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

Bulletin No. IC/FF-41

0107907

TOWOLDMON0022645

Monsanto serves the oil and gas industry with a complete line of high performance heat transfer fluids, hydraulic fluids and specialty lubricants. These proven, special-purpose products can offer ~~substantial~~ significant reduction of fire threat, longer equipment life and improved efficiency in the machinery, power sources, process equipment and transport systems you operate. And they are backed by Monsanto's worldwide technical sales and service personnel, worldwide warehousing.

This pamphlet is supplied to give you a brief description of Monsanto fluids and lubricants pertaining to your particular applications. Complete technical information on any of these precision products and how they can help will be sent to you upon request.

Standard Disclaimer Clause

* NOTE: As used herein, fluids designated "fire resistant" generally are more difficult to ignite or, once ignited, burn at a slower rate than conventional fluids. This does not mean that fire-resistant fluids will not burn.

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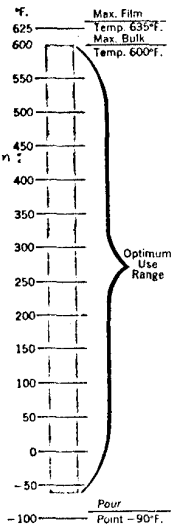
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HEAT TRANSFER FLUIDS FOR HEATING & COOLING APPLICATIONS

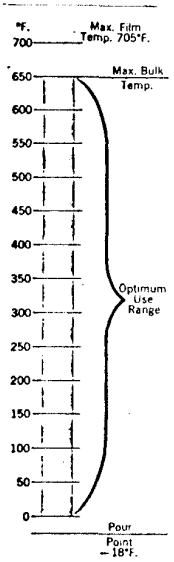
Therminol® heat transfer fluids work by liquid heat transfer in closed loop, non-pressurized systems. They are designed for operating temperature ranges up to 700°F. The non-pressurized, liquid systems can usually be designed for lower costs than pressurized systems operating on steam or vaporized heat transfer media. Therminol liquid heat transfer is ~~recommended for:~~ used in: tanker and barge heating; glycol recovery systems; well choke heating; residential space heating; waste heat recovery; and refinery operations. Of the five Therminol heat transfer fluids available, Therminol 60 and 66 offer properties most typically required in these applications.

In Europe, Monsanto heat transfer fluids are sold under the name Santotherm® Heat Transfer Fluids. Santotherm fluids are identical to those sold under the Therminol name.

Therminol® 60



Therminol® 66



Typical Properties

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® hydraulic fluids were developed to meet the need in industry for a line of fire-resistant hydraulic fluids. In the oil and gas industry, these Pydraul fluids 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. The following Pydraul fluids are those most frequently used in offshore hydraulics.

Typical Properties	Pydraul® 10-E*	Pydraul 29E-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,	-70°F	-45°F	-5°F
Max. Bulk Operating Temperature	175°F	175°F	225°F
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. In use since 1954, the fire-resistant Pydraul compressor lubricants provide excellent lubrication, allow minimum maintenance, and offer maximum safety to critical compressor installations. The following Pydraul lubricants are specifically designed for use in air compressors.

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	-15°F	10°F	10°F
Max. Exit Air Temp.	350°F	350°F	350°F
Boiling Point °F @ 760 mm Hg	725°F	805°F	820°F

Shell Four-Ball Wear
(167°F., 1 hour, 630 rpm., mm scar diameter)

STEEL ON STEEL	PYDRAUL® 30E	PYDRAUL 90E	PYDRAUL 115E
4 kg	0.47	0.28	0.29
10 kg	0.50	0.32	0.39
40 kg	0.64	0.54	0.56
STEEL ON BRONZE			
10 kg	0.46	0.35	0.45
40 kg	0.97	0.65	0.66

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FIRE-RESISTANT INDUSTRIAL TURBINE LUBRICANTS

Turbinol® fluids are synthetic, fire-resistant lubricants for turbine and turbine control systems and are approved by major turbine manufacturers. 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~~ used in high-speed, gas combustion and steam turbines -- used to drive generators, gas compressors and other equipment. Turbinol fluids offer excellent lubricating performance plus the added safety of fire resistance.

Typical Properties	Turbinol® 1122	Turbinol 1223
Viscosity,		
Centistokes @ 40°F	320	750
Centistokes @ 210°F	4.82	6.02
Viscosity, SSU @ 40°F	1,480	3,460
@ 210°F	42.1	45.9
Pour Point	-20°F	-5°F
Specific Gravity, 25°/25°C	1.173	1.142
Vapor Pressure, mm Hg @ 200°F	0.002	0.002
Fire Resistance:		
Fire Point, C.O.C.	650°F	620°F
Autogenous Ignition Temp. (ASTM D2155)	1.050°F	910°F
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	1.01	0.65

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TOWOLDMON0022650

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

Skylube® 450 lubricant 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. Skylube 450 has extreme resistance to high temperature decomposition and oxidation degradation. Engines operated on Skylube 450 lubricant over the past four years include these classes: JT3D; JT8D, JT12, FT-4, and SPEY; plus AiResearch 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	-75°F	--	Max. -75°F
Flash Point, C.O.C.	535°F	Min. 400°F	Min. 400°F
Autogenous Ignition Temp.	785°F	Min. 750°F	--
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® traction lubricants are a new family of synthetic hydrocarbon lubricating oils and greases 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, and 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® Lubricating Oils			
	"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	-65°F	-45°F	-35°F	-10°F
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.	605°F	600°F	620°F	675°F
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 complete technical information or for sales assistance on any of Monsanto's specialty fluids and lubricants, just complete and return the enclosed postage-free card.

Postcard Copy

Please send me additional information on the following Monsanto fluids and lubricants:

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

My application is: _____

_____

_____

☐ Please have your fluids specialist contact me for an appointment.

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone ( ) _____

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