DATA BULLETIN

# Synthetic Multi-Viscosity Hydraulic Oil

## All-Season, Anti-Varnish, Anti-Wear


AMSOIL Synthetic Multi-Viscosity Hydraulic Oil's blend of high-viscosity-index base oils and performance additives provides all-season protection and reliable operation in all types of hydraulic systems. Its proven wear resistance and varnish-control deliver maximum hydraulic system performance and life. Synthetic Multi-Viscosity Hydraulic Oil is additionally tailored to promote energy efficiency and foam suppression.

### All-Season Performance

Multi-Viscosity Hydraulic Oil is designed for all-season use. Each viscosity covers a broad operating temperature range, helping eliminate seasonal oil changes. Its low pour point ensures the oil flows more readily in cold temperatures than petroleum oils. Bearings and other components receive almost immediate lubrication at start up, reducing long-term wear and instances of pressure spikes and erratic operation as a result of poor fluidity. At high operating temperatures, Multi-Viscosity Hydraulic Oil resists thermal breakdown and maintains its protective viscosity, allowing formation of a strong lubricating film.

### Varnish-Control Technology

Increased heat can cause varnish to form on metal surfaces, including valves, pumps and bearings. Its soft, sticky composition ultimately hardens into a harmful veneer that can reduce fluid flow, plug filters, stick valves and increase friction. Synthetic Multi-Viscosity Hydraulic Oil is fortified with anti-varnish additives that chemically react with the building blocks of varnish, inhibiting its formation. It helps hydraulic systems remain clean and long-lasting.

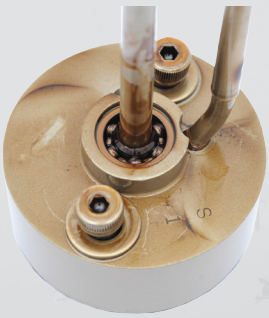
- **Increases convenience and reduces costs due to all-season performance**
- **Formulated to reduce maintenance costs with anti-wear and anti-varnish chemistry**
- **Promotes maximum fluid life by resisting viscosity loss and chemical breakdown**
- **Designed to increase system performance and responsiveness through foam suppression and fast air-release properties**
- **Helps reduce energy costs due to high-viscosity-index, energy-efficient formulation**

**Aluminum Beaker Oxidation Test**

Tested April 2012

**Excessive oxidation results in harmful deposits and varnish that cause a host of problems, including stuck valves and decreased efficiency. In severe oxidation testing, AMSOIL Synthetic Multi-Viscosity Hydraulic Oil resisted elevated heat and oxidation more effectively than the conventional fluid.**

**LEADING CONVENTIONAL HYDRAULIC FLUID (ISO 46)**



**AMSOIL SYNTHETIC MULTI-VISCOSITY HYDRAULIC OIL (ISO 46)**

## TYPICAL TECHNICAL PROPERTIES
### AMSOIL Synthetic Multi-Viscosity Hydraulic Oil

| | **ISO 22** (HVG) | **ISO 32** (HVH) | **ISO 46** (HVI) | **ISO 68** (HVJ) |
|---|---|---|---|---|
| ISO VG (ASTM D 2422) | 22 | 32 | 46 | 68 |
| Kinematic Viscosity @100°C cSt (ASTM D 445) | 5.2 | 6.5 | 8.5 | 11.2 |
| Kinematic Viscosity @40°C cSt (ASTM D 445) | 23.6 | 31.8 | 46.7 | 68.5 |
| Viscosity Index (ASTM D 2270) | 161 | 165 | 161 | 155 |
| Flash Point °C (°F) (ASTM D 92) | 228 (442) | 224 (435) | 246 (475) | 252 (486) |
| Fire Point °C (°F) (ASTM D 92) | 242 (468) | 246 (475) | 266 (511) | 270 (518) |
| Pour Point °C (°F) (ASTM D 97) | -49 (-56) | -46 (-51) | -44 (-47) | -41 (-42) |
| Four-Ball Wear Test (ASTM D 4172) | | | | |
| (40 kg, 1200 rpm, 75°C, 60 min.) | 0.42 | 0.42 | 0.41 | 0.41 |
| Copper Strip Corrosion Test 100°C, 3 hrs. (ASTM D 130) | 1A | 1A | 1A | 1A |
| Foam (ASTM D 892, Sequence I, II & III) | 0/0,10/0,0/0 | 0/0,10/0,0/0 | 0/0,10/0,0/0 | 0/0,35/0,0/0 |
| Demulsibility (ASTM D 1401) | 40-40-0 (20) | 40-40-0 (25) | 40-40-0 (20) | 40-40-0 (20) |
| Seal Tests Elastomer SRE-NBR 1, 100°C, 168 hrs. (ASTM D 471) | Pass | Pass | Pass | Pass |
| Rust Testing | | | | |
| Distilled and Salt Water (ASTM D 665A & B) | Pass | Pass | Pass | Pass |
| KRL Shear Test, 15% Max KV loss, Stay-in-Grade | Pass | Pass | Pass | Pass |

### Anti-Wear Chemistry

Synthetic Multi-Viscosity Hydraulic Oil features a shear-stable formulation fortified with the latest zinc-type anti-wear additives. It meets the stringent viscosity retention requirements of Parker Hannifin (Denison) HF-0 and demonstrates excellent anti-wear performance and compatibility with yellow metals in standardized laboratory and pump manufacturer tests (see below). Synthetic Multi-Viscosity Hydraulic Oil demonstrates excellent protection for pumps, motors, valves and other components against wear.

**YELLOW METAL PISTON SHOES**

**VANE PUMP CAM RING**

**After 608 hours of strenuous pump testing in a Parker Hannifin (Denison) T6H20C Hybrid pump, the piston shoes demonstrated only moderate polishing and trace, random scratches, proving AMSOIL Synthetic Multi-Viscosity Hydraulic Oil excels at protecting yellow metals. The vane pump cam ring exhibited only light polishing and trace scratching, further confirming the excellent wear protection provided by the oil.**

### APPLICATIONS & SPECIFICATIONS

The correct viscosity grade of AMSOIL Synthetic Multi-Viscosity Hydraulic Oil is recommended for high- and low-pressure gear, vane and piston stationary and mobile hydraulic systems, including those with bronze metallurgy. It is recommended for all types of applications requiring the following industry and equipment specifications:

| **Stock Code** | **HVG** | **HVH** | **HVI** | **HVJ** |
|---|---|---|---|---|
| Parker Hannifin (Denison) HF-0, HF-1, HF-2 | | x | x | x |
| Vickers I-286-S, M-2950-S | | x | x | x |
| DIN 51524 Parts 2 & 3 | | x | x | x |
| Cincinnati Milacron P-68 | | x | | |
| Cincinnati Milacron P-70 | | | x | |
| Cincinnati Milacron P-69 | | | | x |

AMSOIL products and Dealership information are available from your local AMSOIL Dealer.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