



CLARITY[®] SYNTHETIC HYDRAULIC OIL AW

32, 46, 68

PRODUCT DESCRIPTION

Clarity[®] Synthetic Hydraulic Oils AW are designed with ashless technology to give maximum protection and improve productivity and fuel efficiency in both mobile and stationary hydraulic equipment in industrial applications. These are high viscosity index fluids that provide a wide operating temperature range.

CUSTOMER BENEFITS

Clarity Synthetic Hydraulic Oils AW deliver value through:

- **Hydraulic system efficiency** — High performance formula improves hydraulic response time, increases operating temperature range and can improve production, as well as the potential for lowering energy cost.
- **Premium performance** — Ashless formulation provides excellent wear protection, rust and corrosion protection, hydrolytic stability, water separability, foam inhibition, and filterability.
- **Long oil life** — Outstanding ability of the synthetic base stock to withstand oxidation at high operating temperatures results in maximum service life for the oil.
- **Excellent wear protection at startup** — Minimum change in viscosity over wide operating temperatures due to high viscosity index. Multiviscosity performance minimizes the need to change viscosity grades for seasonal changes.
- **Excellent low temperature pumpability** — Specifically developed to ensure good low temperature fluidity for low temperature operations as low as -40°C (-40°F) for ISO 32 grade, and -30°C (-22°F) for ISO 46 and 68 grades.
- **Low toxicity** - Inherently biodegradable¹ and has very low acute aquatic toxicity to both fish and invertebrates based on tests of water

accommodated fractions. Ashless formulation facilitates conventional recycling programs.

- **Zinc-free/Ashless** — Suited for applications involving yellow metals found in pumps.

FEATURES

Clarity Synthetic Hydraulic Oils AW are designed to give maximum protection to both mobile and stationary hydraulic pumps in high-performance industrial applications as well as in environmentally sensitive areas.



Clarity Synthetic Hydraulic Oils AW are formulated with synthetic base stock and an ashless, zinc-free additive system that provide exceptional oxidation stability, water separability, foam suppression, and protection against wear, rust and corrosion.

Clarity Synthetic Hydraulic Oils AW are formulated with high VI to improve hydraulic response time and increase operating temperature range.

In side-by-side excavator efficiency testing², Clarity Synthetic Hydraulic Oil AW ISO 46 improved productivity up to 6.2% and fuel efficiency up to 4.5%, when compared to a monograde hydraulic oil (a lower VI product with VI <105). Clarity Synthetic Hydraulic Oil AW ISO 32 provided a 5% increase in fuel efficiency in plastic injection machines when compared to a monograde hydraulic oil.

Clarity Synthetic Hydraulic Oils AW are designed to meet or exceed the performance requirements of conventional antiwear hydraulic oils, especially in

- 1 Inherently biodegradable by OECD 301D testing and guidelines in EPA 800-R-11-002, November 2011 evaluations for a similar product. Product is not considered readily biodegradable. Clarity Synthetic EA Hydraulic Oil should be used if a readily biodegradable EAL fluid is required.
- 2 Clarity Hydraulic Oil AW ISO 32 obtained greater results in both productivity and fuel efficiency compared to an ISO 46.

Product(s) manufactured in the USA.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

A **Chevron** company product

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severe, high-output applications such as axial piston pumps.

Clarity Synthetic Hydraulic Oils AW are long-life lubricants, with a dramatically longer oxidation stability life (ASTM D943, Turbine Oil Stability Test) than conventional hydraulic fluids. A longer oxidation stability life equates to longer service life, which can improve the customer's bottom line. This level of oxidation stability is especially applicable in high efficiency (high speed, high temperature, high output) applications where severe stress is placed on the hydraulic fluid. They have a viscosity index much higher than typical conventional antiwear hydraulic oils, provide excellent low temperature pumpability and better wear protection at high operating temperatures (refer to Typical Test Data table).

Conventional antiwear hydraulic oils formulated with metal-containing performance additives may persist in the environment in the event of leaks.

Vegetable-based hydraulic oils that meet environmental requirements may fall short of performance requirements.

APPLICATIONS

Clarity Synthetic Hydraulic Oils AW are designed for and have shown excellent performance in applications involving:

| ISO Grade | 32 | 46 | 68 |
|--|----|----|----|
| mobile and stationary hydraulic vane-, piston-, and gear-type pumps | X | X | X |
| high performance industrial applications where pressures may exceed 5000 psi | X | X | X |
| servo-valves using multi-metal components | X | X | X |

For low temperature startups, care must be taken to ensure that the hydraulic oil flows freely into the pump and no cavitation occurs. Otherwise, subjecting a pump to cavitation will cause damage to critical components. Careful attention to the oil's viscosity at low temperature is the key to ensuring adequate flow and preventing cavitation.

Please consult with the original equipment manufacturers (OEMs) of your equipment to determine the maximum viscosity allowed during startup under no load conditions.

The recommended maximum viscosity under load conditions for hydraulic oil as specified by most pump OEMs is 860 cSt. For cold starts under no-load conditions, the startup viscosity can be much higher than 860 cSt. No-load running conditions should be applied until the equipment has warmed up to the maximum startup viscosity under load as recommended by the OEM, and full load operation can then be applied when the oil viscosity falls below this recommended viscosity under load.

Refer to the service manual of the equipment to ensure that the minimum fluid viscosity requirements are met at the highest operating temperature. Please consult with your equipment manufacturer if equipment is operating outside normal operation conditions.

Clarity Synthetic Hydraulic Oils AW are not compatible with zinc/calcium containing fluids, and OEM recommended lubricant change-out procedures including drain and flush requirements need to be adhered to.

Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.

CLAIMS AND SPECIFICATIONS

| | 32 | 46 | 68 |
|---|-----------|-----------|-----------|
| Arburg Injection Molding | | A | |
| Bosch-Rexroth RD/RE 90220, 90221 | M | M | M |
| Eaton (Vickers) 35VQ25A (Pump Test) I-286-S (Stationary) M-2950-S (Mobile) | M | M | M |
| Fives Cincinnati (formerly MAG ^a Cincinnati, Cincinnati Machine, Cincinnati Milacron) | M P-68 | M P-70 | M P-69 |
| Frank Mohn, (Framo) hydraulic cargo pumping | | A | |
| Hitachi/John Deere Construction JCMAS HK VG 32, 46 | M | M | |
| Husky Injection Molding | A | | |
| Krauss-Maffei Kunststofftechnik | | M | |
| Parker Hannifin (Denison) HF-0, HF-1, HF-2 | M | M | M |
| ASTM D6158 HM, HV | M | M | M |
| DIN 51524-2 HLP, 51524-3 HVL | M | M | M |
| ISO 11158 L-HM, L-HV | M | M | M |

a Obsolete specification

A: Approved for

M: Meets or exceeds requirements

Do not use in high pressure systems in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

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TYPICAL TEST DATA

| ISO Grade | Test Method | 32 | 46 | 68 |
|--|------------------------|----------------|----------------|----------------|
| Product Number | | 255697 | 255698 | 255699 |
| SDS Number U.S. Colombia | | 29100 32537 | 29100 32537 | 29105 32537 |
| API Gravity | ASTM D287 | 36.5 | 35.2 | 34.6 |
| Density at 15°C, kg/L | ASTM D4057 | 0.8418 | 0.8486 | 0.8514 |
| Viscosity, Kinematic cSt at 40°C cSt at 100°C | ASTM D445 | 31.3 6.8 | 46.5 9.2 | 67.4 11.4 |
| Viscosity, Saybolt SUS at 100°F SUS at 212°F | ASTM D2161 | 145 45.0 | 215.4 49.0 | 312 54.8 |
| Viscosity Index | ASTM D2270 | 184 | 186 | 165 |
| Flash Point, °C(°F) | ASTM D92 | 228(442) | 230(446) | 218(424) |
| Pour Point, °C(°F) | ASTM D97 | -48(-54) | -44(-47) | -45(-49) |
| Brookfield Viscosity, cP at -20°C | ASTM D2983 | 1040 | 1820 | 3030 |
| Brookfield Viscosity, cP at -30°C | ASTM D2983 | 3060 | 5430 | 11,580 |
| Brookfield Viscosity, cP at -40°C | ASTM D2983 | 11,800 | 45,440 | 65,400 |
| Copper Corrosion 3h at 100°C | ASTM D130 | 1b | 1b | 1b |
| Foam Test, Seq. I Tendency, mL Stability, mL | ASTM D892 | 0 0 | 10 0 | 30 0 |
| Tapered Roller Bearing, % Viscosity Loss | CEC L-45-A-99 | < 7% | < 10% | < 7% |
| Rust Test, Procedure A & B | ASTM D665 | Pass | Pass | Pass |
| Water Separability, minutes to <3mL at 54°C | ASTM D1401 | 10 | 10 | 10 |
| Oxidation Stability-TOST Hours to 2.0mg KOH/g acid number | ASTM D943 ^a | > 10,000 | > 10,000 | > 10,000 |
| FZG Gear Test, Fail Load Stage | DIN 51354 | 11 | ≥ 12 | ≥ 12 |
| Dielectric Strength, kV ^b , | ASTM D877 ^c | 35 | 35 | 35 |
| Acute Aquatic Toxicity (LC-50) | OECD 203 | Pass | Pass | Pass |

- a Modified ASTM D943, allowed to run beyond 10,000 h.
- b Dielectric strength value applies only to "point of manufacture" of packaged products produced at a Chevron manufacturing facility. (Does not apply to bulk packaging). The oil will quickly lose its high dielectric strength value when exposed to contamination and to very small amounts of moisture and water.
- c Industry standard test method for measuring kV values is not precise and test results can differ significantly.

The results expressed above were obtained during the development of this product and are considered representative of (any/all) commercial samples.

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