Monsanto

Specialty Fluids and Lubricants

For the Oil & Gas Industry

- Heat Transfer Fluids
- Fire-Resistant Hydraulic Fluids
- Fire-Resistant Air Compressor and Turbine Lubricants
- Traction Lubricants

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Check this list of Monsanto specialty fluids and lubricants. They are special-purpose products offering unique operating benefits in the kinds of machines, power sources, process equipment, and transport systems you operate. And they are backed by Monsanto's worldwide technical sales and service personnel and worldwide warehousing. Monsanto functional fluids can increase safety, improve efficiency and cut maintenance in installations ranging from offshore drilling rigs or production platforms to the liquefaction plant or refinery.

- ☐ Therminol® Heat Transfer Fluids
- ☐ Pydraul® Fire-Resistant Hydraulic Fluids
- ☐ Pydraul® Fire-Resistant Air Compressor Lubricants
- ☐ Turbinol® Fire-Resistant Turbine Lubricants
- ☐ Santotrac® Traction Lubricants

Notice

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HEAT TRANSFER FLUIDS FOR HEATING & COOLING APPLICATIONS

Therminol® fluids transfer heat by liquid heat transfer in closed loop, non-pressurized systems. They are designed for operating temperature ranges up to 700°F. The non-pressurized, liquid systems can usually be designed for lower costs than pressurized systems operating on steam or vaporized heat transfer media. Therminol liquid heat transfer is recommended for: tanker and barge heating; glycol recovery systems; well choke heating; residential space heating; waste heat recovery; and refinery operations.

Typical Properties

	Therminol® 60	Therminol® 66
Appearance	Light yellow liquid	Practically colorless liquid
Density @ 75°F	8.33 lbs./gal.	8.35 lbs./gal.
Fire Point (C.O.C.)	320°F	382°F
Autogenous Ignition Point	835°F (445.8°C)	705°F (374°C)
Viscosity,		
Centistokes @ 0°F	65.0	50,000
Centistokes @ 100°F	4.90	28.0
Centistokes @ 250°F	1.25	2.60
Vapor Pressure		
(mm Hg absolute) @ 250°F	5	2
@ 500°F	240	100
Specific Heat @ 250°F	0.470	0.455
B.T.U./lb. @ 500°F	0.593	0.580
Thermal Conductivity		
(B.T.U./hr.ft., F°) @ 250	0.0718	0.678
@ 500	0.0656	0.637

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FIRE RESISTANT FLUIDS FOR HYDRAULIC SYSTEMS

Pydraul® fluids were developed to provide industry with a line of fire resistant hydraulic fluids. In the oil and gas industry, Pydrauls are used in riser tensioners, heave compensators, guideline tensioners, and blow-out preventers. Pydraul 29 E-LT and 50-E fluids are Factory Mutual approved; they pass the spray test (1,000 psi spray through propane flame); channel iron test (spray impacting 1,300°F red hot metal); and the hot manifold test (Federal Standard 791, dripped on 1,300°F Manifold). Pydraul fluids do not foam or corrode, and they are available in viscosity ranges that ensure smooth operation and rapid equipment response.

Typical Properties	Pydraul 10-E*	Pydraul 29 E-LT	Pydraul 50-E
Appearance	Clear Blue Liquid	Clear Blue Liquid	Clear Blue Liquid
Specific Gravity, 25°/25°C	1.088-1.091	1.093-1.113	1.140-1.160
Viscosity,			
Centistokes @ 100°F	10.0	30.9	49
Centistokes @ 210°F	2.4	6.9	5.9
Absolute SSU @ 100°F	60.5	158	262
Pour Point, F°	-70°	-45°	-5°
Max. Bulk Operating Temperature	175°	175°	225°
Vapor Pressure (mm Hg @ 200°F)	0.002	0.002	0.002

*Not FM approved; passes F.T.M. Std. 791 Hot Manifold Test

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FIRE- AND EXPLOSION-RESISTANT AIR COMPRESSOR LUBRICANTS

Many air compressor explosions and receiver fires can be traced to the use of petroleum oil lubricants. Oil mists and films in the air compressor systems oxidize to a carbon-oxygen complex. Accelerated by heat, pressure or triggered by shock-wave -- oil mists and residues break down into combustible gases that can explode and/or ignite in the air lines and receivers. Pydraul® air compressor lubricants were designed to ensure safer air compressor lubrication. Used since 1954, the fire-resistant Pydraul compressor lubricants provide excellent lubrication, allow minimum maintenance, and offer maximum safety to critical compressor installations.

Typical Properties	Pydraul 30-E	Pydraul 90-E	Pydraul 115-E
Appearance	Clear Blue Liquid	Clear Blue Liquid	Clear Blue Liquid
Specific Gravity, 25°/25°C	1.150-1.1770	1.145-1.165	1.145-1.165
Viscosity,			
Centistokes @ 100°F	30-40	85-95	115-125
Centistokes @ 210°F	4.6-5.0	7.7-8.1	8.9-9.3
Absolute SSU @ 100°F	173	473	695
Pour Point, F°	-15°	10°	10°
Max. Exit Air Temp.,F°	350°	350°	350°
Boiling Point (air),F°	725°	805°	820°

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FIRE-RESISTANT INDUSTRIAL TURBINE LUBRICANTS

Turbinol® fluids are synthetic, fire-resistant lubricants for turbine and turbine control systems. They are inert, oxidation-resistant, and shear stable. Turbinol lubricants maintain lubricity and film integrity at 450 to 500°F operating temperatures; pass ASTM rust and foam tests; are non-corrosive and compatible with all commonly used metals of construction. Turbinol lubricants are recommended for high-speed, gas combustion and steam turbines -- used to drive generators, gas compressors and other equipment. Turbinols are also used as electro-hydraulic control fluids on turbines. They are approved by major turbine manufacturers. Turbinol fluids offer excellent lubricating performance plus the added safety of fire resistance.

Typical Properties	Turbinol 1223	Turbinol 1122
Viscosity,		
Centistokes @ 40°F	750	320
Centistokes @ 210°F	6.02	4.82
Viscosity, SSU @ 40°F	3,460	1,480
@210°F	45.9	42.1
Pour Point, F°	-5°	-20°
Specific Gravity,		
25/25°C	1.142	1.173
Vapor Pressure,		
mm Hg @ 200°F	0.002	0.002
Fire Resistance:		
Fire Point, C.O.C., F°	620°	650°
Autogenous Ignition Temp. (ASTM D2155)	910°	1.050°
Hot Manifold Test (FS 791) @ 1,300°F	Flashes, does not propagate	Flashes, does not propagate
Lubricating Performance,		
Four Ball Wear Test, 40 kilo load		
(625 rpm, 167°F 1 hr.)		
Steel on steel, scar dia., mm	0.58	0.58
Steel on bronze, scar dia., mm	0.65	1.01

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HIGH TEMPERATURE (Aircraft-type) HOT-GAS GENERATOR LUBRICANT

Skylube® 450 is an improved Type II lubricant for jet engine gas generators used as power sources for industrial turbines. It meets in all respects the performance specifications of major manufacturers, such as General Electric's GE-D50TFL and Pratt & Whitney's PWA 521B. It has extreme resistance to high temperatures and oxidation degradation; its Erdco Bearing Rig Test deposit rating of 22-28 is approximately one-half that obtained with the best commercial Type II lubricants. Engines operated on Skylube 450 lubricant over the past four years include these classes: JT3D, JT8D, JT12, FT-4, and SPEY; plus Air Research Turbo-compressors & Air Cycle Machines and Sundstrand CSD's.

Typical Properties	Skylube 450	Limits GE D50TFL-S3 Class B	Limits PWA 521B
Viscosity,			
Centistokes @ -40°F	8860	13000 max.	13000 max.
Centistokes @ 400°F	1.3	1.0 min.	1.0 min.
Pour Point, F°	-75°	--	-75° max.
Flash Point, C.O.C., F°	535	400 min.	400 min.
Autogenous Ignition Temp., F°	785	750 min.	--
Evaporation Loss, after 6-1/2 hrs. @ 400°F (Sea Level, 759 mm Hg)	2.7%	10% max.	25% max.
Corrosion-Oxidation Stability After 72 hrs. @ 350°F, 10 L/hr. Dry Air			
Weight Change, mg/cm^2			
Steel	0.0	±0.20	±0.30
Copper	+0.01	±0.40	±0.30
Aluminum	+0.01	±0.20	±0.30

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HIGH HEAT, HIGH PRESSURE RESISTANT TRACTION LUBRICANTS

Santotrac® lubricants were developed for traction drives. They are lubricants with "grip" that increase the traction coefficient between driver and driven rolling surfaces from 40-80%. The film separates metal-to-metal contact at pressures up to 500,000 psi, operates at temperatures up to 300°F. In laboratory wear tests, Santotrac lubricants approximately double the life of standard roller bearings. The synthetic hydrocarbon base has been formulated into four liquid lubricants and two greases. Santotrac 30 has the lowest operating temperature capability; Santotrac 50, the best balance of properties for most uses, medium viscosity, good anti-wear in sliding contact. The Santotrac greases have the highest traction coefficient of any lubricants known to date.

Typical Properties	Santotrac			
	"30"	"40"	"50"	"70"
Viscosity,				
Centistokes @ -40°F	23,400	--	--	--
Centistokes @ -20°F	--	31,600	41,500	--
Centistokes @ 0°F	--	--	5,120	93,904
Centistokes @ 210°F	3.10	3.68	5.61	11.4
Pour Point, F°	-65°	-45°	-35°	-10°
Density, gms/cc @ 100°F	0.891	0.886	0.889	0.957
Vapor Pressure @ 350°F (mm Hg absolute)	12	12	12	10
Autogenous Ignition Temp., F°	605°	600°	620°	675°
Coefficient of Traction	0.084	0.095 (napthenic oil = 0.066)	0.095	0.095
Shell 4-Ball Wear (200°F, 2 hrs., 1260 rpm, 40 kg load, steel-on-steel) Scar Diameter, mm	0.67	0.75 (napthenic oil = 1.10)	0.51	0.54

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For additional information and answers to your specific questions, please visit us at Booth 2260-62 at the Offshore Technology Conference, Houston, Texas.

Information and sales assistance may also be obtained from any of the Monsanto International Offices listed on the following page.

Monsanto

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