SELECTOR

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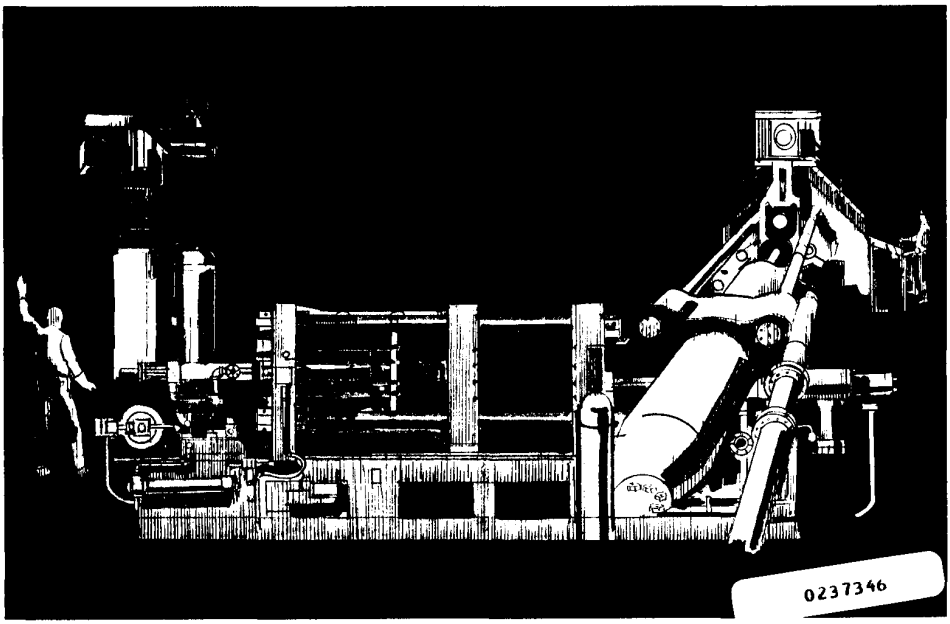
PYDRAUL®

Fire-Resistant Hydraulic Fluid

A guide to selecting the correct Pydraul fluid for hydraulic systems. O/FF-3

Monsanto



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PYDRAUL® fluids

Development

Fire protection for industrial hydraulic operations began with Pydraul in 1951. Pydraul fluids have since provided industry with millions of machine hours of safe operation. Pydraul fluid has never caused a fire—not even when sprayed from broken high pressure hydraulic lines onto white-hot surfaces.

New ways are continuously being explored to improve the excellent performance records of Pydraul fluids. From the first Pydraul fluid, (Pydraul F-9) the family has grown to a dozen-plus specially tailored, fire-resistant safety fluids. Each answers a major but specific hydraulic fluid need for industrial use. In addition to guarding against fire, each Pydraul fluid lubricates as well as premium grade oil. Pydraul fluids have answered the need of virtually every industrial hydraulic operation, indoors and out—from the sub-zero, outdoor hydraulic lift operations for refineries and blast furnaces to the low-viscosity fluid demands of high-speed, precision machine tools.

Performance

Pydraul fluids offer a wide range of viscosities from which you can select the proper range specified by your hydraulic equipment manufacturer. Whichever Pydraul fluid you select, each provides the same protection against fire, premium lubricity, ease of maintenance, and freedom from corrosive action and foam. Pydraul hydraulic fluids also offer several additional benefits—

REDUCED FIRE INSURANCE RATES

Pydraul eliminates fire hazards from hydraulic operations, reduces fire threats to surrounding structure and equipment. Insurance premiums for plants using Pydraul are often lower than premiums for operations using petroleum oil.

LONGER PUMP LIFE

Machines which operate on water-based fluids frequently require pump repair or replacement as often as every two or three months. Machines which use Pydraul hydraulic fluids can operate on the same pump for several years. Pydraul hydraulic fluids give the same long pump life as the finest grade petroleum oil.

NO CORROSION PROBLEMS

Any metal hydraulic system component in contact with Pydraul will not rust. Pydraul hydraulic fluids do not lose anti-rust properties even after extended use.

MAXIMUM EQUIPMENT RESPONSE

Pydraul never produces excessive froth or foam during normal operations to interfere with hydraulic equipment response. Because Pydraul hydraulic fluids lubricate as well as premium petroleum oils, Pydraul permits equipment to operate at optimum response capability.

INSPECTION AND REPLACEMENT DOWN-TIME ARE VIRTUALLY ELIMINATED

Pydraul hydraulic fluids are designed to be permanent. Pydraul fluids do not wear out. Except for normal "make-up" requirements, you never have to add new Pydraul to hydraulic systems. Pydraul eliminates "drain and change" periods; it does not have to be inspected in your system from month to month—or replaced from year to year.

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PYDRAUL® Selector One

	PYDRAUL F-9	PYDRAUL A-200
PHYSICAL PROPERTIES		
Appearance	Cloudy Blue Liquid	Cloudy Blue Liquid
Spec. Gravity 25°/25°C.	1.280—1.295	1.415—1.430
Neutralization No. (acidity) (mg KOH/gm) max.	0.10—0.35	0.80—1.10
Moisture (max.)	0.20%	0.05%
VISCOSITY		
Centistokes @ 100°F.	43 to 53 cs	30.0 to 33.0 cs
@ 210°F.	5.0 to 5.8 cs	2.8 to 3.0 cs
Saybolts as @ 100°F.	225 SSU	144 SSU
measured: 210°F.	43.3 SSU	35.7 SSU
"Absolute Saybolts" @ 100°F.	327 SSU	204 SSU
(SSU x Density) 210°F.	52 SSU	48 SSU
Pour Point	−5°F.	+15°F.
Compressibility x 10^{-6} sq. in./lb.	2.58	2.28
Bulk Temperature Max. (for continuous operation)	225°F.	250°F.
Boiling Point °F at 760 mm Hg.	664°F.	620°F.
Coefficient of Thermal Expansion per °F.	0.00041	0.00040
Specific Heat BTU/lb./°F. @ 77°F.	0.32	0.28
Thermal Conductivity BTU/hr./ft./°F.	0.067	0.068
Vapor Pressure Hg @ 200°F.	0.1mm	0.2mm
Bulk Modulus (Room Temp. 1000-6000 psi)	387,000	438,000
Solubility in Water	Negligible	Negligible
FIRE RESISTANCE TEST		
High Pressure Spray Test (AMS-3150C and Federal Test Method Std. 791) Test fluid sprayed at 1000 psi through orifice, passing through flame of oxyacetylene torch, 6000°F.	Does not flash or ignite up to 3½ feet from orifice.	Does not flash or ignite up to 3½ feet from orifice.
Low Pressure Spray Test (AMS-3150C). Test fluid sprayed at low pressure over ignited, oil-soaked rag to determine degree of increase in flame intensity.	No increase in flame intensity.	Slight increase in flame intensity.
Hot Manifold Test (Federal Test Method Std. 791). Test fluid dripped on at 1300°F.	Does not flash or burn.	Does not flash or burn.
Molten Metal Ignition Test. Test fluid exposed to the surface of aluminum alloy at 1200°F., to test for spontaneous ignition.	Does not ignite: flashes by spark.	Does not ignite.

Fire-resistance Advantages of Pydraul

Pydraul fluids protect hydraulic equipment and personnel with *permanent* fire protection. Pydraul fluids contain no water to evaporate and leave a flammable residue. During their millions of hours of machine use, Pydraul fluids have been accidentally sprayed over molten metal, through electrical arcs, into flames and sparks—without causing fire. Pydraul fluids have never caused or contributed to a hydraulic fire in any type of equipment. They pass all of the important ignition tests for fire-resistance.

Monsanto introduced Pydraul F-9 as industry's first straight synthetic, fire-resistant hydraulic fluid. Pydraul F-9 rapidly became the standard against which all other synthetic hydraulic fluids were judged. Today, it is still considered the basis for comparison. Pydraul F-9 is used in every major type of diecasting machine and a wide variety of other equipment found in the metal-working, glass, and process industries. No other fire-resistant hydraulic fluid has more on-the-line *proven* performance to offer. Pydraul F-9 is listed by Underwriters Laboratories for use in hazardous hydraulic applications. It is also approved by Factory Mutual and U.S. Bureau of mines.

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

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 other straight synthetic fluids. Pydraul A-200 is approved by Factory Mutual.

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PYDRAUL 280	PYDRAUL 625	PYDRAUL 150	PYDRAUL 60
Cloudy Blue Liquid	Cloudy Blue Liquid	Cloudy Blue Liquid	Cloudy Blue Liquid
1.385—1.405	1.360—1.400	1.120—1.131	1.088—1.091
0.2—0.5	0.30	0.17	0.25
0.15%	0.15%	0.10%	0.10%
56 to 62 cs 3.9 to 4.1 cs 274 SSU 39.1 SSU 382 SSU 54.5 SSU	125 to 145 cs 5.7 to 6.2 cs 625.7 SSU 45.9 SSU 845 SSU 59 SSU	29 to 34 cs 6.9 to 8.1 cs 145.9 SSU 52.9 SSU 163 SSU 56 SSU	9.6 to 10.4 cs 2.3 to 2.5 cs 60 SSU 35 SSU 60.5 SSU 35 SSU
+20°F.	+30°F.	−55°F.	−70°F.
2.47	2.66	3.13	3.05
225°F.	225°F.	150°F.	175°F.
671°F.	724°F.	617°F.	707°F.
0.00040	0.00040	0.00042	0.00044
0.28	0.28	0.40	0.42
0.066	0.065	0.072	0.047
0.15mm	0.09mm	0.1mm	0.01mm
406,000	375,000	319,000	328,000
Negligible	Negligible	Negligible	Negligible
Does not flash or ignite up to 3½ feet from orifice.	Does not flash or ignite up to 3½ feet from orifice.	Self-extinguishing.	Self-extinguishing.
Very slight increase in flame intensity.	Very slight increase in flame intensity.	Slight increase in flame intensity.	Slight increase in flame intensity.
Does not flash or burn.	Does not flash or burn.	Intermittent flashing and burning. Little burning in pan below.	Intermittent flashing and burning. Does not burn after leaving tube.
Does not ignite.	Does not ignite.	Does not ignite.	Does not ignite.
Pydraul 280 is a shear stable, higher viscosity medium range safety fluid. Developed specifically for hydraulic clutches in German coal mines, Pydraul 280 has proved successful in a variety of hydraulic applications including diecasting machines and automatic welders. Blended to provide a fluid with a viscosity range between Pydraul A-200 and Pydraul 625, Pydraul 280 is now performance-proved with qualities equal to those of the long accepted Pydraul fluids. Pydraul 280 is approved by Factory Mutual.	High viscosity Pydraul 625 is tailored for ultra-heavy-duty hydraulic operations, such as for large industrial presses and pumps. Pydraul 625 is also used as a fire-and-explosion-resistant air compressor lubricant. Pydraul 625 can be used in any equipment requiring an 800 to 1000 SSU oil. Pydraul 625 has all the good performance characteristics which have won Pydraul fluids the reputation of quality and dependability throughout industry. In years of industrial field use, Pydraul 625 has proved to be a top-grade lubricant. Pydraul 625 is approved by Factory mutual.	Pydraul 150 is used in hydraulic systems to control fuel-to-air ratios for blast furnaces, soaking pits, and other similar related equipment. Although developed especially for severe cold-weather, outdoor operations, Pydraul 150 is also used for certain missile-launch projects and in gears of LOX pumps located in oxygen-rich atmospheres at missile-fueling sites. Pydraul 150 also performs as an excellent low-viscosity fluid for high-speed machine tools.	Low viscosity Pydraul 60 flows freely at −20°F. It retains its properties and thermal stability at temperatures up to 200° F. In hydraulic operations that require precision flow *instantly*, Pydraul 60 supplies smooth operation from machine start to stop; it offers flow-on-demand operation without hydraulic lag. Pydraul 60 offers excellent, fire-resistant, hydraulic operation with vane, gear and piston pumps in high-speed machine tools.

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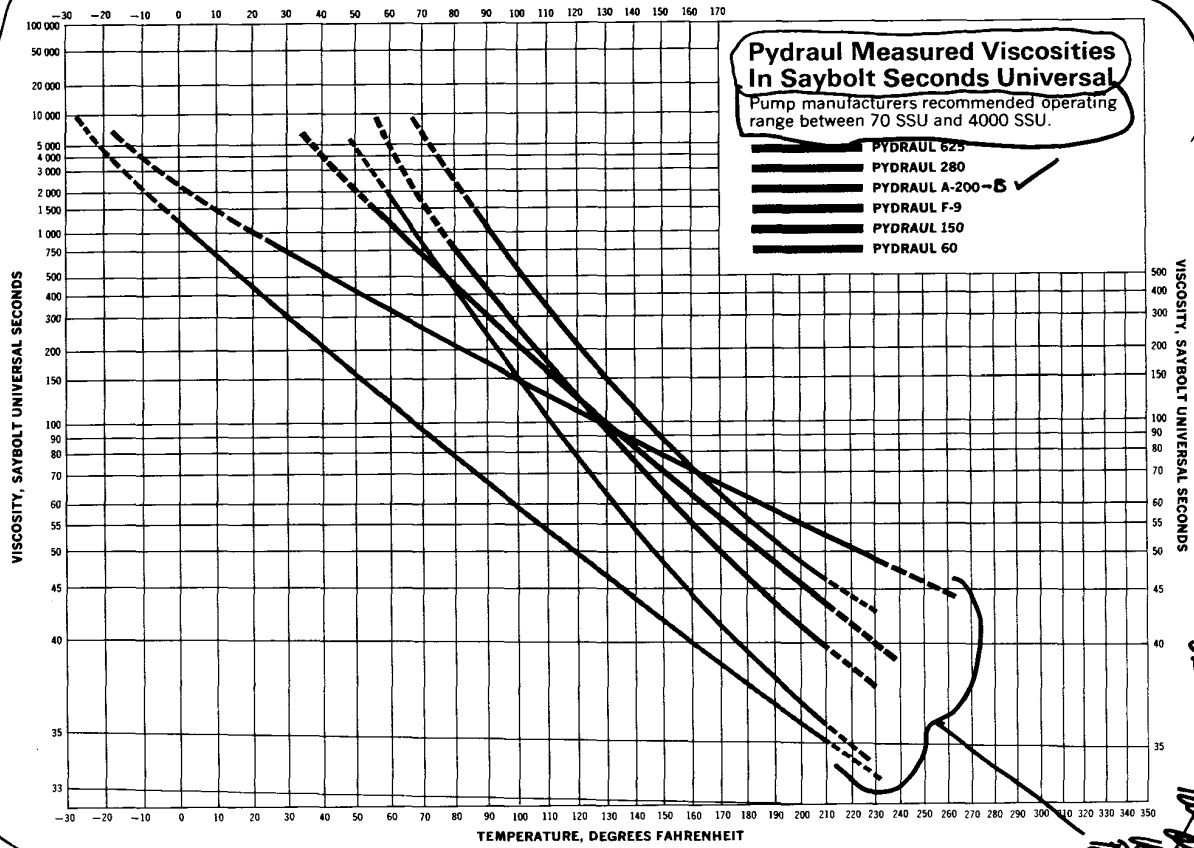

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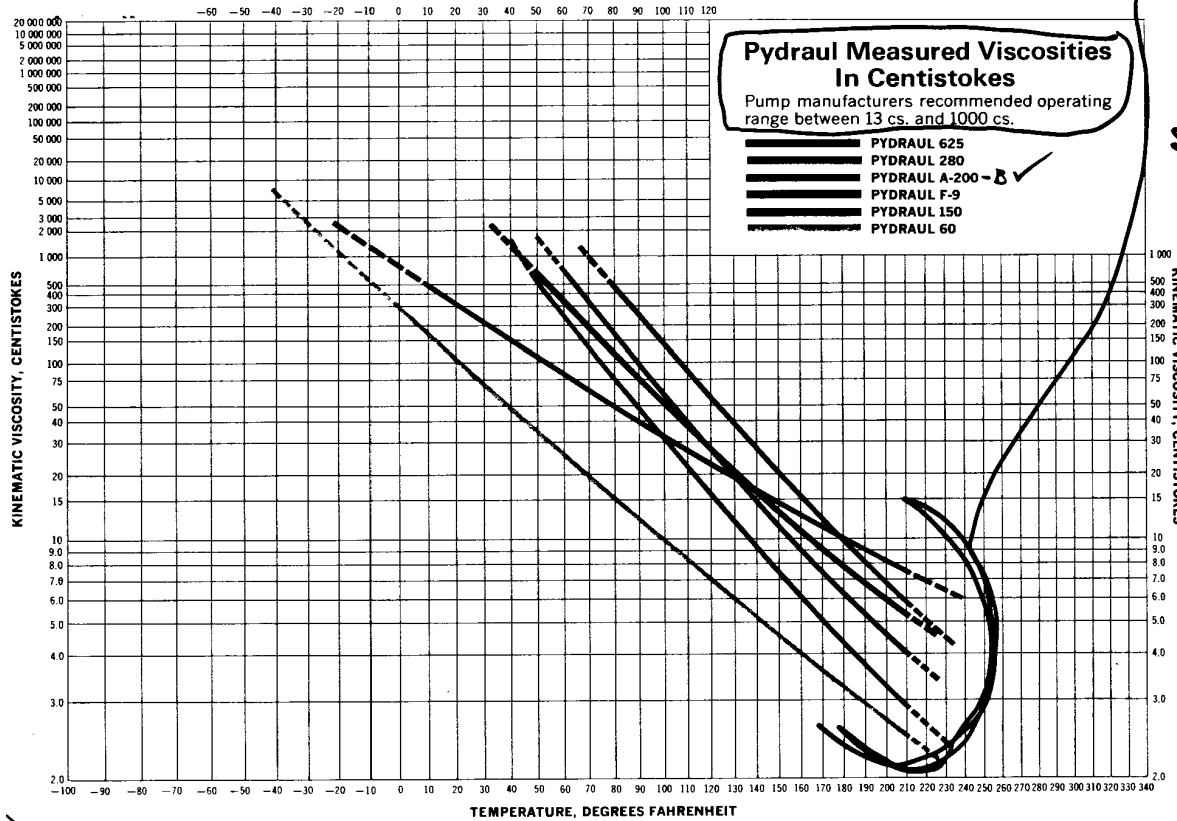

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Pydraul Lubrication Properties

Pydraul fluids lubricate as well as premium petroleum oil. Because of this premium lubricity, Pydraul fluids give the same long pump life as premium petroleum oil. Equipment responds at its optimum capability. And Pydraul fluids are designed to be permanent—they never evaporate or wear out.

	PYDRAUL F-9	PYDRAUL 60	PYDRAUL 150	PYDRAUL A-200	PYDRAUL 280	PYDRAUL 625
Timken Load (Passing)	50 lbs. 17,500 psi	14 lbs. 7,400 psi	40 lbs. 18,200 psi	50 lbs. 16,300 psi	53 lbs. 19,800 psi	55 lbs. 21,200 psi
Almen Wear	2.0 mg@ 4,000 psi	——	3.9 mg@ 4,000 psi	1.3 mg@ 4,000 psi	1.7 mg@ 4,000 psi	2.2 mg@ 4,000 psi
Almen Load	43 lbs. 25,000 psi	48 lbs. 25,000 psi	46 lbs. 23,000 psi	44 lbs. 24,000 psi	47 lbs. 23,500 psi	50 lbs. 23,000 psi
Falex Load—Jaw Load—Lbs.	4100	2300	2000	4200	4100	4100
—Torque—lb. inches	93	73	64	90	87	89
Falex Wear (Under continuous load @ 100 lbs., loss in inches)						
1st 10 minutes	0.000428	0.000475	0.000428	0.000380	0.000490	0.000618
2nd 10 minutes	0.000190	0.000380	0.000332	0.000380	0.000356	0.000332
Shell Four-Ball Wear (167°F. 1 hr., 630 rpm, mm scar) Steel on Steel						
10 kg.	0.28	0.27	0.36	0.29	0.25	0.26
40 kg.	0.67	0.48	0.51	0.43	0.52	0.62
Steel on Bronze						
10 kg.	1.18	0.82	0.80	1.40	1.25	1.10
40 kg.	1.28	2.35	1.58	1.70	1.44	1.19
Pump Test—Vickers (V-105-E, 140°F. 1000 hrs.)						
Ring, grams (loss or gain)	−0.0084	−0.0037	−0.1212	−0.0848		−0.0013
Vanes, grams (loss or gain)	−0.0011	−0.1859	−0.0378	−0.0191		−0.0015
Bushing 2015 grams (loss or gain)	+0.0120	+0.0008	−0.1601	−0.0151		−0.0045
Bushing 2016 grams (loss or gain)	−0.0063	−0.0020	−0.1134	−0.0217		−0.0050

Mixing Compatibilty

PYDRAUL WITH OTHER HYDRAULIC FLUIDS

	F9	60	150	A-200	312*	280	625
FYRQUEL (Formerly Cellulube)							
90	NO	YES	NO	YES	NO	YES	YES
150	NO	YES	NO	YES	NO	YES	YES
220	NO	YES	NO	YES	NO	YES	YES
300	NO	YES	NO	YES	NO	YES	YES
550	NO	YES	NO	YES	NO	YES	YES
HOUGHTO-SAFE							
1010	NO	YES	NO	YES	NO	YES	YES
1055	NO	YES	NO	YES	NO	YES	YES
1120	NO	YES	NO	YES	NO	YES	YES
1130	NO	YES	NO	YES	NO	YES	YES

PYDRAUL WITH OTHER PYDRAUL FLUIDS

	F9	60	150	A-200	312*	280	625
F9	—	NO	YES	YES	YES	YES	YES
60	NO	—	NO	YES	NO	YES	YES
150	YES	NO	—	YES	YES	YES	YES
A-200	YES	YES	YES	—	YES	YES	YES
312	YES	NO	YES	YES	—	YES	YES
280	YES	YES	YES	YES	YES	—	YES
625	YES	YES	YES	YES	YES	YES	—

WATER-GLYCOL and **WATER-OIL EMULSION** Fluids—Pydraul hydraulic fluids are not compatible with these fluids.

*Pydraul 312 is one of a family of new low-cost synthetic base Pydraul fire-resistant fluids characterized by high performance and low cost. The other fluids in this family have the same compatibility as Pydraul 312 with other hydraulic fluids and with other Pydraul fluids. The new Pydraul fluids include: Pydraul 90, Pydraul 135, Pydraul 230, Pydraul 312, Pydraul 540.

0 −10 −20 −30

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Converting to PYDRAUL is Easy

Regardless of the type hydraulic fluid being used, converting a system to low-cost Pydraul fluids is easy. Virtually every type of equipment which uses fire-resistant hydraulic fluid has been converted to Pydraul fluids. Most equipment manufacturers are experienced in Pydraul fluid conversions and should be consulted.

If changing seals is necessary, equipment manufacturers can recommend what seals to change, and many carry a supply of correct seals. Laboratory tests and operational experience show Viton*, Teflon*, and silicone the preferred elastomers for compatible seals. For moderate temperatures (below 140°F) butyl seals, hose, etc. are usually acceptable. Nylon and Teflon are satisfactory for higher temperatures.

To replace other fluids which are compatible with Pydraul and where compatible seals are in the system, it is only necessary to add Pydraul as make-up fluid. It is not necessary to drain or clean. When converting from petroleum oils, non-compatible synthetic fluids, water-glycol fluids, or water-in-oil emulsions, the following steps are recommended. These conform to USA Standard B93.5—1966. For best seal performance, make your future seal selection according to recommendations on page 8 in this booklet.

Please ask the Monsanto fluids specialist for recommendations and assistance, or telephone our technical specialists in St. Louis directly (314) 694-2500.

Change-Over Procedures

CHANGING FROM PETROLEUM OIL

1. Completely drain and clean the system. Small amounts of oil will not interfere with the performance of Pydraul, but resistance to fire is reduced by the amount of oil left in the system.
2. Drain and blow out pipelines. Manually clean valves and reservoirs.
3. Open or remove and drain valves. Replace gaskets, packings, and seals with those compatible with Pydraul. It is particularly important to change dynamic seals. Static seals do not necessarily have to be changed if they are not leaking. Non-compatible static seals will have to be replaced when the part is disassembled for maintenance.
4. Remove pumps, accumulators, and cylinders, if necessary, for draining. Replace packings, seals, gaskets, and bladders with those compatible with Pydraul.
5. Check component functions before the system is closed and fluid is added.
6. If your system cannot be completely drained, you may have to flush it with a small amount of Pydraul.

CHANGING FROM WATER-GLYCOL OR WATER-IN-OIL EMULSION

1. Drain and clean system thoroughly. Remove all traces of water. Empty all lines and low points or dead pockets in components.
2. Clean with steam or warm water. Follow by blowing with dry air.
3. Check sealing materials, hoses, and accumulator bags. Replace if necessary with compatible materials.
4. Install a minimum charge of Pydraul and operate the system from 16 to 24 hours. During this period, inspect the reservoir. If water or other contaminants float to the top, skim them off.
5. Drain the flushing charge immediately after shut-down while the fluid is warm. Drain all isolated points or parts which do not drain back to the reservoir. If water is apparent in fluid clinging to walls, wipe down all accessible parts.

CHANGING FROM PHOSPHATE ESTERS (OTHER THAN PYDRAUL)

1. Drain the system completely.
2. Cleaning is unnecessary.
3. Generally, seal changes are unnecessary at the time of conversion, but installation of compatible seals is recommended during routine maintenance.

*Registered trademark of E. I. Du Pont de Nemours & Co., Inc.

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Seals and Packings Information

Materials compatible with Pydraul hydraulic fluid are necessary for dynamic or moving seals. For static seals they are preferred, but not essential. The following table indicates materials recommended, depending on the Pydraul fluid selected.

PYDRAUL FLUID	BUTYL	EPR	VITON	SILICONE	BUNA N	NEOPRENE	NATURAL RUBBER
A-200	M	M	R	R	U	U	U
F-9	S	S	R	R	U	U	U
150	R	R	S	R	U	U	U
625	S	S	R	R	U	U	U
280	S	S	R	R	U	U	U
60	R	R	U	S	U	U	U

R—Recommended S—Satisfactory M—Marginal U—Unsatisfactory

This list of component manufacturers is a guide to obtaining seals compatible with Pydraul fluids. Please contact your equipment manufacturer or seal supplier for their most current recommendations.

Acushnet Process Company
776 Belleville Avenue
New Bedford, Massachusetts 02745

Anchor Packing Company
401 North Broad Street
Philadelphia, Pennsylvania 19108

Bearings, Inc.
3634 Euclid Avenue
Cleveland, Ohio 44115

A. W. Chesterton Company
Everett
Massachusetts 02149

Chicago Rawhide Manufacturing Company
1311 Elston Avenue
Chicago, Illinois 60622

C. E. Conover & Company, Inc.
333 Passaic Avenue
Fairfield, New Jersey 07006

Crane Packing Company
6400 Dakton Street
Morton Grove, Illinois 60053

Garlock Packing Company
Palmyra
New York 14522

Goshen Rubber Company, Inc.
P. O. Box 416
Goshen, Indiana 46526

Greene, Tweed & Company
North Wales
Pennsylvania 19454

Hercules Packing Corporation
11061 Walden Road
Alden, New York 14004

International Packing Corporation
Bristol
New Hampshire 03104

Johns-Manville
22 East 40th Street
New York, New York 10016

C. W. Marsh Company
36 Hudson Street
Muskegon, Michigan 49441

Minnesota Rubber Company
3630 Wooddale Avenue
Minneapolis, Minnesota 55416

Parker Seal Company
10567 Jefferson Boulevard
Culver City, California 90230

Plastic & Rubber Engineering, Inc.
756 East Florence Avenue
Los Angeles, California 90001

Plastic & Rubber Products Company
2100 Hyde Park Boulevard
Los Angeles, California 90047

Precision Rubber Products Corporation
Hartmann Drive
Lebanon, Tennessee 37087

Raybestos-Manhattan, Inc.
Packing Division
Passaic, New Jersey

Reliable Rubber Products
Eddyington
Pennsylvania 19020

Rockwell Mechanical Packing Company, Inc.
1634 Long Beach Avenue
Los Angeles, California 90021

W. S. Shamban Company
11617 West Jefferson Boulevard
Culver City, California 90230

Vellumoid Company
Rockdale Street and Beaman Avenue
Worchester, Massachusetts 01606

The James Walker Packing Company, Inc.
P. O. Box 75
Chicago Heights, Illinois 60411

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Filters and Hoses

FILTERS/Most standard oil filters are satisfactory. You can use active earth or clay types. Filter manufacturers include:

Briggs Filtration Division
Bowser Corporation
Cookeville, Tennessee

Capital Engineering Company
5839 Ashland Avenue
Chicago, Illinois

Commercial Filters Corporation
(Honan-Crane)
Lebanon, Indiana

Cuno Engineering Corporation
Sub. of American Machine
& Foundry
4627 S. Vine Street
Meriden, Connecticut

Dollinger Corporation
20 Centre Park
Rochester 3, New York

Fulflo Specialties Company, Inc.
410 Fancy Avenue
Blanchester, Ohio

Hilliard Corporation
98 W. Fourth Street
Elmira, New York

Marvel Engineering Company
7227 North Hamlin Avenue
Chicago 45, Illinois

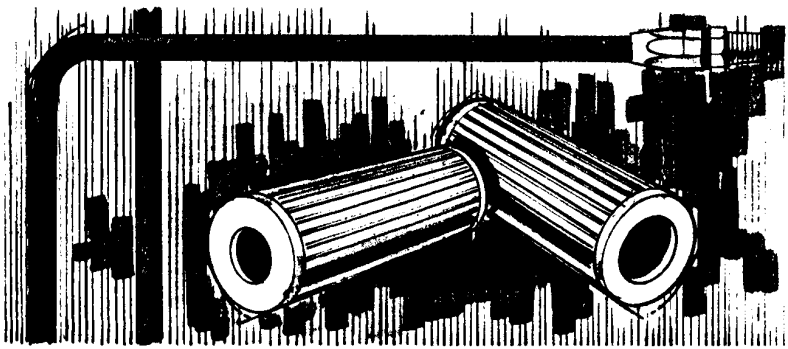
Pall Corporation
32 Sea Cliff Avenue
Glen Cove, L. I., New York

Purolator Products
1000 New Brunswick Avenue
Rahway, New Jersey

Rosaen Filter Corporation
1776 E. Nine Mile Road
Hazel Park, Michigan

Schroeder Bros. Corporation
101 Nichol Avenue
McKees Rocks, Pennsylvania

Serfilco Division
Service Filtration Corporation
7408 North Milwaukee
Niles, Illinois 60648



HOSES/Although both neoprene and buna elastomers swell somewhat in Pydraul, hose of these materials have given satisfactory service when made of a reinforced braid construction. Butyl, nylon or Viton are preferred when new hoses are installed. Suppliers include:

Anchor Coupling Company
3600 N. Fourth Street
Libertyville, Illinois

Eastman Mfg. Company
(See Imperial-Eastman Corp.)
Department T. R.
6300 West Howard Street
Chicago 48, Illinois

Electric Hose & Rubber Co.
1201 Duro Street
Wilmington, Delaware

Gates Rubber Company
999 South Broadway
Denver, Colorado 80217

Imperial Eastman Corp.
6300 W. Howard Street
Chicago, Illinois

Lewis Products
Hohenwald, Tennessee 38462

Samuel Moore Co.
Mantua, Ohio

Resistoflex Corp.
Roseland, New Jersey

Stratoflex, Inc.
222 Roberts Cutoff Rd.
Fort Worth, Texas

Weatherhead Corp.
302 E. 131st Street
Cleveland, Ohio 44108

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Other Components

SWIVEL COUPLINGS

Systems for Pydraul fluids often contain swivel couplings. Some suppliers are:

Chiksan Division
FMC Corporation
332 N. Brea Boulevard
Brea, California

PIPE JOINT SEALERS

. . . can be bought from:

American Sealants Company
(See Loctite Corporation)
115 N. Mountain Road
Hartford 11, Connecticut

Crane Packing Company
6410 Oakton Street
Morton Grove, Illinois

Dow Corning Corporation
Midland, Michigan

Friesland Plastics Company
Friesland, Wisconsin

General Electric Company
Insulating Materials Department
1 Campbell Road
Schenectady 6, New York

Permatex Company
Department T. R.
Flagler Court Building
West Palm Beach, Florida

W. S. Shamban & Company
11617 W. Jefferson Boulevard
Culver City, California

Shell Chemical Company
110 W. 51st Street
New York, New York

ACCUMULATORS

. . . many hydraulic systems for Pydraul contain an accumulator which uses a bladder to separate the fluid from air or nitrogen pressure. For these, a rubber compatible with the fluid is necessary. Suppliers include:

Greer Hydraulics, Inc.
5930 W. Jefferson Boulevard
Los Angeles, California

PAINTS

. . . resistant to Pydraul are supplied by:

Amercoat Corporation
Department T
Brea, California

Andrew Brown Paint Company
5413 S. District Boulevard
Los Angeles, California

Carboline Company
32-R Hanley Industrial Court
St. Louis, Missouri

Carrol Products
148 Marine Street
Farmingdale, New York

Finch Paint & Chemical Company
Torrence, California

W. P. Fuller & Company
1645 W. Valencia Drive
Fullerton, California

The Glidden Company
900 Union Commerce Building
Cleveland, Ohio

Interchemical Corporation
Finishes Division
1255-T Broad Street
Clifton, New Jersey

Lowe Brothers Company
Third & Madison Streets
Dayton, Ohio

Magna Coatings & Chemical Corporation
1785 N. Eastern Avenue
Los Angeles, California

Nycote Laboratories
15002 Delano Street
Van Nuys, California

Pittsburgh Plate Glass Company
One Gateway Center
Pittsburgh 22, Pennsylvania

Rinshed-Mason Company
5935 Milford
Detroit, Michigan

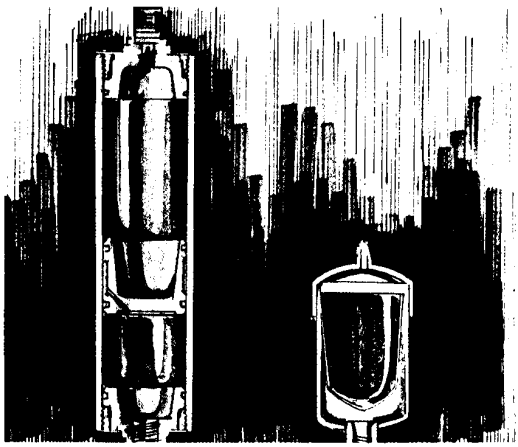
Royalty Paint & Varnish Company
Pasadena, California

Saran Protective Coatings Company
2415 Burdette at Reed
Ferndale, Michigan

Sherwin-Williams Company
101 Prospect Avenue, N. W.
Cleveland, Ohio

Titanine, Inc.
Seagrave Corporation
Elmwood & Morris Avenues
Union, New Jersey

U. S. Paint, Lacquer & Chemical Company
2101 Singleton
St. Louis, Missouri



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DISTRICT SALES OFFICES ALL DIVISIONS

ATLANTA, GEORGIA 30326
Lenox Towers East
3400 Peachtree Rd. N. E.—Suite 1711
Tel. (404) 577-2260

BOSTON, MASSACHUSETTS 02149
Everett Station
Tel. (617) 387-5010

CHICAGO, ILLINOIS
3158 Des Plaines Ave.
Des Plaines, Illinois 60018
Tel. (312) 296-6688

CINCINNATI, OHIO 45206
1501 Madison Road
Tel. (513) 751-6707

CLEVELAND, OHIO 44122
3645 Warrensville Center Rd.
Tel. (216) 991-5400

DETROIT, MICHIGAN 48235
500 Northland Towers East
Tel. (313) 357-0910

HONOLULU, HAWAII 96812
205 Pacific International Bldg.
677 Ala Moana Blvd., P. O. Box 3824
Tel. (808) 512-744

HOUSTON, TEXAS 77002
1300 Main Street
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