SINCE 1839
Schaeffer's
SPECIALIZED LUBRICANTS

TECHNICAL DATA

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ISO 9001 CERTIFIED

#288 HTC EXTREME PERFORMANCE WITH DYNAVIS®
ISO Grades 15, 22, 32 and 46

HTC Extreme Performance with **DYNAVIS®** is a synthetic blend, anti-wear, rust and oxidation inhibited maximum efficiency multi-grade hydraulic fluid specially formulated for use in hydraulic excavators, hydraulic cranes, aerial bucket trucks, forestry equipment, and industrial hydraulic systems. These systems are subjected to wide variations in ambient and operating temperatures and require protection against the formation of varnish deposits on close clearance servo-valves and other system components.

HTC Extreme Performance with **DYNAVIS®** is blended from the finest quality solvent refined, severely hydro-finished base oils and polyalphaolefin (PAO), synthetic base fluids available to provide the following advantages:

- Excellent low temperature properties and superior oxidation stability
- Excellent resistance to thermal degradation
- High viscosity index
- Excellent film strength
- Superior operating temperature reduction
- Compatibility with all types of seals and coatings

Added to the synthetic blend base oil is a carefully balanced, premium anti-wear additive package, **VarniShield™**, and an extremely shear stable viscosity index improver, **DYNAVIS®**. **VarniShield™** is patented hydraulic fluid additive technology designed to prevent the formation and build-up of varnish deposits, while providing exceptional anti-wear performance, outstanding thermal and oxidation stability, rust and corrosion protection and rapid water separation. The **VarniShield™** additive system provides HTC Extreme Performance with **DYNAVIS®** with a high degree of thermal and oxidative stability thus minimizing the formation of sludge and varnish. If any varnish particles do form, the dispersancy of the **VarniShield™** additive will keep these particles suspended to prevent them from depositing on critical internal components. This helps eliminate the replacement of components such as filters and valves and the costs associated with these activities.

In addition to protecting against the formation of varnish deposits, keeping the system clean and operating longer, the **VarniShield™** additive technology provides the following performance benefits:

- Exceptional and long lasting anti-wear protection to protect system components
- Extended pump and bearing life
- Enhanced thermal and oxidative stability
- Superior hydrolytic stability with excellent demulsibility characteristics so water separates quickly
- Excellent rust and corrosion protection that extends component life
- Excellent anti-foaming and air release properties.
- Reduced sludge, varnish and deposit formation to reduce filter blockage and provide excellent filterability.
- Improved durability of non-ferrous parts.
- Enhanced compatibility with existing fluids.
- Excellent fluid quality reserve to maintain performance features under severe service conditions and extended drain intervals.
- Enhanced fluid and seal life which results in reduced system maintenance.

DYNAVIS® additive technology provides multi-grade functionality and wide temperature performance. In addition, **DYNAVIS®** will increase the performance of the hydraulic system by increasing the hydraulic efficiency of the system and reducing energy and fuel consumption. **DYNAVIS®** will also enhance the productivity of the equipment. The extremely shear stable polymer viscosity index improver provides HTC Extreme Performance with **DYNAVIS®** with a viscosity index ranging from **175 to >200** (depending on ISO grade). This extremely high viscosity index provides the proper viscometric properties that are needed for maximum efficiency over a wide range of operating temperatures and pressures. By maintaining its viscometric properties in the optimum viscosity range for the hydraulic pump, HTC Extreme Performance with **DYNAVIS®** will provide the following performance benefits:

- Improved viscometric properties over a wide range of temperatures
- Less warm-up time and improved start-up during low temperature operation
- Faster and smoother response of the hydraulic system at low temperatures
- Less power required and consumed at cold start-up than conventional fluids
- Reduced risk of pump cavitation and lubricant starvation at low operating temperatures
- Improved volumetric and hydro-mechanical efficiency
- Less internal pump leakage at high operating temperatures
- Excellent resistance to recirculation resulting in a reduction in heat build-up and an increase in hydraulic system responsiveness
- Less hydraulic system fade
- Stable pump performance, especially during high operating temperatures
- Excellent protection from wear during periods of high operating temperatures and high pressures
- Higher flow rate at peak operating temperature
- Stress on the overall system is kept in check
- Significantly less wear and tear on hydraulic system components (pumps, hoses, seals, etc.)
- An increased Temperature Operating Window (TOW) that allows the fluid to perform consistently and reliably with in a wide range of temperatures from cold to hot
- Ability to exhibit lower viscosity at cold temperatures and delivery of stay-in-grade viscosity at high operating temperatures
- Minimization of friction and wear and reduced fuel consumption over a wide temperature range
- Elimination of seasonal changes
- Increased hydraulic power
- Enhanced energy efficiency with lower energy consumption for the same amount of work
- Improved productivity (more work can be done in the same amount of time)
- Reduced Greenhouse gas emissions
- Lower operating temperatures which reduces the risk of overheating and equipment shutdown
- Potential fuel savings and reduced emissions
- Reduced operating and maintenance costs

HTC Extreme Performance with **DYNAVIS®** also contains Micron Moly®, a liquid soluble type of moly that plates itself to sliding, rolling and rubbing metal surfaces of hydraulic and compressor systems. This plating action forms a long lasting solid lubricant film on surfaces that will withstand pressures up to 500,000 pounds per square inch. Micron Moly® not only produces a smooth finish surface, but also reduces friction between the moving parts which results in less heat being generated, lower operating temperatures, and a reduction in downtime.

HTC Extreme Performance with **DYNAVIS®** meets and exceeds the following specifications and manufacturers requirements: Denison HF-O, Eaton-Vickers M2950-S, JCMAS HK specification Eaton Char-Lynn, Haldex Barnes, Husky, FMC, Rexnord, Commercial Shearing HD 2/900, Commercial Hydraulics, Cincinnati Machine P-68,and P-70, DIN 51524 Part 3, ISO 6743/4 Type HV, ISO 11158:2009 HV, Bosch Rexroth, Saur Sundstrand, Saur Danfoss, US Steel 126, 127 and 136; AF Nor E 48-603, Altec and Pittman.

TYPICAL PROPERTIES

ISO Grade	**15**	**22**	**32**	**46**
Specific Gravity 60°F/15°C	0.88	0.86	0.875	0.88
Viscosity cSt 40°C (ASTM D445)	14.5-16.5	20.60-24.2	28.8-35.2	41.4-50.60
Viscosity cSt 100°C (ASTM D445)	4.0-4.75	4.90-5.70	6.8-7.8	8.0-10.2
Viscosity Index (ASTM D2270)	227	207	195	180
Brookfield Viscosity (ASTM D2983)				
cP @ 0°C/32°F		120	210	309
cP @ -10°C/14°F		230	419	---
cP @ -20°C/-4°F		479	989	2,259
cP @ -30°C/-22°F	<500	1,250	2,529	5,917
cP @ -40°C/-40°F	562			
Sonic Shear Test, 40 minutes (ASTM D5621), % Viscosity Loss @ 40°C	7.5	7	7	7.9
Flash Point °F/°C (ASTM D92)	390°/198.9°	420°/216°	435°/224°	440°/227°
Pour Point °F/°C (ASTM D97)	<-76°/<-60°	-76°/-60°	-65°/-54°	-63°/-53°
Aniline Point °F/°C (ASTM D611)		220°/104°	220°/104°	220°/104°
Total Acid Number (ASTM D664)	0.91	0.91	0.91	0.91
Copper Strip Corrosion Test 3 hrs. (ASTM D130)	1A	1A	1A	1A
Rust Test (ASTM D665) *(Distilled Water) & (Salt Water)*	Pass	Pass	Pass	Pass
Four Ball EP Test (ASTM D2783) Weld Point, kg	160	160	160	160
Four Ball Wear Test (ASTM D4172)				
1hr/40kg/130°F, Mean Scar diameter, mm	0.5	0.45	0.4	0.4
1hr/20kg/130°F, Mean Scar diameter, mm	0.3	0.27	0.27	0.27
Falex Continuous Load lbs. (ASTM D3233), Failure Load,lbs-f	1250	1250	1250	1250
Conradson Carbon Residue (ASTM D189), % Residue	0.01	0.01	0.01	0.01
Foam Tendency (ASTM D892)				
Sequence I	0/0	0/0	0/0	0/0
Sequence II	0/0	0/0	0/0	0/0
Sequence III	0/0	0/0	0/0	0/0
FZG Test (ASTM D5182) Load Stage Pass	12	12	12	12
Hydrolytic Stability (ASTM D2619)				
Copper Wt. Loss, mg/cm^2	0.0566	0.0566	0.0566	0.0566
Acidity of Water mg/KOH	0	0	0	0
Demulsibility Test (ASTM D1401),Oil-Water-Emulsion	40-40-0	40-40-0	40-40-0	40-40-0
Time, minutes	15	15	15	15
Denison Filterability Test TP-02100				
Filtration Time, without water (seconds)	146	146	146	146
Filtration Time, with 2% water (seconds)	163	163	163	163
Oxidation Stability Test (ASTM D943) Hours to TAN of 2	5000+	5000+	5000+	5000+
Sludge Tendencies (ASTM D4310)				
Neutralization Number after 1000 hours	0.34	0.34	0.34	0.34
Insoluble Sludge, mg	39.4	39.4	39.4	39.4
Total Copper, mg	0.1	0.1	0.1	0.1
Thermal Stability Test (ASTM D2070) 168 hr/135°C, copper/steel catalyst				
Sludge (mg/1000ml)	1.8	1.8	1.8	1.8
Copper weight loss, mg/100ml	0.2	0.2	0.2	0.2
Condition of Copper Rod	1	1	1	1
Air Release (ASTM D3427), Time (minutes @ 122°F)	6.2	6.2	6.2	6.2
Denison T6H20C Hybrid Pump Test				
Phase 1 1700 rpm/110°C, weight loss	5.1	5.1	5.1	5.1
Phase 2 1700 rpm/80°C + 1% water, weight loss	5.8	5.8	5.8	5.8
Vickers 35VQ25 Pump Test				
Total Weight Loss Vane, mg	5	5	5	5
Total Weight Loss Ring, mg	11	11	11	11
Total Weight Loss, mg	16	16	16	16