

# REALIZE SUPERIOR PROTECTION, PERFORMANCE AND COST SAVINGS WITH AMSOIL SYNTHETIC HYDRAULIC OILS



Hydraulic systems are everywhere, with common examples including the following:

- Garbage trucks
- Mobile cranes
- Snow plows
- Forklifts
- Dump trucks
- Excavators
- Front-end loaders
- Mobile shears
- Backhoes
- Mobile well-drilling and core-sampling equipment
- Skidders
- Piling rigs
- Street sweepers
- Mobile hydraulic power units
- Bucket trucks
- Tow trucks
- Feller bunchers
- Scissor lifts

## Hydraulic Systems

Hydraulic systems can look complex and intimidating, but most are relatively straightforward, consisting of a sump, a pump, hoses, valves and either pistons or hydraulic motors.

**Sump** – The hydraulic system's sump is responsible for holding the oil, providing time for the transferring of heat, and a place for contaminants, including water, to settle.

**Pump** – The hydraulic system's pump produces the fluid flow that creates pressure. In most cases, it is the most expensive part in the system. Hydraulic oils are subjected to pump tests to prove their ability to protect pumps under normal operating conditions. Hydraulic systems can have many different types of pumps, but the three most common are gear, vane and piston pumps. Gear pumps are often found on lower-pressure systems and are relatively simple and reliable. As positive displacement pumps, they pump a fixed amount of fluid for every revolution. Although variations exist, a good example is an automotive oil pump. Vane pumps are common on mobile equipment and can be variable or constant displacement. Piston pumps can be found on higher-pressure applications and are more complex and sensitive to contamination than vane or piston pumps.

**Hoses** – Hoses carry hydraulic pressure and flow to various components, and are perhaps the weakest link in any hydraulic system. Maintenance is often ignored until a problem develops. Hoses fail due to heat, cold, repeated flexing, physical damage and exposure to the elements.

**Valves** – Valves control the route of the hydraulic flow within the system, sending flow and pressure to components in order to operate them. Pulling a lever back may route fluid to one side of the hydraulic system, causing it to extend a piston,

while pushing it forward may cause it to retract. Varnish presents a major problem with valves, causing them to stick or not allowing them to seal properly.

## Pistons/Hydraulic Motors

– Pistons and hydraulic motors convert the hydraulic flow and pressure into work. Pistons provide linear motion, allowing bulldozer blades to lift and backhoe buckets to tip, while motors convert hydraulic flow and pressure into rotational force, allowing drills to operate. Common issues associated with pistons and hydraulic motors are internal or external leakage. External leakage results in loss of fluid and possible contamination issues, while internal leakage results in lost efficiency. For example, a bottle jack with its valve only partially closed requires furious pumping to lift an object off the ground and won't be able to keep it there.

## Hydraulic Oil

Zinc-containing hydraulic oil is a commonly-used hydraulic fluid, while other applications call for zinc-free hydraulic oil, motor oil or transmission fluid. Hydrostatic hydraulic oil is required when the fluid must also operate the hydrostatic transmission, biodegradable hydraulic oil is often required in environmentally sensitive areas and some applications require fire-resistant hydraulic oils.

Each type of hydraulic oil has unique characteristics, and it's important to understand what's required for specific applications. The equipment's operator's manual will usually recommend viscosities for the ambient temperatures the machine is operated in or could even recommend a specific oil brand. This information can be used to determine the appropriate AMSOIL synthetic hydraulic oil. When in doubt, contact AMSOIL Technical Services at 715-399-TECH.



## Hydraulic Oil Problems

Heat and contamination present serious challenges for hydraulic oils. If the system becomes too hot, the oil's viscosity can thin to the point where the pump is damaged or seals are destroyed. Because conventional hydraulic oil is often less expensive than synthetic hydraulic oil, it is important to understand the benefits and cost savings AMSOIL synthetic hydraulic oils provide.

**Heat Reduction** – The synthetic construction of AMSOIL synthetic hydraulic oils can reduce heat in hydraulic systems, leading to better viscosity retention, less varnish build-up and oxidation, reduction in component wear (including hoses), longer seal life and better overall system performance.



**Cold-Weather Performance** – AMSOIL synthetic hydraulic oils have much better cold-temperature characteristics than many petroleum oils. This can be seen by comparing the viscosity index, Brookfield viscosity and pour point numbers of a conventional oil to the corresponding viscosity AMSOIL synthetic hydraulic oil. Because mobile equipment generally sits out in the elements while on a job site, conventional hydraulic oils can thicken in the cold and lead to damage such as excessive pump wear due to cavitation, blown hoses, broken shafts or extended warm-up times that waste fuel. Use of the proper AMSOIL synthetic hydraulic oil viscosity helps reduce or eliminate many of these issues.

**All-Season Functionality** – To eliminate some of the problems associated with temperature changes, many mobile equipment owners switch viscosities with the

seasons. They may run an ISO VG 22 viscosity oil in the winter and switch to an ISO VG 32 or 46 oil in the summer. AMSOIL synthetic hydraulic oils are high-viscosity-index formulations that can eliminate the need for seasonal changes. It's very possible to run an ISO 32 or ISO 46 successfully year-round in all but the most extreme cold conditions.

### Hose Life Preservation –

Because many equipment operators consider blown hoses, leaky seals and loss of hydraulic fluid an unavoidable problem, they may not initially be interested in investing in more expensive hydraulic fluid they believe will just end up on the ground. If hoses mainly get snagged, chafed or damaged externally, they will continue to lose hoses until they physically remedy the situation. However, if the hoses and seals are blowing in cold weather or because of deterioration, AMSOIL synthetic hydraulic oils can help. Cold and heat wreak havoc on hoses and seals. Cold, thick fluid can cause pressure spikes and extremely hot fluid breaks down hoses and seals over time. The superior cooling and flow properties of AMSOIL synthetic hydraulic oils help preserve hose integrity.



## AMSOIL Synthetic Anti-Wear Hydraulic Oils

AMSOIL Synthetic Anti-Wear Hydraulic Oils effectively inhibit oxidation to help prevent acid formation and viscosity increase, resist carbon and varnish deposits and inhibit rust and foam (providing smooth hydraulic operation). They contain a very effective zinc-based anti-wear/antioxidant additive which controls wear in high-speed, high-pressure vane and gear pumps while meeting the lubrication requirements of axial piston pumps with bronze-on-steel metallurgy.

- Extended oil drain intervals
- Anti-wear protection
- Recommended for gear, vane and piston pumps
- Contain rust, oxidation and foam inhibitors
- Designed for a wide temperature range
- Hydrolytically stable and readily separate from water

## AMSOIL Biodegradable Hydraulic Oil

AMSOIL Biodegradable Hydraulic Oil (BHO) is a premium-performance hydraulic oil that exhibits high biodegradability and low aquatic toxicity, along with superior oxidative stability, excellent low-temperature performance and outstanding results in laboratory and extended duration pump testing. It contains antioxidants that prolong oil life and foam inhibitors that help promote problem-free operation. ■

