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DATE November 20, 1975

JOB Monsanto Fire Resistant Hydraulic Fluids

(W. D. Lubic, MICC, B1NB; 4-2630)

IC/FF-56

Monsanto (logo)

PYDRAUL®

FIRE RESISTANT FLUIDS AND LUBRICANTS

designed for optimum operating efficiency, greater safety and minimum maintenance.

Monsanto was the pioneer in the development of synthetic fire resistant* lubricants. Over the past quarter century, specialized functional fluids have been developed to meet essentially every required operating condition in a wide variety of specialized hydraulic equipment. A broad choice of viscosity/temperature characteristics is available to give optimum machine response and dependable operation even under severe climatic and operating conditions.

Check over the range and types of hydraulic fluids that are available. Monsanto will provide you with detailed performance information on the ones that interest you.

(Standard Disclaimer Clause Plus *Fire-Resistance Disclaimer)

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Monsanto

2-3259-0372-6

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NOTICE: "Nothing contained herein is to be construed as a recommendation to use any product in conflict with any patent. MONSANTO MAKES NO WARRANTIES AS TO THE FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY OF ANY PRODUCT REFERRED TO, no guarantee of satisfactory results from reliance upon contained information or recommendations, and disclaims all liability for any resulting loss or damage."

*"**NOTE:** Materials designated 'fire resistant' generally are more difficult to ignite, or once ignited, burn at a slower rate than corresponding conventional materials. This term does not mean that fire resistant materials will not burn. However, when properly used, Monsanto's fire resistant PYDRAUL® ~~HYDRAULIC~~ FLUIDS are useful in helping customers meet their fire safety requirements."

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OPERATING ADVANTAGES OF PYDRAUL FLUIDS

Pydraul fire resistant fluids are formulated to give excellent lubrication, long pump life and efficient equipment operation with minimum maintenance. The use of a fire resistant fluid frequently lowers insurance premiums below the costs for operating with petroleum oils. Pydraul fluids are heat- and shear stable, inhibit metal corrosion, eliminate foaming and permit equipment to operate at optimum response capability.

SERVICE-PROVEN APPLICATIONS OF PYDRAUL FLUIDS

Steel Industry

Continuous casters
Rolling mills
Furnaces
Scrap chargers
Stripper cranes
Arc welders
Combustion controls
Mobile equipment

Aluminum Industry

Stripper cranes
Direct chill casters
Furnaces
Rolling mills
Shearers
Combustion controls
mobile equipment

Forging And Extrusion

Forge presses
Extrusion presses
Billet manipulators

Diecasting

Diecast machines
Trim presses

Fabrication

Forming presses
Welders
Furnaces

Foundries

Furnaces
Molding lines

Mining Industry

Power shovels & draglines
Blasthole drills
Bulldozers & rippers
Tractors
Scrapers & Graders
Crushers
Ore Feeders
Trucks
Jumbos
Ore Drills
Mechanical Loaders & Scrapers

Air Compressors

Reciprocating
Rotary Screw

Offshore Oil And Gas

Drill String Heave Compensators
Guideline tensioners
Riser tensioners

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PYDRAUL

Fire Resistant Lubricants for Air Compressors

Pydraul lubricants for air compressors — 30-E, 90-E and 115-E — were developed to eliminate the conditions that cause compressor fires and explosions. Numerous studies, including work by the U.S. Bureau of Mines, The Walter Kidde Company and various individual researchers shows that carbonaceous deposits from petroleum in high pressure lines are the primal cause of compressor explosions and receiver fires. Mist and accumulated petroleum oil film can, under a variety of conditions, break down and ignite.

Pydraul 30-E, 90-E and 115-E air compressor lubricants were especially developed to eliminate the petroleum oil mist and oil's carbonaceous deposits that have been found to be the causes of receiver fires and compressor explosions. ~~The~~ Pydraul synthetic lubricants reduce deposit build-up in pipes, coolers and on exhaust valves -- saving down-time and cleaning. Aside from greater safety many users find the savings in maintenance alone warrants use of Pydraul compressor lubricants.

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PYDRAUL® "E" SERIES

All-synthetic Premium Grade Fluids

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Pydraul "E" series fluids are straight phosphate-ester lubricants offering superior stability, long service life and excellent lubricity.

Hydraulic Fluid / Air Compressor Lubricant

Typical Properties *	PYDRAUL 10-E	PYDRAUL 29-E-LT	PYDRAUL 30-E	PYDRAUL 50-E	PYDRAUL 65-E	PYDRAUL 90-E	PYDRAUL 115 E
Appearance	Clear Blue Liquid	Clear Blue Liquid	Clear Blue Liquid	Clear Blue Liquid	Clear Blue Liquid	Clear Blue Liquid	Clear Blue Liquid
Specific Gravity @ 25°C	1.035–1.075	1.090–1.110	1.135–1.175	1.145–1.165	1.147–1.167	1.145–1.165	1.145–1.165
Acidity, mg KOH/g max.	0.25	0.25	0.15	0.15	0.15	0.15	0.15
Water, % max.	0.10	0.15	0.10	0.10	0.10	0.10	0.10
VISCOSITY							
Centistokes @ 100°F.	10.0 cs	30.9 cs	32 cs	49 cs	67.3 cs	85–95 cs	112 cs
@ 210°F.	2.4 cs	7.5 cs	4.8 cs	5.9 cs	7.1 cs	7.7–8.1 cs	9.3 cs
SSU @ 100°F.	60 SSU	145 SSU	150 SSU	231 SSU	312 SSU	415 SSU	505 SSU
@ 130°F.	35 SSU	57 SSU	42 SSU	46 SSU	58 SSU	52 SSU	56 SSU
@ 210°F.	60.5 SSU	158 SSU	174 SSU	267 SSU	349 SSU	473 SSU	644 SSU
@ 250°F.	35 SSU	54 SSU	47 SSU	58 SSU	74 SSU	57 SSU	66 SSU
Pour Point	–70°F.	–45 °F.	–15 °F.	–5 °F.	0 °F.	410°F.	–15°F.
Flash Point (Cleveland Open Cup)	375°F.	475 °F.	475°F.	525 °F.	525 °F.	350°F.	525°F.
Fire Point (Cleveland Open Cup)	780°F.	500 °F.	525 °F.	560 °F.	560 °F.	805°F.	575°F.
Coefficient of Expansion per °F.	0.00044	0.00040	0.00035	0.00035	0.00035	0.00035	0.00035
Bulk Modulus @ 77°F.	0.42	0.39	0.36	0.37	0.38	0.38	0.39
Thermal Conductivity, BTU/hr/ft²/°F./in.	0.067	0.0737	0.0720	0.0726	0.0726	0.0723	0.0731
Specific Heat, BTU/lb/°F.	0.507	0.502	0.502	0.502	0.501	0.502	0.501
Evaporation, Weight % Loss (6½ hrs. @ 400°F.)	32% max.	3% max.	2% max.	2% max.	2% max.	3% max.	2% max.
Rust Protection (ASTM D-665)	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Foaming (ASTM D-892)	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Solubility in Water	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
FIRE RESISTANCE TESTS							
Factory Mutual Spray Test. Test fluid sprayed at 1500 psi through nozzle, impinging on hot manifold.	Fail	Pass	Pass	Pass	Pass	Pass	Pass
Factory Mutual Channel Iron Test. Test fluid sprayed at 1500 psi through nozzle impinging on hot 2" I.D. pipe.	Fail	Pass	Pass	Pass	Pass	Pass	Pass
Wick Test (Federal Test Method Std. 791). Test fluid dripped on hot manifold.	Intermittent flashing but does not propagate to pan below.	Intermittent flashing but does not propagate to pan below.	Intermittent flashing but does not propagate to pan below.	Intermittent flashing but does not propagate to pan below.	Intermittent flashing but does not propagate to pan below.	Intermittent flashing but does not propagate to pan below.	Intermittent flashing but does not propagate to pan below.
Factory Mutual Approved. FM	No	Yes	Yes	Yes	Yes	Yes	Yes

*This data is based upon samples tested in the laboratory. It is not guaranteed for all samples. The properties listed above, in addition to varying from sample to sample, are subject to change from time to time due to process modifications and improvements. For complete sales specifications write to Monsanto Company at the address listed in this bulletin.

~~Hydraulic Fluid~~

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PYDRAUL C SERIES

Phosphate-ester Base Economy Grade Fluids

Pydraul "C" series fluids have a phosphate ester base formulated with petroleum fractions to produce a fire resistant fluid in a range of viscosities.

Pydraul MC fluid is a waterless, constant composition "C" series ~~phosphate-ester~~ fluid developed specifically for use in mining equipment. Pydraul MC fluid meets the fire resistance requirement of the U.S. Bureau of Mines Schedule #30.

	PYDRAUL® 230-C Hydraulic Fluid	PYDRAUL 312-C Hydraulic Fluid	PYDRAUL 540-C Hydraulic Fluid	PYDRAUL MC** Hydraulic Fluid
Typical Physical Properties*				
Appearance	Clear Green Liquid	Clear Green Liquid	Clear Green Liquid	Clear Green Liquid
Spec. Gravity 25/25°C.	1.040–1.060	1.030–1.050	1.030–1.050	1.098
Neutralization No. (mg KOH/g) max.	0.30	0.30	0.30	0.30
Moisture (max.) %	0.15	0.15	0.15	0.15
VISCOSITY				
Centistokes @ 100°F.	46.2 cs	66 cs	106 cs	69 cs
@ 210°F.	6.9 cs	8.4 cs	10.5 cs	6.9 cs
SSU @ 100°F.	215 SSU	309 SSU	491 SSU	320 SSU
@ 210°F.	49 SSU	54 SSU	61 SSU	48 SSU
Absolute SSU @ 100°F.	224 SSU	311 SSU	498 SSU	
(SSU x Density) @ 210°F.	49 SSU	52 SSU	59 SSU	
Pour Point	−20 °F.	−10°F.	0°F.	−10°F.
Bulk Temp. Max. (continuous operation)	200°F.	200°F.	200°F.	
Boiling Point °F. at 760 mm Hg	500°F.	540°F.	545°F.	
Coefficient of Thermal Expansion per °F.	0.00038	0.00036	0.00036	0.00034
Specific Heat BTU/lb./°F. @ 77°F.	0.41	0.41	0.40	0.39
Thermal Conductivity BTU/hr./ft./°F.	0.0755	0.0760	0.0749	0.0728
Vapor Pressure mm Hg @ 200°F.	0.24	0.20	0.22	
Bulk Modulus (Room Temp. 1000-6000 psi)	332,000	330,000	336,000	
Rust Test ASTM D-665	Pass	Pass	Pass	Pass
Foam Test ASTM D-892	Pass	Pass	Pass	Pass
Solubility in Water	Negligible	Negligible	Negligible	Negligible
FIRE RESISTANCE TESTS				
Factory Mutual Spray Test. Test fluid sprayed at 1000 psi through orifice, passing through flame of propane torch.	Pass	Pass	Pass	Pass
Factory Mutual Channel Iron Test. Test fluid sprayed at 1000 psi through orifice, onto hot channel iron at 1300°F.	Pass	Pass	Pass	Pass
Hot Manifold Test (Federal Test Method Std. 791). Test fluid dripped on at 1300°F.	Intermittent flashing but does not propagate to pan below.	Intermittent flashing but does not propagate to pan below.	Intermittent flashing but does not propagate to pan below.	
Factory Mutual Approval. FM FM	Yes	Yes	Yes	
Meets U. S. Bureau of Mines Schedule #30	–	–,	–	Yes

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CONVERSION TO PYDRAUL FLUIDS

Changing over to a fire resistant Pydraul fluid is quite simple, a matter of selecting the proper material composition of seals and packings. Operating experience shows the preferred materials are Viton*, Teflon* or silicone rubber. Monsanto provides detailed information on change-over and most equipment manufacturers familiar with Pydraul fluids will do the same.

PYDRATEK® -100

Fire Resistant Preservative Fluid For New And Stand-by Equipment

A corrosion and rust protection fluid whose liquid film preserves metal surfaces for up to 12 months. May be applied by spray, dip, brush, wiped on or as an internal fill-and-drain with no removal necessary before adding the operating fire resistant hydraulic fluid. Protects metal surfaces for up to twelve months.

Pydratek-100 passes High Pressure Spray Tests (sprayed at 1000 psi through oxyacetylene flame @ 6000°F.) without flashing or igniting with torch up to 3 feet from orifice. (AMS-3150 C, 4.9.32 and Federal Test Method Std. 791.) It has good temperature stability in prolonged storage at -30°C. cycled to 70°F. and remains clear.

TYPICAL PHYSICAL PROPERTIES**

	Centistokes	SSU
Viscosity @ 0°F.	45,000	209,000
@ 20°F.	4,380	20,000
@ 100°F.	43.7	203
@ 210°F.	5.1	43
Pour Point, °F.	-5	

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Specific Gravity, 60°/60°F.	1.154
Acidity, Total Acid No.	10.3
Flash Point (Cleveland Open Cup)	465°F.
Fire Point (Cleveland Open Cup)	565°F.

For more detailed information, check the types of fluid(s) that interest you.

Please send me further data on:

_____ Pydraul Hydraulic Fluids and Lubricants

~~_____ Pydraul "Series E" Premium Fluids~~

~~_____ Pydraul "Series C" Economy Fluids~~

~~_____ Pydraul Air Compressor Lubricants~~

_____ Pydraul MC Fluid for Mining Equipment

_____ Pydratek-100 Preservative Fluid

The type of hydraulic equipment we operate is:_____

_____ with fluid capacity of approx. _____ gallons _____ operating in a temperature range of _____°F.

Name _____ Title_____

Company_____

Address _____

City _____ State _____ Zip _____

Postage Paid Reply Indicia to Dept. BINB

Add MICC Address Line & District Office Listing

Monsanto Logo 0165210

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