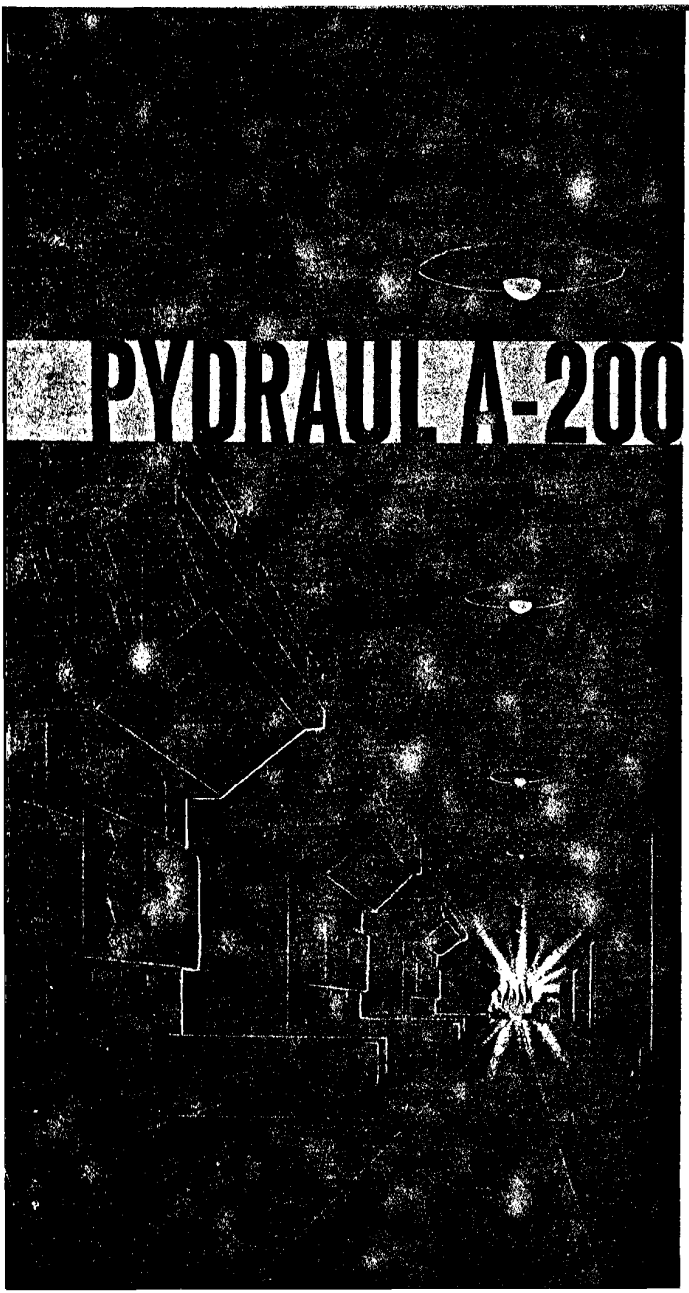

Monsanto

. . . low-cost, straight-synthetic, fire-resistant hydraulic fluid

Pydraul A-200, introduced to industry in 1959, was the FIRST *fire-resistant hydraulic fluid to break the "price/performance barrier." Today, it is one of the most widely used general-purpose fire-resistant hydraulic fluids in industry.*

Pydraul A-200 performs like premium-grade petroleum oil in a wide variety of industrial applications, from die-casting to aluminum extrusion. It protects plants and personnel with chemically "inherent" fire resistance, yet costs less than straight synthetic fluids.

Pydraul A-200 is the "modern" fire-resistant hydraulic fluid . . . combines the excellent performance of Pydraul F-9 with low cost, low maintenance. And, Pydraul A-200 is rapidly becoming the "standard" gauge for industrial hydraulic fluid performance, as it saves more dollars . . . more production time . . . and more lives!

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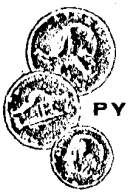
PYDRAUL A-200 IS SAFE...

In all important tests for fluid fire-resistance, Pydraul A-200 passes with flying colors. Here are the tests and the results:

HOT MANIFOLD TEST (per MIL-F-7100) (Pydraul A-200 was exposed to the surface of a manifold, 1300° F.)	FLUID DID NOT BURN OR FLASH ON TUBE OR AFTER LEAVING TUBE.
HIGH-PRESSURE IGNITION TEST (AMS-3150B) (Pydraul A-200 was sprayed through a small orifice at 1000 psi, passing through the flame of an oxy-acetylene torch, 6000° F.)	FLUID DID NOT FLASH OR IGNITE WITH TORCH UP TO 3½ FEET FROM ORIFICE.
LOW-PRESSURE SPRAY TEST (AMS-3150B) (Pydraul A-200 was sprayed through an orifice at low pressure, the mist passing over an ignited oil-soaked rag.)	FLAME BRIGHTENED BUT DID NOT INCREASE APPRECIABLY.
MOLTEN METAL IGNITION TEST (Pydraul A-200 was exposed to the surface of a molten alloy, 1250° - 1350° F.)	FLUID DID NOT SPONTANEOUSLY IGNITE. FLASHES BY SPARK BUT SELF EXTINGUISHING.



PYDRAUL A-200 IS ECONOMICAL...

The biggest economy of any fire-resistant hydraulic fluid is one which cannot be *seen*—until a hydraulic line breaks in the plant, and the fluid is sprayed to a nearby ignition source. When this happens, a flammable fluid can destroy equipment, lose thousands of dollars of production, injure personnel, and even cause loss of life!

Pydraul A-200 is a kind of "chemical insurance policy" . . . *your* protection against production loss and injury due to hydraulic fluid fire.

Pydraul A-200 is important to maintenance programs, also. "A-200" meets the important lubricating requirements found in premium petroleum oils—nothing has been sacrificed to achieve Pydraul A-200's excellent fire-resistance! High film strength and good anti-wear properties *protect* hydraulic equipment and costly components—and Pydraul A-200 is outstanding in film strength and anti-wear performance.

Lower initial cost sets Pydraul A-200 in a class by itself in the field of all-synthetic fire-resistant fluids. Where safety counts, Pydraul A-200 is the *finest* hydraulic fluid available—at the lowest cost per gallon!

Pydraul A-200 is directly compatible with other non-aqueous fire-resistant hydraulic fluids. It may be added to conventional all-synthetic fluids in the reservoir *with no performance loss.*

Pydraul A-200 eliminates flushing (in a clean system) if petroleum oils are being used. A-200 *combines readily, makes conversion easy.*

PYDRAUL A-200 IS PERFORMANCE-PROVED...

Since its introduction in 1959, Pydraul A-200 has complied an impressive performance record in a wide variety of equipment within several industries. Some typical applications for Pydraul A-200 are:

DIECASTING MACHINES	EXTRUSION PRESSES	FORGING PRESSES
HYDRAULIC PRESSES	INJECTION MOLDING MACHINES	ELECTRIC FURNACES
FURNACE TILTERS	SCARFERS	FURNACE DOOR OPENERS
REGULATORS	INGOT LOADERS	ELEVATORS AND HOISTS
PERMANENT MOLD CASTERS	SCRAP METAL BALERS	HYDRAULIC JIGS
STAMPERS	PLATING MACHINES	

Pydraul A-200 is a "modern" concept in fluids technology, *designed to stay abreast of new* equipment, and applications of the future.

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PYDRAUL A-200 IS DEPENDABLE...

Four reasons why "A-200" is the fluid you can count on:

NON-THICKENING Pydraul A-200 is designed to be permanent. It does not have to be inspected or replaced from month to month, or year to year. "A-200" does not thicken with use, will not form sludge or lose desirable properties with time.

"RUGGEDNESS" Pydraul A-200 has better resistance to abuse – temporary overheat, bearing load, and other stresses – than any other fire-resistant fluid. It resists "breakdown," even under extreme conditions.

GOOD ANTI-RUST A-200 protects metal surfaces in the presence of water. Passes rust test (ASTM-D 665 A) with perfect score – no rust (10 0).

SHEAR STABILITY A-200 undergoes no loss of viscosity, even after many years of use in the most severe pump operations.

PYDRAUL A-200 IS AN EXCEPTIONAL PERFORMER...

	"A-200"		Typical Premium Pet. Fluid	
Timken Load (Passing)	50# 16,340 psi		15# 6,500	
Shell Four Ball Wear Test:				
(167° F., 1 hr.; mm scar)	10 kg.	40 kg.	10 kg.	40 kg.
Steel on steel:	0.29	0.43	0.23	0.80
Steel on bronze:	1.40	1.70	1.73	2.71
Pump Test Data:				
Vickers V-104-D Vane Pump				
11 G. P. M. Cartridge				
900 psi				
120° F.				
1000 hours				
Wt. Loss From ring:	.031 G.		0.03 – 0.74	
Almen EP Test	48#	44# T.	8#	17# T.
(passing load and torque in pounds)				

PYDRAUL A-200: TYPICAL PROPERTIES

Appearance:	Cloudy blue liquid
Specific Gravity: (25°C/25°C)	1.415 – 1.430
Neutralization Number:	0.80 – 1.10
Moisture:	0.05% maximum
Viscosity: (See graph on back page)	100°F. 230 SSU
	210°F. 41.9 SSU
Bulk Modulus: (Room temp., 1000-6000 psi)	400,000
Compressibility:	2.50×10^{-6} sq. in. / lb.
Coefficient of Thermal Expansion, per °F.	0.00040
Specific Heat: 77°F. (or 25°C.)	0.28 BTU/Lb./°F.
Thermal Conductivity:	0.068 BTU/Hr./Ft./°F.
Solubility in H_2O:	Negligible
Vapor Pressure:	0.2 mm Hg @ 200°F.
Pour Point:	+15°F.
Auto-ignition Point:	1220°F.

PYDRAUL A-200 IN SYSTEMS USING OTHER FLUIDS...

If you are now using another conventional all-synthetic fluid . . .
simply add Pydraul A-200 as makeup. No modifications in present system necessary.

If you are using petroleum fluids . . .
drain, change to resistant dynamic seals and bladders, remove internal paint (if any), charge and operate.

If you are using a water-based fluid . . .
drain, check for sludges and worn parts, flush with Pydraul A-200, change to resistant dynamic seals and bladders, remove the flush (filter flushed material and decant water to reclaim), re-load and run.

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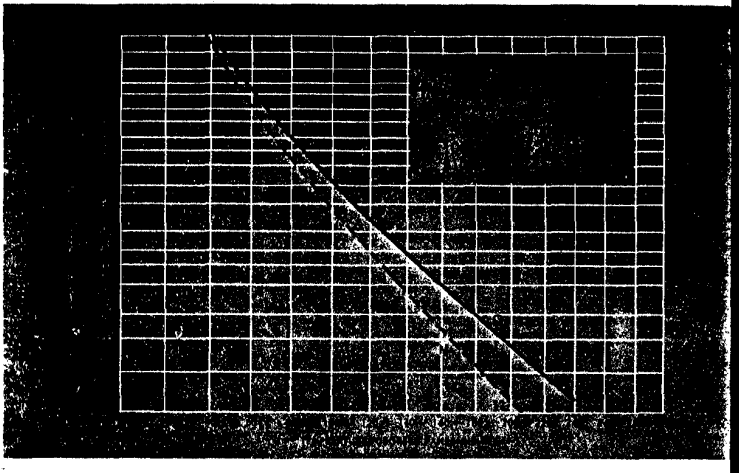
PYDRAUL* A-200 TYPICAL PROPERTIES

Viscosity:

Laboratory viscosity measurements are effected by fluid density. Because petroleum oils all have similar densities, their measured viscosities can be compared. The densities of synthetic fluids vary, however, so the measured viscosities must be corrected if comparisons are to be made.

In the graph below, curve "M" is the laboratory-measured viscosity of Pydraul A-200. Curve "C" shows the viscosity-temperature relationship of Pydraul A-200, modified for the differences in densities between oil and Pydraul A-200. Comparing curve "C" with a viscosity curve of a medium weight petroleum hydraulic oil, it is seen that the two are viscosity equivalents at normal operating temperatures.



Density (Gms/cc)	1.42 @ 100° F. 1.43 @ 60° F.
Pour Point:	+ 5° F.
Auto-Ignition Temperature:	Above 1200° F.

HANDLING AND STORAGE

Like all specialized hydraulic fluids, certain precautions are advisable when handling Pydraul A-200. No problems will arise when it is used as recommended.

Repeated or continuous skin contact should be avoided and inhalation of the vapors at elevated temperatures should be prevented. Pydraul A-200 is only mildly irritating to the eyes (but can cause pain) and like any other synthetic hydraulic fluid, it exerts a solvent-type action on the skin. Where prolonged contact cannot be avoided, gloves should be worn.

There is no vapor inhalation hazard associated with use at room temperature. In brief exposure to vapors given off at elevated temperatures, no systemic effects have been found in extensive animal experimentation. Exposures of one hour to the decomposition materials showed local respiratory irritation, but no systemic effects.

Eye irritation studies after using the material full strength showed it be a mild irritant with no permanent damage to the eye tissues.

If Pydraul A-200 is splashed or sprayed into the eyes, wash thoroughly, with water. To relieve irritation, physicians have used 1% pontocaine solution as well as the opthalmic cortisone acetate solution.

Pydraul A-200 can be stored at sub-zero temperatures without damage to the fluid. Just allow A-200 to warm to room temperature, and use.

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