



NUTO^{*} H oils offer the following quality and performance features:

- ◆ Excellent anti-wear properties
- ◆ Good thermal and hydrolytic stability
- ◆ Rust-and oxidation-inhibited
- ◆ Excellent performance in most circulating oil applications
- ◆ Suitable for use in mobile hydraulic systems
- ◆ Meets the latest major hydraulic pump manufacturers performance requirements
- ◆ Excellent antifoam and air release characteristics
- ◆ Excellent filterability performance
- ◆ Optimum range of viscosity grades available

Primary Applications

NUTO H is the trademark for a line of premium-quality hydraulic oils, designed to meet the most stringent requirements of all major manufacturers and users of hydraulic equipment. NUTO H oil derives its anti-wear properties from a zinc dialkyldithiophosphate (ZDDP) additive with good thermal and hydrolytic stability. This special additive is very effective in reducing vane, piston and gear pump wear, making NUTO H the first choice for hydraulic power transmission in systems operating at high loads, speeds, and temperatures. Its good additive stability also allows the use of NUTO H in severe-service hydraulic systems employing axial and radial piston pumps.

NUTO H oil is available in International Standards Organization (ISO) viscosity grades 22, 32, 46, 68, 100, and 150. These six grades will meet the viscosity requirements of essentially all hydraulic systems.

Performance Features

In addition to their anti-wear properties and thermal and hydrolytic stability, NUTO H oils are characterized by outstanding rust protection, oxidation stability, good demulsibility, and low air entrainment. They are non-corrosive to metal alloys, except those containing silver, and are fully compatible with common seal materials. NUTO H oils are fortified with an anti-foam agent and a pour-point depressant. With their high viscosity index (V.I.), NUTO H oils resist large changes in viscosity across the commonly encountered range of operating temperatures,

and their low pour point assist in providing a ready flow of fluid during cold-weather startup.

A major pump manufacturer recommends a maximum oil viscosity of 865 cSt (4000 SUS) at startup and a minimum of 13 cSt (70 SUS) at operating temperatures. Nuto H 22 oil satisfies these conditions in the temperature range from -16°C (3°F) to 56°C (133°F). The comparable range for Nuto H 32 is from -10 °C (14 °F) to 65 °C (149 °F) and for NUTO H 150 oil is 15 °C (59 °F) to 105 °C (221 °F).

Wear prevention

NUTO H oils are effective in reducing rate of wear in vane, gear, and piston pumps, and in other hydraulic system components where boundary lubrication exists. The excellent anti-wear properties of NUTO H oils have been demonstrated in critical pump tests.

In the Vickers 35VQ25 vane pump test, vane and ring weight loss due to wear are determined. The pump is run for 50 hours at 2400 rpm and 3000 psig pressure with an inlet oil temperature of 93°C (199 °F). Average ring and vane weight loss values for Nuto H are very low and well within acceptable weight loss criteria for the test, which make NUTO H oil suitable for use in stationary and mobile hydraulic systems.

The excellent wear protection of the Nuto H product line is also evident by the high rating, FZG of 11 to 12, in the gear wear test.

Thermal and hydrolytic stability

Many conventional anti-wear oils containing ZDDP may partially decompose at unusually high temperatures or in the presence of water. The products of thermal decomposition may appear in the system as sticky sludge which can interfere with the operation of close-tolerance components, such as servo valves. Hydrolytic decomposition can also produce compounds, which may be corrosive to metals in the system.

Filterability

Modern hydraulic system with higher operating pressures and closer tolerances use finer and improved efficiency filtration systems to achieve cleaner fluid systems for improved and longer component operation and longer component life.

The Nuto H formulation technology provides excellent filterability characteristics even with ingress of moisture into the hydraulic fluid. Excellent Afnor and Denison filtration performance, with dry and wet test variations, has been obtained.

Pump Equipment Manufacturers

Nuto H provides excellent Eaton - Vickers 35VQ25 and 104C vane pump performance and has Eaton - Vickers M-2952-S approval.

NUTO H oils also pass the Parker Hannifin HPD (formerly Denison Hydraulics) vane and piston pump performance tests including the wet and dry T6H20C vane pump test, and are approved against Denison specifications HF-0 and HF-2.

NUTO H oils pass the Cincinnati Machine Thermal Stability test and appropriate grades are approved for CM numerical-control equipment. NUTO H 32, 46, and 68 oils are approved against CM specifications P68, P70, and P69, respectively.

Summary

NUTO H oils are multi-purpose hydraulic oils and can be used for all hydraulic applications, except for pumps, such as Lucas, with silver-alloy bearings. They are also an excellent choice for applications requiring premium rust- and oxidation-inhibited circulating oils, even though the anti-wear properties may not be required.

Precautions

NUTO H oils are manufactured from high quality petroleum base stocks, carefully blended with selected additives. As with all petroleum products, good personal hygiene and careful handling should always be practiced. Avoid prolonged contact to skin, splashing into the eyes, ingestion or vapour inhalation. Please refer to our ESSO Material Safety Data Sheet for further information.

Note: This product is not controlled under Canadian WHMIS legislation.

Typical properties

NUTO H Grade	22	32	46	68	100	150
Density kg/m³	865	872	875	878	881	885
Viscosity cSt @ 40 °C	22.0	32.6	46.2	68.8	103.3	151.3
cSt @100 °C	4.3	5.4	6.7	8.7	11.4	14.6
Viscosity Index	100	97	96	97	97	95
Pour Point °C	-36	-36	-30	-30	-27	-24
° F	-33	-33	-22	-22	-17	-11
Flash Point °C	202	206	218	222	252	266
°F	396	403	424	432	494	511
Color, ASTM	0.5	1.0	1.0	1.5	1.5	2.0
Neutralization Number	0.60	0.40	0.40	0.40	0.40	0.40
Rust Protection						
A. Distilled water	No Rust	No Rust	No Rust	No Rust	No Rust	No Rust
B. Sea water	No Rust	No Rust	No Rust	No Rust	No Rust	No Rust
Hydrolytic Stability, Cu mass loss, mg/cm²	0.17	0.04	0.04	0.04	0.04	0.04
Copper Corrosion Test	1A	1A	1A	1A	1A	1A
Filterability: Denison - Wet & Dry		Pass	Pass	Pass	Pass	Pass
Afnor - Wet & Dry	Pass	Pass	Pass	Pass	Pass	Pass
Cincinnati Milacron Spec. Approved		P68	P70	P69	—	—
Denison HF-0 :		Approved	Approved	Approved	-	-
Denison P-46 Piston Pump		Pass	Pass	Pass	-	-
Denison T6C Vane		Pass	Pass	Pass	-	-
Vickers 35VQ25 Vane Pump Test		Pass	Pass	Pass	Pass	Pass
104/105C Vane Pump Test	Pass					
Vane pump test total ring and vane wear, mg		<10	<10	<10	<10	<10
Oxidation Stability						
Turbine Oil Stability Test, life, hours	3500+	2500+	2500+	2500+	2000+	2000+
Rotary Bomb Oxidation Test, minutes	400	350	350	325	250	250
FZG Spur Gear Test, Failure Load Stage (FLS)	11	11	11	12	12	12

The values shown here are representative of current production. Some are controlled by manufacturing specifications, while others are not. All may vary within modest ranges.