HYDRAULIC POWER UNIT SERVICE & PARTS MANUAL

SKILL AND QUALITY GO INTO EVERY POLYPAC® SYSTEM

MANUFACTURED BY:

CONTINENTAL HYDRAULICS

® POLYPAC® SYSTEMS CENTER

5505 West 123rd St. Savage, MN 55378
www.continentalhydraulics.com

ISO 9001
REGISTERED QUALITY SYSTEM

POLYPAC SYSTEMS CENTER
MAINTENANCE MANUAL INFORMATION SHEET

PSC DISTRIBUTOR:

CUSTOMER:

DISTRIBUTOR PO:

CUSTOMER PO:

ITEM NO:

ASSEMBLY DRAWING #:
HYDRAULIC SCHEMATIC DRAWING #:
ELECTRICAL SCHEMATIC DRAWING #:

PSC ORDER #:

MODEL CODE:

PUMP #1:

PUMP #2:

PUMP #3:

PLEASE CONTACT YOUR LOCAL CONTINENTAL HYDRAULICS DISTRIBUTOR FOR SALES AND SERVICE

CONTINENTAL HYDRAULICS®

POLYPAC® SYSTEMS CENTER

"Points to Consider"

Congratulations! You have received another quality built power unit from one of the largest designer, builder, and supplier of hydraulic power units in the Midwest. There are many points to consider for the successful start-up and operation of a hydraulic power unit. Following are a few points we would like to cover based on our field of experience. Other points should be covered and we will always remain on a stand-by-basis to answer any questions or comments you may have.

Every unit we ship is inspected for circuit integrity and tested at maximum pressure and flow based on electric motor capacity. Any special pump, relief valve settings you have requested have been made and noted on a card attached to the components that was set. **Units shipped without special settings are set at low pressure – around 300 PSI.**

I.

FILL THE RESERVOIR WITH PREMIUM GRADE HYDRAULIC FLUID. RECOMMENDED FLUID VISCOSITY'S ARE AS FOLLOWS:

MAXIMUM SYSTEM PRESSURE	MINIMUM OPERATING VISCOSITY	RECOMMENDED OPERATING VISCOSITY	RECOM. MINIMUM FLUID VISCOSITY RATING
1000 PSI	80 SUS	100-250 SUS	ISO 32 (150 SUS @ 100°F)
1500 PSI	100 SUS	150-250 SUS	ISO 46 (220 SUS @100°F)
2000 PSI	120 SUS	150-250 SUS	ISO 46 (220 SUS @ 100°F)
3000 PSI	120 SUS	150-250 SUS	ISO 46 (220 SUS @ 100°F)

FILL THROUGH A SUITABLE FILTER COMPATIBLE WITH THE FLUID. CHECK THE FLUID CODE ON THE MODEL DESIGNATION FOR YOUR UNIT: **H1** IS HYDRAULIC OIL, **H2** IS WATER-IN OIL EMULSION, **H3** IS PHOSPHATE ESTER, **H4** IS WATER GLYCOL, **H5** IS AUTOMATIC TRANSMISSION FLUID. **IF THE FLUID YOU ARE USING DOES NOT MATCH THE CODE ON THE UNIT, CONTACT YOUR NEAREST CONTINENTAL HYDRAULICS REPRESENTATIVE.**

FOR COLD WEATHER OPERATION, DOWN TO 0° F, AUTOMATIC TRANSMISSION FLUIDS (ATF) DEXTRON II OR TYPE "A" OR TYPE "F" MAY BE USED. HOWEVER, WITH THE ATF FLUIDS IT IS RECOMMENDED THAT THE RESERVOIR TEMPERATURE NOT EXCEED 130°F.

MAINTAIN FLUID LEVEL INDICATED ON THE FLUID LEVEL SIGHT GAUGE. IF YOU HAVE ANY CONCERN ABOUT THE ENVIRONMENT YOUR UNIT IS GOING TO OPERATE IN, IT IS ALWAYS PRUDENT TO CONTACT YOUR LOCAL CONTINENTAL HYDRAULICS REPRESENTATIVE.

II.

Great care has been taken to protect your unit during shipment, however, no one can predict the amount of jarring and shaking that the unit will be subjected to. Therefore, all foot bracket type pump/motor assemblies should be rechecked for alignment prior to initial start-up. This can be accomplished by wiring the motor to a proper electrical source. Check the motor nameplate for correct wiring on dual voltage motors. Jog the motor to check rotation. Polyphase motors are bi-directional and proper rotation can be established by reversing any two power leads.

The electrical characteristics of control valve are shown on their solenoids. Make sure they are wired to a proper matching voltage/cycle source.

CAUTION: **Simultaneously energizing both solenoids on the same double solenoid valve could cause the coils to burn out.**

III.

Pressure Adjustment – Pressure Compensated Pumps

Pressure adjustment should be made when the circuit is in a no flow condition with the electric motor running and after the pump has been primed and "broken in". Pressure compensated pumps will operate at "no flow" conditions without damage. System pressure should be set as low as possible to prevent unnecessary pressure to overcome dynamic pressure drop plus acceleration required to move the load. **NEVER OPERATE ABOVE RATED PRESSURE INDICATED ON THE PUMP NAMEPLATE.**

Fixed displacement pumps should have a relief valve installed as close to the pump outlet as possible. This valve should be set 200-300 PSI higher than the maximum system working pressure. **NOT USING SOME TYPE OF RELIEF OR UNLOADING CIRCUIT WITH A FIXED DISPLACEMENT PUMP COULD BE DANGEROUS AND IS NOT APPROVED BY CONTINENTAL HYDRAULICS.**

All piston pumps and vane pumps operated above 1500 PSI should have a relief valve in their circuit. The relief should be set at a minimum of 100 PSI above operating pressure.

If the unit you received does not contain a relief valve and it is a piston pump unit, or a vane pump unit operating above 1500 PSI, check to see that there is a relief valve elsewhere in the circuit, or contact your nearest Continental Hydraulics Distributor for advice.

IV.

For most industrial applications, an operating temperature of 140°F is considered maximum. The system should be designed so that heat rise at the reservoir does not exceed 40°F above ambient air temperature. At higher temperatures, difficulty is often experienced in maintaining reliable and consistent hydraulic control, component life is reduced, hydraulic fluid deteriorates, and a potential hazard to operating personnel is created.

V.

Maintain operating oil level indicated on the sight gauges. Most foreign material in a system flushes to the reservoir after a few hours of operation permitting its drain, replacement of fluid, and cleaning of the strainer. The strainer should be cleaned a minimum of every 4,000 hours and more often if the unit/actuators are operating in a highly contaminated atmosphere such as a foundry of lumber mill. If the unit is equipped with a pressure/return filter, replace filter elements. These filters are highly recommended to protect components and extend their life. It is best to specify filters with indicators that identify when it is time to change elements.

Pressure gauges should have some type of shut-off so they can shut off when they are not being read. Occasionally the shut-off valve should be opened at atmospheric pressure to exhaust any pressurized fluid between the gauge and valve.

In the event of component malfunction, it is best to contact your local Continental Hydraulics representative for advice about the most economical means of repair.

GOOD PREVENTIVE MAINTENANCE OF ALL COMPONENTS IN YOUR SYSTEM IS STILL THE BEST INSURANCE YOU HAVE FOR MAINTAINING YOUR SYSTEM IN GOOD WORKING ORDER.

UNSCHEDULED DOWNTIME IS MOST OFTEN MORE COSTLY THAN THE TIME IT TAKES TO IMPLEMENT GOOD PREVENTIVE MAINTENANCE PROCEDURES.

We wish you many happy years of operating pleasure with your power unit and look forward to your constructive comments and suggestions about how to continue to improve/upgrade the units we are currently building.

The Employees of **Polypac Systems Center.**

Continental HYDRAULICS®

TECHNICAL bulletin

NO. 10

HYDRAULIC FLUID RECOMMENDATIONS FOR PUMPS

GENERAL

Oil in hydraulic systems performs the dual function of lubrication and transmission of power. It constitutes a vital factor in a hydraulic system and its' careful selection should be made with the assistance of a reputable supplier. The proper selection of oil assures satisfactory life and operation of the system components – with particular emphasis on hydraulic pumps and motors.

Two very important factors to be remembered in the selection of hydraulic fluids are (1) the oil must have rust and oxidation inhibition for satisfactory system operation, and (2) the oil must have proper viscosity to maintain adequate sealing and lubricating quality at the expected operating temperatures.

Also, of major importance to long and trouble–free component and fluid life is – fluid cleanliness. Fluids filtered at nominal 10 micron filtration is the most inexpensive insurance possible for continuous trouble-free operation.

OPERATING SPECIFICATIONS

Fluid Temperatures (pump inlet)

Petroleum	Recommended maximum, 130° F (59° C)
Water-base	Recommended maximum, 120° F (55° C)
Synthetic	Recommended maximum, 130° F (59° C)

Aniline Point for Buna N Elastomers ..... 190°/230° F (88°/110° C) – specified for petroleum base fluids only

Viscosity

Start-up	Maximum, 1000 SUS
At operating temperature	Acceptable, 80 - 400 SUS
Nominal	Recommended, 100 - 250 SUS

The following information on various hydraulic fluids should be used as a guide only. On the last page there is a viscosity versus temperature chart for your use to determine the viscosity of the fluid you choose at your operating temperature.

PETROLEUM FLUIDS – Unimproved Oils

MANUFACTURER	BRAND NAME	VISCOSITY @100° F	VISCOSITY @ 210° F	GRAVITY (° API)	VISCOSITY INDEX	ANILINE POINT
CITGO	PACEMAKER	200	47	30	95	226
AMOCO	INDOIL IND. No. 21	200/210	46	31	95	217
CHEVRON OIL	CHEVRON EP HYD. OIL No. 11	215	48	30	95	217
MOBIL OIL	DTE MEDIUM	225	46	30	95	210/215
TEXACO OIL	RANDO – B	216	47	29.1	97	215
HUMBLE OIL	TERESSTIC 47	221	48	31.5	110	232
UNION 76	UNAX RX 215	215	46	31	100	222
ATLANTIC RICHFIELD	IDEAL D	205	46	32	101	223
GULF OIL	HARMONY 47	205	47	30.6	101	223
SINCLAIR OIL	DURO 200	200			95	219
SHELL OIL	HYDRAULIC No. 29	220	47	31	95	215
	TELLUS No. 29	210	47	31	95	215

PETROLEUM FLUIDS – Improved Oils (MS Oils)

MANUFACTURER	BRAND NAME	VISCOSITY @100° F	VISCOSITY @ 210° F	GRAVITY (° API)	VISCOSITY INDEX	ANILINE POINT
RAMSHEAD	DoALL ESL ANTI-WEAR HYD. OIL	215	48	30.5	95	222
AMOCO	RYKON IND. OIL No. 21	200/210	50	30.3	131	226
	RYKON IND. OIL No. 31	304	59	29.6	132	
MOBIL OIL	DTE 25	225	49	30	95	210/215
	DTE 24	153	44	31	95	210/215
TEXACO OIL	RANDO HD-B	216	48	30	104	222
HUMBLE OIL	NUTO H48	203	48	31.2	105	220
UNION &/	UNAX AW 215	215	48	31	100	222
CONTINENTAL OIL	CONOCO SUPER HYD. OIL No. 21	215	48	31	100	225
SOHIO	INDUSTRON FF48	216	47	28.8	97	216

FDA APPROVED FLUIDS – Under Federal Drug Administration Reg. No. 121.2553

MANUFACTURER	BRAND NAME	VISCOSITY @ 100° F	VISCOSITY @ 150° F	VISCOSITY INDEX	SPECIFIC GRAVITY	MAX. % WATER
UNION CARBIDE	UCON FDC-300	150	44	114	1.12	0.5

FIRE RESISTANT FLUIDS – Phosphate Esters

MANUFACTURER	BRAND NAME	VISCOSITY @ 100° F	VISCOSITY @ 210° F	VISCOSITY INDEX	SPECIFIC GRAVITY	
CELANESE	FYROQUEL 220	223	43	–25	1.13	
HOUGHTON	HOUGHTO–SAFE 1120	230	43	–20	1.13	
MOBIL	PYROGARD 53	220	42.5	0	1.16	
NALCO	FYRE SAFE 1220	220	44	–40	1.25	
SHELL	SFR C	220	42	43	1.14	
MONSANTO	PYDRAUL F-9	@ 200° F 335	52	32	1.28	

FIRE RESISTANT FLUIDS – Chlorinated Hydro-carbon

MANUFACTURER	BRAND NAME	VISCOSITY @ 200° F	VISCOSITY @ 210° F	VISCOSITY INDEX	SPECIFIC GRAVITY	
MONSANTO	PYDRAUL A-230	269	52	–50	1.10	
SHELL	SFR 29	230		–50	1.42	

FIRE RESISTANT FLUIDS – Synthetic/Petroleum

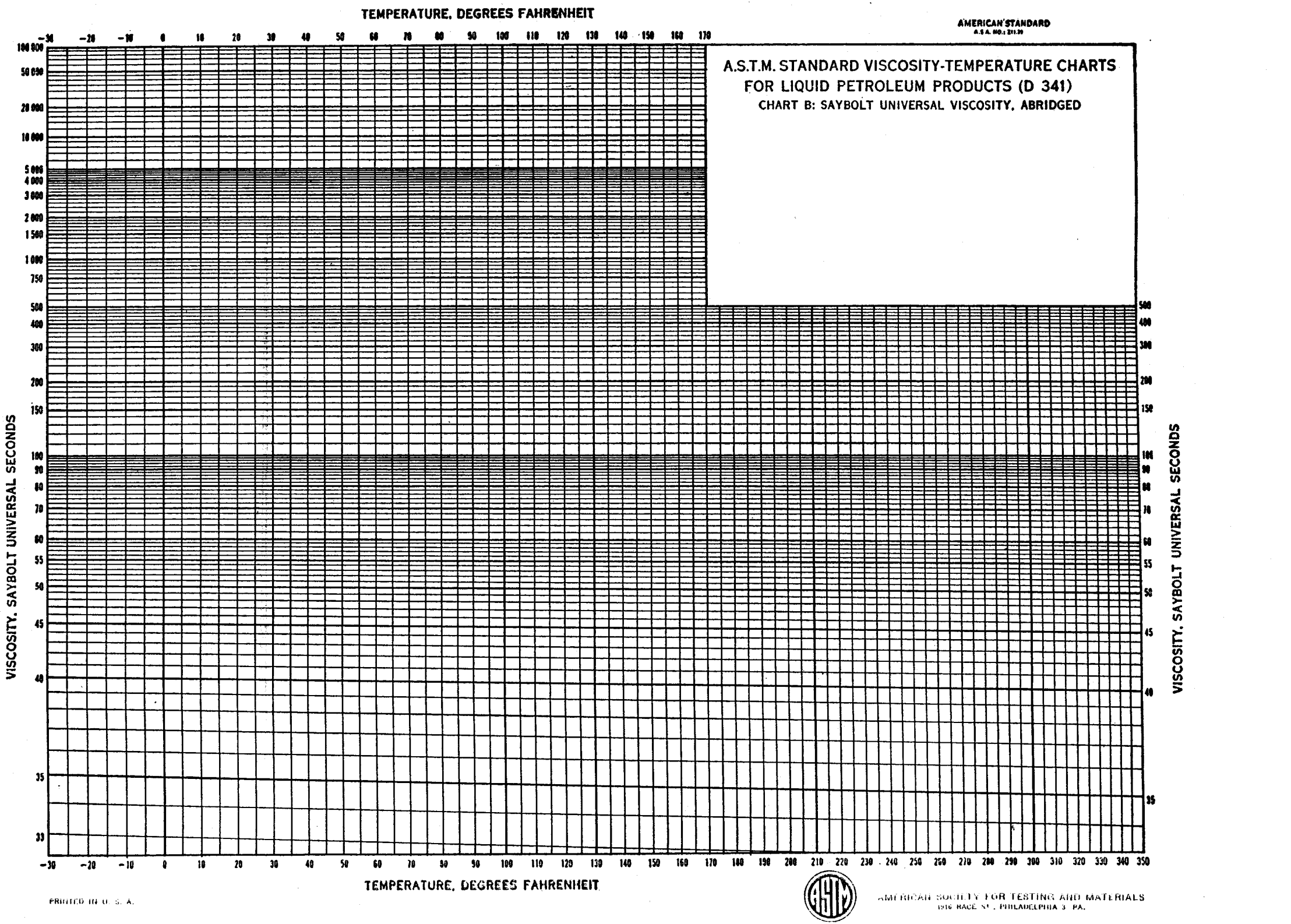
MANUFACTURER	BRAND NAME	VISCOSITY @ 100° F	VISCOSITY @ 210° F	VISCOSITY INDEX	SPECIFIC GRAVITY	
MONSANTO	PYDRAUL 312	338	56	81	1.10	

FIRE RESISTANT FLUIDS – Water Glycol

MANUFACTURER	BRAND NAME	VISCOSITY @ 100° F	VISCOSITY @ 150° F	VISCOSITY INDEX	SPECIFIC GRAVITY	MAX. % WATER
CASTROL	HYSPIN AF-1	250	109	150	1.09	40
HOUGHTON	HOUGHTO–SAFE 620	200	89	164	1.05	38
MOBIL	NYVAC FR200	200	90	160	1.08	42
STUART	DASCO FR-300	300	124	155	.75	40
TEXACO	SAFETY FLUID 200	206	93	161	1.09	40
	SAFETY FLUID 300	314	144	155	1.09	42

FIRE RESISTANT FLUIDS – Water-in-Oil

MANUFACTURER	BRAND NAME	VISCOSITY @ 100° F	VISCOSITY @ 150° F	VISCOSITY INDEX	SPECIFIC GRAVITY	MAX. % WATER
AMERICAN	PERMAMUL	621		140	.95	40
GULF	GULF FR	625			.95	40
HOUGHTON	HOUGHTO–SAFE 5046 W	450	155	130	.95	38
MOBIL	PYROGARD D	450		140	.92	40
SHELL	IRUS 902	450	155	134	.92	40
TEXACO	HYDRAFLUID	384	152	145	.93	40


TEMPERATURE, DEGREES FAHRENHEIT
AMERICAN STANDARD
A.S.A. NO.: Z11.39
A.S.T.M. STANDARD VISCOSITY-TEMPERATURE CHARTS
FOR LIQUID PETROLEUM PRODUCTS (D 341)
CHART B: SAYBOLT UNIVERSAL VISCOSITY, ABRIDGED
VISCOSITY, SAYBOLT UNIVERSAL SECONDS
VISCOSITY, SAYBOLT UNIVERSAL SECONDS
TEMPERATURE, DEGREES FAHRENHEIT
PRINTED IN U. S. A.
AMERICAN SOCIETY FOR TESTING AND MATERIALS
1916 RACE ST., PHILADELPHIA 3, PA.

CONTINENTAL HYDRAULICS

GENERAL TROUBLESHOOTING GUIDE

PUMPS

EXCESSIVE PUMP NOISE:

*Check pump rotation. Direction of rotation must correspond with arrow on the pump case.

*Check fluid level. Surface fluid should be well above the end of the suction line during all of the work cycle.

*Check fluid types. Make sure fluid is a good clean hydraulic fluid with a minimum of 100 SUS viscosity at operating temperature.

*Check coupling alignment. Pump and motor should be aligned within .003 T.I.R.

*Check for air leaks in suction line and case line. Locate by pouring oil or grease around suspect areas while listening for change in the sound of operation. Tighten or repair as required.

*Check for restricted flow in the suction piping. Make sure all piping and fittings are full size throughout. Make sure suction line is not plugged. Avoid excessively long suction lines and elbows.

*Check for restrictions at filter or strainer. Calculate required size and double to allow for partial blocking by contaminates.

*Check for sticking vanes. Remove pump cover and check rotor and vanes for presence of chips, sticky oil or varnish deposits.

*Check pump speed. Speeds above maximum rating are harmful and cause premature failure.

*Check for air or air bubbles in intake line. Make sure reservoir has baffles and return lines terminate below fluid level on the opposite side of the baffle from the intake lines.

SYSTEM EXCESSIVELY HOT:

*Check operating pressure. Reduce pressure to minimum required for installation.

*Check to see if the pump is discharging through relief valve. Remove relief valve. Relief valves are not required with the Continental pumps and they create additional heat.

*Check to see if pump is unloading during idle periods of machine operating cycle. Use an open center valve or dual pressure governor when applicable on machine cycle.

*Check cooling system. Install cooler or increase reservoir capacity.

R0.10 (2-83)
Eng. No. 251860

*Check for **excessive pump slippage.** Tighten bolts on the pump cover.

*Check **case drain return location.** Make sure the drain and suction lines are separated by a baffle in reservoir or that drain is located at a distance practical before fluid re-enters pump.

*Check **progressively through the system components.** Feel components to locate excessively hot ones and repair or replace them.

*Check for **high ambient or radiant temperatures.** Relocate power unit, baffle against heat, or use fan directed against reservoir to increase air flow across the reservoir.

LEAKAGE AT SHAFT SEALS:

*Check for **abrasives on the pump shaft.** Protect shaft from abrasive dust and foreign materials.

*Check for **damage at installation.** Possible scratched or damaged seals. Replace seals, avoiding cuts when passing over keyways.

*Check **coupling alignment.** Pump and motor should be aligned within .003 T.I.R.

*Check for **pressure in pump case.** Inspect case drain for restrictions. Pipe should be full size direct to reservoir. Pressure should not exceed 10 psi.

*Check for **fluid incompatibility.** Fluid aniline point must be 220^{o} F $\pm$ 15^{o} F. Fire resistant fluid may require special seals – convert seals.

BEARING FAILURE:

*Check for **chips or other foreign materials.** Make sure clean fluid is used.

*Check **coupling alignment.** Pump and motor should be aligned within .003 T.I.R.

*Check for **excessive shock loads.** Observe maximum rating of operating pressure, reduce operating pressure.

*Check for **overhung loads.** Overhung loads are not recommended. Continental pumps are not designed to handle overhung loads. Make provisions for outboard bearings to alleviate condition.

*Check for **high operating pressure.** Reduce to maximum pressure at no flow.

*Check for **incorrect fluids.** See data pages for proper fluid codes.

*Check for **possible improper start-up.** See proper pump start-up procedures.

PUMP NOT DELIVERING FLUID:

*Check **pump rotation.** Direction of rotation must correspond with arrow on the pump case.

*Check **fluid level.** Surface fluid should be well above the end of the suction line during all of the work cycle.

*Check minimum pump speed recommendations. To be sure of proper priming characteristics.

*Check for improper pressure adjustment. Turn in pressure adjustment screw two or three turns after spring tension is felt.

*Check for air leaks in suction line. Tighten joints and eliminate any possible place for air to enter system.

*Check fluid viscosity. May be too heavy for proper priming. Check recommendations on pump data page.

*Check maximum volume control. Turn volume control counterclockwise to increase delivery.

*Check for a bleed-off in another portion of the circuit. Look for open center valves or other controls connected directly to tank.

*Check for plugged suction lines. A periodic check should be made as a preventive maintenance procedure.

*Check for excessive pump slippage. Tighten bolts on the pump cover.

*Check for broken pump shaft or rotor. Check for signs of excessive shock, dirt, foreign material or other cause of failure.

*Check for sheared key at the coupling. Replace when required.

LACK OF VOLUME:

*Check maximum volume control. It may be screwed in too far; back out the maximum volume control.

*Check for dirt or chips under the vanes holding the pressure ring on center. Dismantile pump, inspect, and clean up dirt and chips.

PUMP NOT DEVELOPING PRESSURE:

*Check if pump is delivering fluid. See section headed "Pump not delivering fluid".

*Check pressure adjusting screw setting. Adjust pressure screw to obtain desired operating pressure at deadhead.

*Check to see if pressure is being relieved through a relief or bypass valve. Remove relief valve, or set cracking pressure at least 200 psi above pump pressure valve. Relief valves are not required with Continental pumps and they create additional heat.

*Check to see if fluid is bypassing to reservoir. Test the circuit pressure, progressively watching for open center valves and/or other valves open to reservoir.

*Check for sticky pressure ring. Loosen pump cover bolts to prove theory.

PUMP NOT DEVELOPING PRESSURE (cont'd)

*Check to see if pressure gauge line is shut off. Check to see if gauge snubber is open. Install a pressure gauge known to be accurate in a line open to direct pump pressure.

*Check to see if system requires more fluid than pump capacity. Check the pressure at deadhead.

*Check for malfunctioning or broken gauge. Install a new gauge.

OVERLOADING MOTOR:

*Check to see if the motor is properly sized for pressure and volume requirements; review engineering data pages for proper horsepower recommendations.

*Check to see if the pump is by-passing through relief valve; remove the relief valve. Relief valves are not required with Continental pumps and they create additional heat.

*Check to see if there is excessive internal slippage in the pump; tighten the cover bolts on the pump.

*Check to see if the pump is being started with full pressure and volume; use a higher starting torque motor or start pump with valves closed so no fluid will flow.

*Check to see if the motor overload protection is undersized; install a larger capacity unit with a larger heater.

*Check for low voltage; check the voltage input and/or increase to larger wire leads.

*Check the motor wiring for the wrong voltage; Check the motor leads for proper voltage connections.

*Check for internal pump seizure; repair or replace pump.

VALVES

VALVES SPOOL RESPONSE SLUGGISH:

*Check for dirt in the system. Drain and flush system. Disassemble and clean if necessary.

*Check for restricted drain (external drain models only). Check fittings or drain lines.

*Check for low pilot pressure (pilot operated valves only). Check for pilot pressure system.

*Check for malfunctions of the solenoids. Check for proper source and voltage.

*Check for distortion of the valve body. Check flatness of the mounting surface. Align the valve body and piping to remove strain. Loosen mounting bolts.

*Check flow rate through valve. Must be within valve flow limits.

VALVE SPOOL FAILS TO MOVE:

*Check for dirt in the system. Disassemble, clean and flush.

*Check for blocked drain (external drain models only). Inspect for plugs or foreign matter.

*Check to see if the pilot pressure is off. (pilot operated valves only). Check the source of pilot pressure.

*Check to see if the solenoids are inoperative. Check the electrical source and solenoid coils.

*Check distortion of the valve body. Check flatness of the mounting surface. Align the valve body and piping to remove strain. Loosen mounting bolts.

*Check for improper reassembly after repair. Use master parts page and repair pages for proper assembly, parts and procedures.

VALVE PRODUCES AN UNDERSIRED RESPONSE:

*Check for improper installation connections. Check the installation drawings.

*Check for improper assembly of valves. Check master parts pages and installation drawings.

*Check flow rate thru valve.