The clearance between moving parts will determine what viscosity oil should be used. Proper viscosity assures that the oil won't separate, which helps reduce excessive friction. Other important considerations are pour point and flash point.

The colder the temperature, the stiffer the oil gets. Pour point is the coldest temperature at which the oil will continue to pour. Flash point is the coldest temperature that will still permit a momentary flash without sustaining combustion when a small flame is put next to the surface of the oil.

Oil also acts as a coolant. As oil comes in contact with high-temperature engine parts near the combustion chambers, heat transfers to the oil, which in turn transfers the heat to the outside air as the oil travels through the oil cooler. Friction itself also causes heat, as any roller-blader will tell you after sliding face down on a sidewalk. By bathing or splashing oil on moving parts where there is friction, the oil helps carry away the heat as well as reduce the friction between parts.

A third purpose of oil is its ability to cleanse. It gathers up particulate matter (such as water, dirt, dust, and flakes of metal and carbon) as it travels through the engine and holds them in suspension. Eventually the oil encounters the system filter, which traps the contaminants but allows the filtered oil to reenter the cycle through the engine.

The fourth function of oil is to prevent rust and corrosion. As an engine cools after use, moisture condenses onto the cylinder walls and other engine parts. This moisture, and other contaminants, lead to internal engine rust and corrosion. Oil coats the surfaces, thus preventing moisture and contaminants from actually contacting them.

The last major use of oil is to seal and cushion. Oil helps the piston rings form a seal against the cylinder wall, permitting maximum compression within the cylinder. It also cushions the shock of the moving parts.

TYPES OF OIL

Mineral oil, in one form or another, has been in use for years; the Wright Brothers used "A-Mobiloil" mineral oil in their early motors. Even though today's mineral oil, meeting military specification (MilSpec) MIL-L-6082B, is a well-established, common aircraft engine lubricant, it does have some important drawbacks. When aerated at high temperatures, especially after engine shutdown, oxidation takes place, which is the formation of carbon deposits. Even at temperatures of 150 degrees and lower, the combination of water vapor, lead compounds, and partially burned fuel tend to "cook" into sludge. This gooey mass clogs filters and can even damage engine bearings.

Some time ago there was a short-lived metallic ash detergent oil. It was a mineral oil with an ash-forming additive—metallic salts of barium and calcium. Initially, it appeared to be the answer to problems associated with mineral oil. It decreased the tendency for oxidation, reduced spark plug fouling to a minimum, lowered the tendency for preignition, and had minimal effect on the combustion process while it facilitated engine-cleaning action. The latter was considered especially noteworthy because as the oil traveled through the engine it removed carbon deposits and sludge. Unfortunately, metallic ash detergent oil was a disaster disguised as a blessing. The loosened deposits ended up clogging