PRECISION HYDRAULIC PERFORMANCE

CENEX® PREMIUM HYDRAULIC FLUIDS

CENEX® HYDRAULIC OIL *for All Your Applications*

Choose the right premium hydraulic fluid for all of your equipment applications.

Your precision hydraulic equipment requires premium quality lubricants to protect its heavy-duty hydraulic systems in mobile and stationary applications. For the best performance, use dedicated anti-wear hydraulic oil formulated for high pressure and tough operating conditions. Cenex® offers exceptional hydraulic oils for all of your industrial and off-highway equipment needs. Our Indol® hydraulic oils are built with the highest quality HCG-2 base oils resulting in outstanding oxidation and thermal stability. With the addition of a uniquely balanced additive system, all Indol® oils provide total anti-wear, shear stability, hydrolytic stability, anti-rust, demulsibility, and anti-foam performance. And all Cenex hydraulic oils meet or exceed stringent OEM requirements.

Dielectric Strength is important.

Cenex hydraulic fluids are formulated to have high dielectric strength, which translates to superior insulating properties. These fluids are ideal for applications where high voltage equipment is present, such as utility bucket trucks and mobile cherry pickers.

When you are selecting a hydraulic fluid, you should look for:

- Remarkable thermal and oxidation stability to extend oil life
- Extraordinary anti-wear technology which minimizes wear in high speed, high pressure piston, vane and gear pumps resulting in longer pump life
- Exceptional rust and corrosion protection to extend equipment life
- Superior protection against particle contamination to extend oil and equipment life
- High dielectric strength (insulating) for voltage equipment operations
- Excellent foam and aeration inhibition to protect hydraulic equipment

Equipment application also has a significant influence on hydraulic oil selection. **Use the Hydraulic Fluid Selection Guide (page 3) to find the right Cenex® hydraulic oil for your application.**

Hydraulic Fluid Selection Guide

Will the fluid be used in an environmentally sensitive area?

YES

See page 4.

NO

Is an emulsified fluid needed?

YES

See page 4.

NO

Will the fluid be used in a multi-season application?

YES

Will the fluid be used in high pressure hydrostatic transmission?

YES

See page 6.

NO

Will the fluid be used in an environment with high potential for contamination?

NO

See page 5.

YES

See page 5.

NO

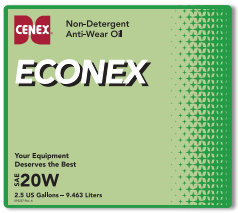
Will the fluid be used in an extreme duty cycle?

YES

TURBINE OIL XL

See page 7.

NO



See page 6.

Indol® NZ

Indol® NZ is a premium quality non-zinc ashless multi-grade, anti-wear ISO 46 MV hydraulic oil. It is designed to exceed the performance requirements of major pump and equipment builders requiring the use of a premium non-zinc hydraulic oil.

Benefits

- Compatible with other non-zinc based fluids and there is no cross-contamination concern because of its stabilized additive package
- Free of heavy metals (zinc free) and therefore can be used in environmentally sensitive areas
- Superior anti-wear performance to extend equipment life
- Excellent thermal oxidation stability with minimal sludge/ varnish to extend oil life for prolonged drain intervals
- Outstanding corrosion protection of hydraulic systems

Typical Applications

Parker Denison HF-0 (Hybrid Pump), HF-1, HF-2; **Fives Cincinnati** P-70; **Bosch Rexroth**; **Eaton Brochure** 03-401-2010; **Eaton** E-FDGN-TB002-E; **Eaton Vickers** (35VQ25) I-286-S, M2950-S; USS 127; AFNOR 48-603; DIN 51524 HVLP, Part 2/3, ISO 11158 and ASTM D6158; GM LS-2, LH-0402; ASTM D-943 Oxidation Test: > 8000 Hrs

Indol® NZ Typical Properties	
ISO Viscosity Grade	**46 MV**
Approximate SAE Grade	5W-20
API Gravity/Lbs gallon	31.4 / 7.23
Flash Point, °C/°F	232 / 448
Viscosity @ 100°C, cSt	8.4
Viscosity @ 40°C, cSt	47.3
Viscosity Index	155
Pour Point, °C /°F	-48/-54
Brookfield @ -35 °C, cp	20,000
MRV @ -35 °C, cp	20,500
FZG gear test, stages	12
D-665A/B Rust Test	Pass
D-130 Copper Protection	Pass
Foam Seq. I, II, III	Pass
Dielectric Strength, KV	40*

*Dielectric Strength and Ultra Clean only in new sealed drums and 5-gallon containers from CHS Lubricant manufacturing plants.

Indol® EH

Indol® EH is a premium emulsifying, high zinc, anti-wear ISO 46 hydraulic oil. It is designed to meet the hydraulic performance requirements of major construction equipment builders and others requiring the use of an anti-wear hydraulic oil that will hold small amounts of water (emulsify) in the hydraulic system.

Benefits

- Formulated to hold water in dispersion so there is no free water draining or damage concern (such as seal issues or freezing below 0°C, etc.)
- Enables extended drain intervals
- Extraordinary long-lasting anti-wear and corrosion protection
- Provides superior and total shear stability

Typical Applications

Cat® HYDO™ Advanced 10; OEM hydraulic systems requiring oil that will emulsify water; **Parker Denison** HF-0, HF-1, HF-2; **Fives Cincinnati** P-70; **Bosch Rexroth**; **Eaton Brochure** 03-401-2010; **Eaton** E-FDGN-TB002-E; **Eaton Vickers** (35VQ25) I-286-S, M2950-S; USS 127; DIN 51524-2, ISO 11158 and ASTM D6158; ASTM D-943 Oxidation Test > 5000 Hrs

Indol® EH Typical Properties	
ISO Viscosity Grade	**46**
SAE Grade	10
API Gravity/Lbs gallon	30.9 / 7.25
Flash Point, °C/°F	226 / 439
Viscosity @ 100°C, cSt	6.9
Viscosity @ 40°C, cSt	47.0
Viscosity Index	102
Pour Point, °C/°F	-39 / -38
MRV @ -30°C, cP	16,000
FZG gear test, stages	13
Zinc, % wt.	0.10
D-665A/B Rust Test	Pass
D-130 Copper Protection	Pass

The typical properties listed reflect the general characteristics of the product, and are not manufacturing specifications. Normal batch-to-batch variations should be expected.

Indol®

Indol® is an exceptional quality zinc anti-wear hydraulic oil designed to exceed the performance requirements of major pump manufacturers. The formulation is exceptional at minimizing wear in high speed, high pressure vane and gear pump applications, while also meeting the requirements for bronze axial piston pumps.

Benefits

- Superior oxidation stability reduces sludge and varnish on critical components to extend oil and equipment life
- Outstanding rust and corrosion protection against moisture particles
- Contains an advanced additive package that uniquely balances hydrolytic stability and demulsibility to provide exceptional oil performance

Indol® MV

Indol® MV is formulated to be extremely shear stable and provide superior temperature performance.

Benefits

- Exceptional multi-season performance
- Long-lasting anti-wear and corrosion protection

Indol® (Ultra Clean)*

Indol® (Ultra Clean) series goes through a special fine filtering process during the manufacturing of select ISO grades. This ensures an ultra clean oil to prevent excess wear under high pressure and close manufacturing operations.

Benefits

- Protects against particle contamination and extends the life of the oil and the equipment
- Provides maximum hydraulic system protection
- Reduces sludge and varnish on critical components

Indol®, Indol® MV, and Indol® (Ultra Clean)* Typical Applications

Parker Denison HF-0, HF-1, HF-2; **Fives Cincinnati** P-68, P-69, P-70; **Eaton Brochure** 03-401-2010; **Eaton** E-FDGN-TB002-E; **Eaton Vickers** (35VQ25) I-286-S, M2950-S; **Bosch Rexroth**; **Marzocchi**, Racine S; DIN 51524-2, ISO 11158 and ASTM D6158; GM LS-2; AFNOR 48-603; U.S. Steel 126, 127, 136; ASTM D-665, Rust Test A&B: Pass; ASTM D-943 Oxidation Test: 9,000+ Hrs; U.S. Steel 126

Indol® and Indol® (Ultra Clean)* Typical Properties

ISO Viscosity Grade	MV-32	22	32	46	68	100	150	220	460
Approximate SAE Grade	(5W-20)	(5W)	(10W)	(20W)	(20)	(30)	(40)	(50)	–
Viscosity @ 100°C, cSt SUS	6.6 46.5	4.4 40.6	5.5 44.3	6.9 48.5	8.8 55.1	11.4 63.2	15.6 76.4	19.3 93.0	30.5 145
Viscosity @ 40°C, cSt SUS	33.3 156	22.1 106	32.4 150	46.5 215	69.0 313	101.1 456	152.3 686	220.2 992	461.3 2136
Viscosity Index	158	108	106	104	100	99	105	99	95
Pour Point, °C/°F	-48/-54	-42/-44	-42/-44	-39/-38	-36/-33	-27/-17	-30 /-22	-21/-6	-3/27
API Gravity/lbs./gal.	32.3/7.19	33.4/7.15	32.1 /7.2	31.2/7.24	30.6/7.27	30.1/7.2	29.5/7.32	28.8/7.35	25.7/7.5
Flash Point, °F	400	400	420	440	460	480	500	540	560
Dielectric Strength, KV	40*	40*	40*	40*	40*				
Indol (Ultra Clean) series	Yes*	Yes*	Yes*	Yes*	Yes*				

*This Dielectric Strength and Ultra Clean specification are only found in the above products that are in new sealed drums, totes, and 2½ -gallon containers from CHS Lubricant manufacturing plants. The drums and totes will have the ultra clean logo on them.

Hydrostatic Fluid

Hydrostatic Fluid is an exceptional quality hydrostatic ISO 46 MV hydraulic oil containing additional anti-wear additives. It is designed to exceed the performance requirements of major hydrostatic and hydraulic pump manufacturers.

Benefits

- Superior multi-season temperature stability for equipment exposed to extreme environments
- Outstanding rust and corrosion capabilities, especially when moisture is present
- Premium anti-wear technology provides exceptional film strength, resulting in longer pump life
- Maintains the highest level of performance throughout the toughest operating and extended drain conditions

Typical Applications

Parker Denison HF-0, HF-1, HF-2; **Fives Cincinnati** P-70; **Eaton Brochure** 03-401-2010; **Eaton** E-FDGN-TB002-E; **Eaton Vickers** I-286-S, M2950-S (35VQ25); **Bosch Rexroth**; **Sauer-Danfoss**; **Marzocchi**, Racine S; GM LS-2; AFNOR 48-603; U.S. Steel 126, 127, 136; DIN 51524-2 HLP, ISO 11158 and ASTM D6158; ASTM D-665, Rust Test A&B: Pass; ASTM D-943 Oxidation Test: 6000+ Hrs

Hydrostatic Fluid Typical Properties	
ISO Viscosity Grade	**46-MV**
Approximate SAE Grade	(5W-20)
API Gravity/Lbs gallon	31.1/5
Flash Point, °C/°F	230/445
Viscosity @ 100°C, cSt SUS	8.4 52.1
Viscosity @ 40°C, cSt SUS	47.6 211
Viscosity Index	153
Pour Point, °C/°F	-48/-54
Brookfield @ -35°C, cp	11,900
MR V@ -35°C, cp	8500
Dielectric Strength, KV	40*

*This Dielectric Strength stated is in new sealed drums, totes, and 2½-gallon containers from CHS Lubricant manufacturing plants.

Econex

Econex non-detergent anti-wear hydraulic oil formulated with a unique low-zinc anti-wear additive package. This oil is recommended for use where a non-detergent oil is specified and a specific anti-wear hydraulic oil is recommended. The formulation is exceptional under thermal and oxidative stress, to ensure stable equipment performance.

Benefits

- Excellent anti-wear hydraulic fluid with sufficient equipment protection
- A cost-optimized formulation that provides extended drain intervals
- Meets a majority of equipment requirements for hydraulic systems, air compressors, vacuum pumps and hand oilers for machine parts

Typical Applications

Fives Cincinnati P-68, P-69, P-70; **Eaton Brochure** 03-401-2010; **Eaton** E-FDGN-TB002-E; **Eaton Vickers** I-286-S; DIN 51524, ISO 11158 and ASTM D6158; U.S. Steel 136, 127; ASTM D-943 Oxidation Test: Exceeds 1000 Hours

Econex Typical Properties				
ISO Viscosity Grade	**32**	**68**	**100**	**220**
Approximate SAE Grade	(10W)	(20)	(30)	(50)
Viscosity @ 100°C, cSt SUS	5.3 43.3	8.9 54.3	11.6 63.1	19.4 91.7
Viscosity @ 40°C, cSt SUS	31.4 142	69.8 306	101.8 446	216.2 940
Viscosity Index	100	100	101	102
Pour Point, °C/°F	-38/-39	-27/-33	-22/-30	21/-6
API Gravity/lbs./gal.	32.6/7.18	30.4/7.28	30.7/7.26	27.5/7.41
Flash Point, °F	405	440	485	470

Turbine Oil XL

Turbine Oil XL is a premium quality zinc free rust and oxidation (R&O) inhibited turbine oil. It is designed for optimum control of oxidation, sludge, corrosion and maximizing industrial equipment life.

The lighter ISO grades of Turbine Oil XL are used in steam, gas, or hydraulic turbines with or without gear reducers, compressors, vacuum pumps, air tools, air line lubricators and low pressure hydraulic systems.

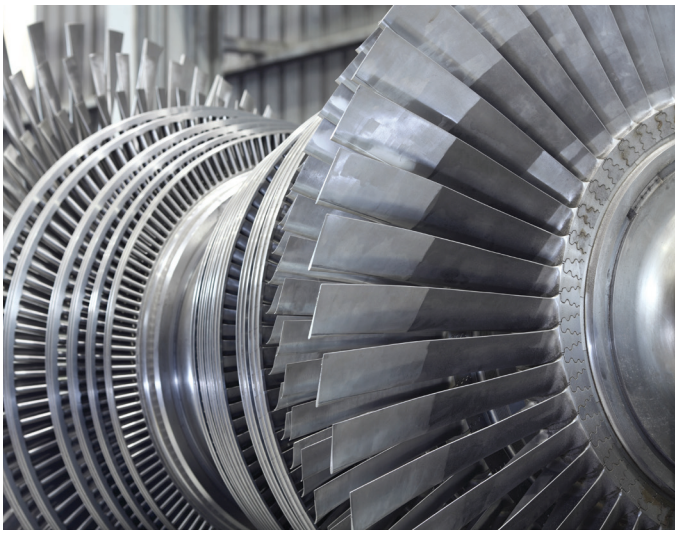
The heavier ISO grades are used as circulating oils in industrial applications, non-EP gear boxes, machine tools, speed reducers, roller chains, cone drives, slow speed plain and rolling element bearings.

Benefits

- **Oxidation Control:** Superior oxidation and thermal stability provides maximum oil, filter, and equipment life.
- **Hydrolytic Stability:** Hydrolytic stability minimizes acidity and copper attack in the presence of moisture.
- **Rust and Corrosion Protection:** A unique rust inhibitor maximizes oil compatibility while preventing rust and corrosion of critical components for longer life.

Typical Applications

Cincinnati Lamb P38,54,55,57; **AGMA** 9005-D94, US Steel 126 (R&O); **Denison** HF-1, MIL-L 17672D; ASTM D4304 Type1 (non-EP); DIN 51515/17, DIN 51524 Part 1; ISO 8068, British Standard 489; ASTM D-943 Oxidation Test: 12,000 hrs



Turbine Oil XL Typical Properties							
ISO Viscosity Grade	**32**	**46**	**68**	**100**	**150**	**220**	**320**
API Gravity /lbs./gal.	32.4/7.19	31.4/7.23	30.7/7.26	30.4/7.28	28.9/7.33	28.0/7.38	27.5/7.47
Flash Point, °F	430	440	450	460	470	480	490
Viscosity@100°C, cSt SUS	5.4 43.3	6.9 48.1	8.6 54.3	11.8 63.1	14.7 77.9	19.0 96.3	24.0 116.2
Viscosity @40°C, cSt SUS	31.7 160	45.7 225	65.8 330	101.4 490	153.8 750	218.1 1160	334.1 1620
Viscosity Index	104	107	102	105	94	98	92
Pour Point, °F/°C	-44/-42	-33/-36	-27/-33	-22/-30	5/-15	+15	+21/-6
Total Acid Number	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Copper Corrosion	1A	1A	1A	1A	1A	1A	1A
Rust Test	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Foam Test	Pass	Pass	Pass	Pass	Pass	Pass	Pass
5 Metals Test (Pitting/Etching)	None	None	None	None	None	None	None
FZG Load Stage	11	11	11	11	11	11	11

The typical properties listed reflect the general characteristics of the product, and are not manufacturing specifications. Normal batch-to-batch variations should be expected.

CONSIDER YOUR APPLICATION *Before Choosing a Hydraulic Oil*

Improper use of or sub-par hydraulic oils can:

- Cause pump cavitation damage due to poor air release. Other hydraulic oils, that contain silicone antifoams, are known to increase time required for entrained air to escape, which can cause hydraulic control precision loss
- Lead to more frequent oil drains because of inferior thermal and oxidation stability, which shortens oil life by allowing more sludge and varnish build-up
- Result in filter plugging from the hydrolysis of additive components
- Increase corrosion and pump wear due to inadequate additive chemistry technology

Know your viscosity grade.

Viscosity is an important factor when selecting the proper hydraulic oil for your equipment. Anti-wear, anti-oxidization or anti-corrosion properties are irrelevant if the viscosity grade is not correctly matched to the operating temperature range of the advanced hydraulic system. Cenex® manufactures hydraulic oils in a wide range of viscosities to meet your needs. The oils are most often labeled in terms of ISO number or grade, but these numbers correlate to specific SAE grades. They are generally selected based on the oil's viscosity for use in a certain type of equipment operating over a specific temperature range.

Start here when determining viscosity in your application:

- What is the ambient temperature now?
- What will be the expected operating conditions and temperature while the equipment is working?
- What are the OEM recommendations for your equipment?

Visit Cenex.com or contact your local Cenex® distributor to discover more.

CENEX

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