

COPY

DATE

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JOB

SPECIAL FUNCTION HEAT TRANSFER FLUIDS

-- 4-Page, 2/color Folder

(W. D. Lubric, MCCC, BINB - 4-2630)

SPECIAL FUNCTION

Heat Transfer Fluids

Hydraulic Fluids

Traction Lubricants

Fire Resistant Air Compressor & Turbine Lubricants

the *Industry*
FOR OIL & GAS RECOVERY, ~~HANDLING, & PROCESSING EQUIPMENT~~

Daind,
Please look this
over. If you think
it will suffice I can
have it printed on about
4 pages. Give me a
call & let me know. (4-2630)
Bill Lubric

0107849

Monsanto

TOWOLDMON0022605

↪ Monsanto
Specialty Fluids and Lubricants

For the Oil & Gas Industry

- Heat transfer fluids
- Fire-resistant hydraulic fluids
- Fire-resistant air compressor & turbine lubricants
- Traction lubricants

0107850

Monsanto

* Greater Safety * Higher Efficiency * Lower Maintenance.

Check this list of specialized fluids ^{Monsanto} ~~Worldwide availability~~ ^{and lubricants} You'll find They are special-purpose products - ~~chemically designed for the job.~~ They offer ^{ing} unique operating benefits in the kinds of machines, power sources, process equipment, and transport systems you operate. Monsanto functional fluids can increase safety, improve efficiency and cut maintenance in installations ranging from ~~the~~ off-shore rig or well-head to the liquefaction plant or refinery.

Need. highlight benefits of 'range'

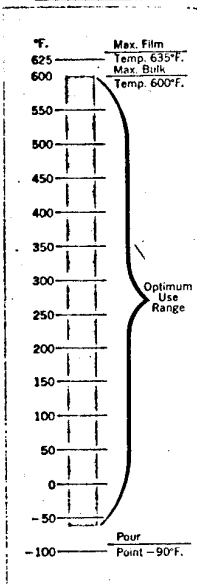
and they are backed by Monsanto's worldwide technical sales and service personnel and worldwide warehousing.

Disclaimer

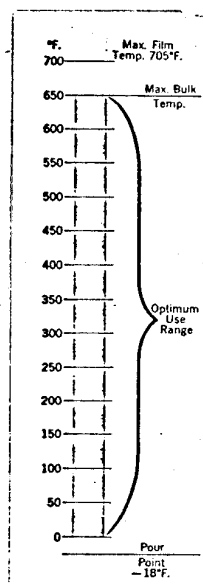
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~~THERMINOL TYPICAL PROPERTIES~~

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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Heating & Cooling Applications

HEAT TRANSFER FLUIDS FOR ~~PROCESSING & SPACE HEATING~~ ☐

(P)

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; ~~off shore oil rigs and gas platform heating~~ ^{production}; waste heat recovery; and refinery operations.

glycol recovery systems; well choke heating; residential space heating;

~~glycol recovery systems~~

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TOWOLDMON0022609

1) FIRE RESISTANT FLUIDS FOR HYDRAULIC SYSTEMS ☐

Pydraul Hydraulic fluids were developed to make pressure-operated equipment safe from fire. Sudden leaks can spurt mists or streams of hydraulic fluid at ignition sources such as electrical contacts, welding torches, light bulbs, hot metal. Seepage from seals and joints can also be a fire hazard. 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~~ *provide industry* 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 Temp.	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-^{Vand}~~FIRE-SAFE, EXPLOSION-RESISTANT AIR COMPRESSOR LUBRICANTS ☐

~~A major cause of many air~~
 Every analysis of compressor explosions and receiver fires can be traced ^{the cause of} the cause to petroleum oil lubrication. Oil mists and films in ^{than} 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 receivers} the receivers. Pydraul air compressor lubricants were designed to ensure safer ^{air} compressor lubrication. Used since 1954, ^{the fire-resistant Pydraul} Pydraul compressor lubricants provide fire or explosion, ^{excellent} excellent lubrication, ^{and} minimum maintenance, ^{offer} maximum safety, ^{critical} critical compressor installation.

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°

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

0107855

FIRE-RESISTANT INDUSTRIAL TURBINE LUBRICANTS

^② *synthetic, fire-resistant lubricants for turbine and turbine control systems.*
 Turbinol fluids are ~~chemically-made "oily" liquids with fire~~
~~resistance built into the molecule.~~ They are inert, oxidation-
 resistant, and shear stable. Turbinol lubricants maintain lubri-
 city and film integrity at 450-500°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 ~~the~~ ^{gas combustion and steam} high-speed, continuous operating turbines-
~~used to drive generators, compressors & other equipment.~~ Turbinol are
 of the types and scale used by utility companies to power electric
 also used as electro-hydraulic control fluids on turbine
 generators. They are approved by major turbine manufacturers.

Turbinol fluids offer excellent lubricating performance plus the
 added safety of fire resistance.

Typical Properties

	<u>Turbinol 1223</u>	<u>Turbinol 1122</u>
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 ~~in service~~ 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.

<u>Typical Properties</u>	<u>Skylube 450</u>	<u>Limits GE D50TF1-S3 Class B</u>	<u>Limits PWA 521B</u>
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			
<u>Weight Change, mg./cm²</u>			
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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TOWOLDMON0022613

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	0.095	0.095
		(napthenic oil = 0.066)		
Shell 4-Ball Wear (200°F, 2 hrs., 1260 rpm, 40 kg load, steel-on-steel)				
Scar Diameter, mm	0.67	0.75	0.51	0.54
		(napthenic oil = 1.10)		

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

Monsanto Ind. Chem. Co.,

800 N.

St. Louis, Mo., U.S.A. 63166

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TOWOLDMON0022615