

COPY

|                                   |                                          |
|-----------------------------------|------------------------------------------|
| DATE                              | November 20, 1975                        |
| JOB                               | Monsanto Fire Resistant Hydraulic Fluids |
| (W. D. Lubic, MICC, B1NB; 4-2630) |                                          |

IC/FF-56

Monsanto (logo)

PYDRAUL<sup>®</sup>

### 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)

DSW 281653

**Monsanto**

**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."

DSW 281654

## 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. <sup>Pydraul</sup>~~The~~ 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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## 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

| <u>Steel Industry</u>         | <u>Aluminum Industry</u>        | <u>Forging And Extrusion</u> |
|-------------------------------|---------------------------------|------------------------------|
| Continuous casters            | Stripper cranes                 | Forge presses                |
| Rolling mills                 | Direct chill casters            | Extrusion presses            |
| Furnaces                      | Furnaces                        | Billet manipulators          |
| Scrap chargers                | Rolling mills                   |                              |
| Stripper cranes               | Shearers                        |                              |
| Arc welders                   | Combustion controls             |                              |
| Combustion controls           | mobile equipment                |                              |
| Mobile equipment              |                                 |                              |
| <u>Diecasting</u>             | <u>Fabrication</u>              | <u>Foundries</u>             |
| Diecast machines              | Forming presses                 | Furnaces                     |
| Trim presses                  | Welders                         | Molding lines                |
|                               | Furnaces                        |                              |
| <u>Mining Industry</u>        | <u>Air Compressors</u>          |                              |
| Power shovels & draglines     | Reciprocating                   |                              |
| Blasthole drills              | Rotary Screw                    |                              |
| Bulldozers & rippers          |                                 |                              |
| Tractors                      |                                 |                              |
| Scrapers & Graders            |                                 |                              |
| Crushers                      |                                 |                              |
| Ore Feeders                   |                                 |                              |
| Trucks                        |                                 |                              |
| Jumbos                        |                                 |                              |
| Ore Drills                    |                                 |                              |
| Mechanical Loaders & Scrapers |                                 |                              |
|                               | <u>Offshore Oil And Gas</u>     |                              |
|                               | Drill String Heave Compensators |                              |
|                               | Guideline tensioners            |                              |
|                               | Riser tensioners                |                              |

DSW 281656

## 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 ~~phosphate-ester~~ fluid developed specifically for use in mining equipment. Pydraul MC fluid meets the fire resistance requirements of the U.S. Bureau of Mines Schedule #30.

← CLEAR TO SUGGEST HAZY

| Typical Physical Properties*                                                                                       | PYDRAUL 312-C                                              |                                                            | PYDRAUL 540-C                                              |                                                            | PYDRAUL MC**                                               |
|--------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|------------------------------------------------------------|------------------------------------------------------------|------------------------------------------------------------|------------------------------------------------------------|
|                                                                                                                    | Green Liquid                                               | Green Liquid                                               | Green Liquid                                               | Green Liquid                                               | Green Liquid                                               |
| Spec. Gravity 25/25°C.                                                                                             | 1.030-1.050                                                | 1.030-1.050                                                | 1.030-1.050                                                | 1.030-1.050                                                | 1.030-1.050                                                |
| Neutralization No. (mg KOH/g) max.                                                                                 | 0.30                                                       | 0.30                                                       | 0.30                                                       | 0.30                                                       | 0.30                                                       |
| Mositure (max.) %                                                                                                  | 0.15                                                       | 0.15                                                       | 0.15                                                       | 0.15                                                       | 0.15                                                       |
| VISCOSITY                                                                                                          |                                                            |                                                            |                                                            |                                                            |                                                            |
| Centistokes @ 100°F.                                                                                               | 46.2 cs                                                    | 66 cs                                                      | 106 cs                                                     | 106 cs                                                     | 69 cs                                                      |
| SSU @ 100°F.                                                                                                       | 6.9 cs                                                     | 8.4 cs                                                     | 10.5 cs                                                    | 10.5 cs                                                    | 6.9 cs                                                     |
| SSU @ 210°F.                                                                                                       | 215 SSU                                                    | 309 SSU                                                    | 491 SSU                                                    | 491 SSU                                                    | 320 SSU                                                    |
| Absolute SSU @ 100°F.                                                                                              | 49 SSU                                                     | 54 SSU                                                     | 61 SSU                                                     | 61 SSU                                                     | 48 SSU                                                     |
| (SSU x Density) @ 210°F.                                                                                           | 224 SSU                                                    | 311 SSU                                                    | 498 SSU                                                    | 498 SSU                                                    | 48 SSU                                                     |
| Pour Point                                                                                                         | -20 °F.                                                    | -10 °F.                                                    | 0 °F.                                                      | 0 °F.                                                      | -10 °F.                                                    |
| Bulk Temp. 100% (continuous operation)                                                                             | 200°F.                                                     | 200°F.                                                     | 200°F.                                                     | 200°F.                                                     | 200°F.                                                     |
| Boiling Point °F. at 760 mm Hg                                                                                     | 500°F.                                                     | 540°F.                                                     | 545°F.                                                     | 545°F.                                                     | 545°F.                                                     |
| Coefficient of Thermal Expansion per °F.                                                                           | 0.00036                                                    | 0.00036                                                    | 0.00036                                                    | 0.00036                                                    | 0.00036                                                    |
| Specific Heat BTU/lb./°F. @ 77°F.                                                                                  | 0.41                                                       | 0.41                                                       | 0.40                                                       | 0.40                                                       | 0.39                                                       |
| Thermal Conductivity BTU/hr./ft./°F.                                                                               | 0.0755                                                     | 0.0755                                                     | 0.0749                                                     | 0.0749                                                     | 0.0728                                                     |
| Vapor Pressure mm Hg @ 200°F.                                                                                      | 0.24                                                       | 0.20                                                       | 0.22                                                       | 0.22                                                       | 0.22                                                       |
| Bulk Modulus (Room Temp. 1000-6000 psi)                                                                            | 332,000                                                    | 330,000                                                    | 335,000                                                    | 335,000                                                    | 335,000                                                    |
| Rust Test ASTM D-665                                                                                               | Pass                                                       | Pass                                                       | Pass                                                       | Pass                                                       | Pass                                                       |
| Front Test ASTM D-352                                                                                              | Pass                                                       | Pass                                                       | Pass                                                       | Pass                                                       | Pass                                                       |
| Solubility in Water                                                                                                | Negligible                                                 | 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                                                       | 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                                                       | 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. | Intermittent flashing but does not propagate to pan below. | Intermittent flashing but does not propagate to pan below. |
| Factory Mutual Approval, FM                                                                                        | Yes                                                        | Yes                                                        | Yes                                                        | Yes                                                        | Yes                                                        |
| Meets U. S. Bureau of Mines Schedule #30                                                                           | -                                                          | -                                                          | -                                                          | -                                                          | -                                                          |
| *Disclaimer from pg. 4A                                                                                            | **Missing data to come                                     |                                                            |                                                            |                                                            |                                                            |

DSW 281657

STLCOPCB4062985

# All-synthetic Premium Grade Fluids

Hydraulic "E" series fluids are straight phosphate-ester lubricants offering superior stability.

life and excellent lubricity.

Y. *Sleighly Hazy*  
BUSH GREEN

Blueish  
Green

[illegible]

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.

~~William Moore~~ (P-4A)

## 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<sup>®</sup>-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\*

|                  | <u>Centistokes</u> | <u>SSU</u> |
|------------------|--------------------|------------|
| 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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\*Pick up disclaimer

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

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

Please send me further data on:

|                                                                   |                                                               |
|-------------------------------------------------------------------|---------------------------------------------------------------|
| <input type="checkbox"/> Pydraul "Series E"<br>Premium Fluids     | <input type="checkbox"/> Pydraul "Series C"<br>Economy Fluids |
| <input type="checkbox"/> Pydraul Air Compressor Lubricants        |                                                               |
| <input type="checkbox"/> Pydraul MC Fluid for<br>Mining Equipment | <input type="checkbox"/> Pydratek-100<br>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

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