-film lubrication. Boundary lubrication occurs when it is impossible to maintain a continuous oil film between moving parts and intermittent metal-to-metal contact results. Additives can greatly reduce the amount of damage that can occur during boundary lubrication. Boundary lubrication conditions always exist during engine starting and often during the operation of a new or rebuilt engine.

REDUCE FRICTION - Motor oils must reduce friction. Automobile manufacturers recommend oils based on SAE grades according to expected atmospheric conditions. This helps to ensure adequate but not excessive viscosity at normal operating temperatures. Excessive viscosity can make an engine work harder at moving the oil and therefore lose some of its efficiency and create more heat.

PREVENT RUST AND CORROSION - Motor oils must also prevent rust and corrosion. Unburned fuel and soot can mix with water to form sludge and varnish deposits on critical engine parts. Sludge buildup may clog oil passages, which reduces oil flow. Varnish buildup interferes with proper clearances, restricts oil flow and causes vital engine parts to stick and malfunction. The life of an engine depends on an oil's ability to neutralize the effects of these corrosive substances. that may or may not readily collapse. Foam present in motor oil inhibits heat transfer and impedes lubrication due to the high compressibility of air. In order to allow an engine to run efficiently, motor oil must be non-foaming.

KEEP ENGINES CLEAN - Another important feature of any motor oil related to preventing rust and corrosion is the necessity of keeping engine components clean. Sludge and varnish can be controlled with the proper additives and can be filtered out of vital engine components. In performing its lubrication function, some oil must reach the area of the top piston ring in order to lubricate the rings and cylinder walls. This oil is then exposed to the heat and the flame of burning fuel, and part of it actually burns off. Modern oils have been chemically engineered to burn as cleanly as possible in order to minimize the harmful deposits left on the walls of the combustion chambers. These build-ups can cause ring sticking and breakage, pinging, engine knock or other combustion irregularities that reduce the efficiency and economy of the engine. basic functions today as they did years ago. All of these functions are considered when designing any motor oil, whether it will be a synthetic or mineral-based oil.

COOL VITAL COMPONENTS - Engine oil also acts as a coolant. In fact, the water-antifreeze mixture used in an automobile's cooling system only does about 60 percent of the cooling job. And it usually only cools the upper portions of the engine - the cylinder heads, cylinder walls and the valves. As much as 5 to 10 percent of engine heat comes from friction produced by closely fitted engine parts such as connecting rods, main bearings, camshafts and piston rings. The crankshaft, the main and connecting rod bearings, the camshaft and its bearings, the timing gears, the pistons and many other components in the lower engine rely on oil to carry the heat load away.

SEAL - The surfaces of the piston rings, ring grooves and cylinder walls are not completely smooth. They feature microscopic hills and valleys that can reduce engine efficiency by allowing combustion pressure to escape into the low pressure area of the crankcase. Motor oils must fill in these hills and valleys on ring surfaces and cylinder walls, allowing maximum combustion pressure. also to provide adequate protection once the engine reaches normal operating temperatures.

PREVENT FOAMING - Anti-foam additives in modern oils prevent foaming of motor oil due to air in the crankcase being whipped into the oil. Foamed oil contains air bubbles that may or may not readily collapse. Foam present in motor oil inhibits heat transfer and impedes lubrication due to the high compressibility of air. In order to allow an engine to run efficiently, motor oil must be non-foaming.

INCREASE FUEL ECONOMY - A final function of a motor oil is in increasing fuel economy. Various additives such as friction modifiers can allow engines to operate at increased levels of efficiency, resulting in better fuel economy for vehicles.

All of these functions, to some extent, can be performed by both mineral and synthetic oils. However, synthetic oils do not contain many of the impurities that mineral oils can, and this allows synthetics to perform at higher levels in all categories. AMSOIL has long recognized the benefits that a synthetic oil can offer over a mineral oil. Synthetic fluids exhibit higher tolerances and greater lubricating properties in every aspect of automotive operation. And AMSOIL motor oils contain the finest additive packages to insure that a vehicle can receive the finest in protection and operate at a high level of efficiency. starting and often during the operation of a new or rebuilt engine.