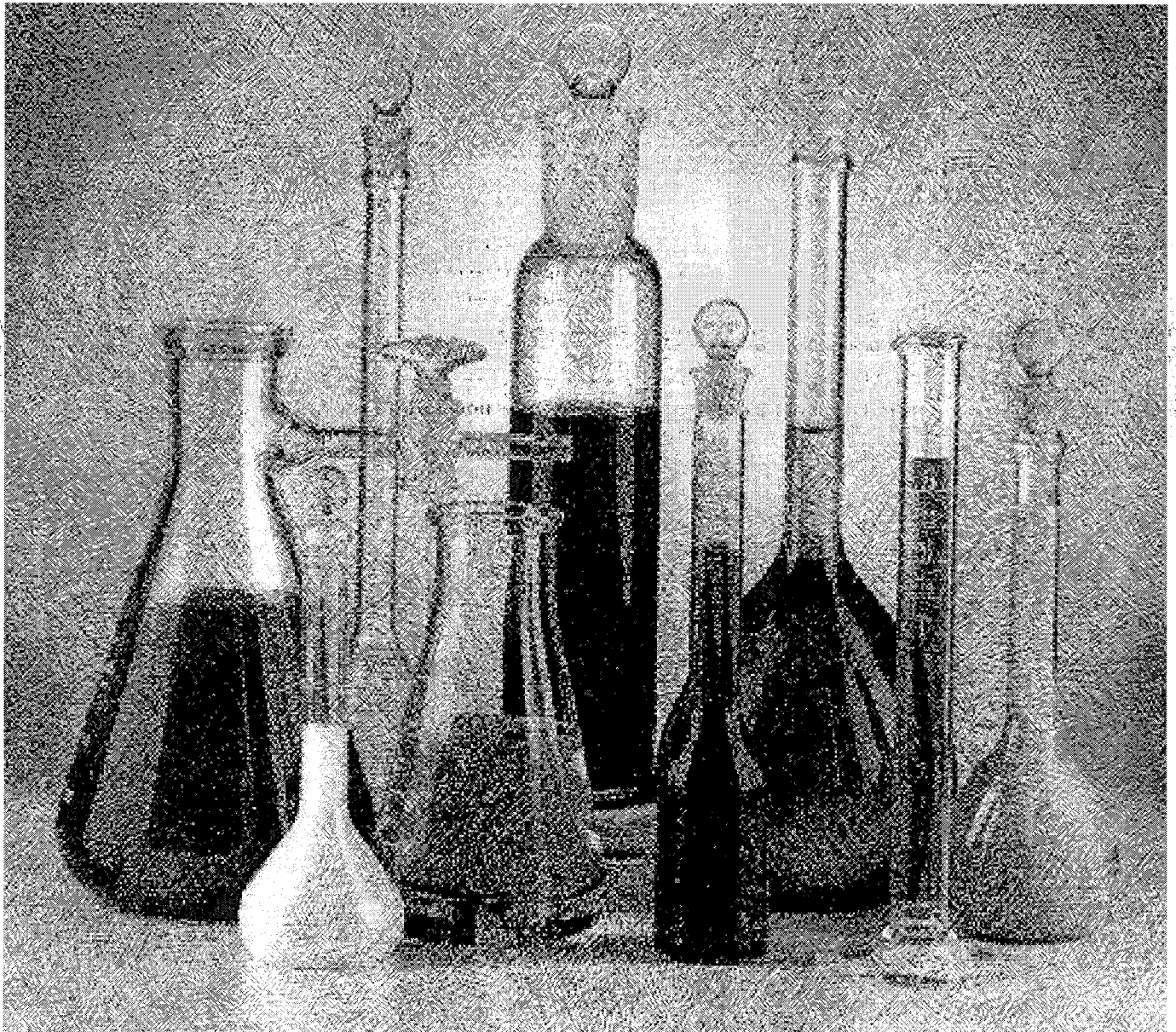




VICKERS

Guide to Alternative Fluids

Petroleum Base, Water Glycol, Invert Emulsion
90-10 HWBF Thickened, Polyolester,
Phosphate Ester, Rapeseed Oil





Alternative Fluids

The use of alternative fluids in industrial hydraulic systems is increasing for many reasons.

- Conservation of oil
- Improved fire resistance or fire protection
- Safety (reduce oil on floor, fumes, etc.)
- Reduced external contamination (food, chemical processes, etc.)
- Environmental concerns (disposition of oil products, fumes, etc.)

Pressure and flow ratings of hydraulic components generally have to be reduced when alternative fluids are used. A different selection of components may also be required, such as a different grade of filter in order to maintain cleaner fluid.

Because hydraulic pumps depend on the pumping fluid for dynamic lubrication, it is necessary to alter the ratings in order to retain the durability and operating life that is expected in today's industrial circuits.

Many hydraulic pumps available on the market today will not express a reduced rating when used with alternative fluids. These products will, however, provide a reduced service life if operated at the rated conditions defined for petroleum oil.

Vickers products will provide exceptional life when used with a good quality clean fluid at the pump ratings specified for that fluid. The characteristics that are expected of a good quality fluid are included in the enclosed Fluid Specifications.

Fluid maintenance is critical to the durability of all hydraulic components, and particularly so with hydraulic pumps. This becomes even more of a factor when alternative fluids are used. All types of alternative fluids require extensive maintenance in order to maintain proper levels of water content, viscosity, acidity and contamination.

"Vickers Guide to Systemic Contamination Control", bulletin 561, provides a thorough explanation of the fluid cleanliness requirements of today's hydraulic systems, and the fluid maintenance methods that will result in the long, trouble-free life that a hydraulic system should provide.

Usage Tips

Using alternative fluids in hydraulic systems requires extra caution in order to maintain long component and circuit life. The following tips will help achieve maximum performance from the hydraulic circuit, while protecting the individual hydraulic components from early erosion or damage.

- 1 Do not exceed the pump ratings for the specified fluid being used.
- 2 Select a good quality fluid from a reputable supplier. Each fluid has specific minimum and/or maximum requirements that must be met in order to provide adequate lubrication and erosion protection to circuit components. Refer to the Fluid Specification chart for the specific requirements for each type of fluid.
- 3 Select hydraulic circuit components that have the same petroleum base fluid rating as the pump. These components will then receive the same reduction in ratings that the pump does, when used with an alternative fluid.
- 4 Always design the circuit with the reservoir oil level sufficiently above the pump inlet (overhead reservoir design) so as to assure a minimum pressure of 0 psig (14.7 psia) at the pump inlet.
- 5 Always design the circuit with sufficient reservoir capacity or sufficient cooling capacity so the specified temperature of the fluid is not exceeded.
- 6 Establish a regular and frequent fluid maintenance schedule to assure that correct water content is maintained, the specified fluid viscosity is not exceeded, the fluid acidity (PH level) remains within limits and the contamination level is within specifications. Refer to the Fluid Specifications chart for the minimum/maximum specifications for the fluid being used.
- 7 It is more difficult to maintain cleanliness requirements with alternative fluids than with petroleum base fluids. Refer to "Vickers Guide to Systemic Contamination Control" bulletin 561 for details.



Vickers Industrial Pump Ratings Petroleum Base and Alternative Fluids

Fluid Type <i>Required Seals</i> Maximum Temp.	Petroleum Base <i>Nitrile</i> 150°F		Water Glycol <i>Nitrile</i> 120°F		Invert Emulsion <i>Nitrile</i> 120°F		90-10 H.W.B.F <i>Thickened Nitrile</i> 120°F		Polyol Ester <i>Fluorocarbon/Nitrile</i> 150°F		Phosphate Ester <i>Fluorocarbon/Nitrile</i> 150°F		Rapeseed Oil <i>Nitrile</i> 150°F	
	Max. Pres. psi	Max. Speed rpm	Max. Pres. psi	Max. Speed rpm	Max. Pres. psi	Max. Speed rpm	Max. Pres. psi	Max. Speed rpm	Max. Pres. psi	Max. Speed rpm	Max. Pres. psi	Max. Speed rpm	Max. Pres. psi	Max. Speed rpm

VANE PUMPS

20V5,8,11 -282	3000	1800	2000	1500	1000	1500	1500	1500	2000	1500	3000	1500	3000	1800
20V5,8,11 -22	3000	1800	2300	1500	1000	1500	1500	1500	2000	1500	3000	1500	3000	1800
20V12 -282	2300	1800	2000	1500	1000	1500	1500	1500	2000	1500	2300	1500	2300	1800
20V12 -22	2300	1800	2300	1500	1000	1500	1500	1500	2000	1500	2300	1500	2300	1800
20V14	2000	1800	2000	1500	1000	1500	1500	1500	2000	1500	2000	1500	2000	1800
25,35,45V -282	2500	1800	2000	1500	1000	1500	1500	1500	2000	1500	2500	1500	2500	1800
25,35,45V -22	2500	1800	2300	1500	1000	1500	1500	1500	2000	1500	2500	1500	2500	1800

PISTON PUMPS

PVQ10	3000	1800	2000	1800	2000	1500	1500	1500	2000	1800	2000	1800	3000	1800
PVQ13	2000	1800	1500	1800	1500	1500	1000	1500	1500	1800	1500	1800	2000	1800
PVQ20	3000	1800	2000	1800	2000	1500	1500	1500	2000	1800	2000	1800	3000	1800
PVQ32	2000	1800	1500	1800	1500	1500	1000	1500	1500	1800	1500	1800	2000	1800
PVQ40	3000	1800	2000	1800	2000	1500	1500	1500	2000	1800	2000	1800	3000	1800
PVQ45	2750	1800	1800	1800	1800	1500	1350	1500	1800	1800	1800	1800	2750	1800
PVE27QI	3625	1800	1750	1800	1750	1500	1500	1500	2250	1800	2250	1800	3625	1800
PVE35QI	3625	1800	1750	1800	1750	1500	1500	1500	2250	1800	2250	1800	3625	1800
PVE47QI	3625	1800	1750	1800	1750	1500	1500	1500	2250	1800	2250	1800	3625	1800
PVE62QI	3625	1500	1750	1500	1750	1200	1500	1200	2250	1500	2250	1500	3625	1500
PVH57QI	3625	1800	2500	1800	2250	1500	2250	1500	3300	1800	3300	1800	3625	1800
PVH74QI	3625	1800	2500	1800	2250	1500	2250	1500	3300	1800	3300	1800	3625	1800
PVH98QI	3625	1800	2500	1800	2250	1500	2250	1500	3300	1800	3300	1800	3625	1800
PVH131QI	3625	1500	2500	1500	2250	1200	2250	1200	3300	1500	3300	1500	3625	1500

NOTES:

1. All maximum speed figures are based on atmospheric pressure (1.0 bar absolute) at pump inlet. This will require an overhead reservoir.
2. Hydraulic components generally experience shorter life using alternative fluids. Vickers components will, however, experience longer life than competitive products operating under similar conditions.
3. Alternative fluids have a reduced tolerance for contamination over petroleum base fluids. Good filtration is therefore critical. Vickers recommends that these fluids be kept cleaner. Refer to "Vickers Guide to Systemic Contamination Control" bulletin 561 for details.
4. All listed ratings are based on the use of a good quality fluid. If you have any questions concerning the quality of the fluid you are using, order a Fluid Analysis Kit (part number 894276) from Vickers or your local Vickers Distributor, and submit a sample of your fluid to the Vickers Fluid Analysis Laboratory for evaluation.



Minimum/Maximum Fluid Specifications

A good hydraulic fluid will comply with all characteristics and specifications available from your fluid supplier, as shown below:

FLUID					
Specification	Petroleum Base	Water Glycol	Invert Emulsion	Polyol Ester	Phosphate Ester
Appearance	Clear yellow or amber fluid	Clear red or pink fluid	White opaque fluid	Clear amber fluid	Clear green or yellow fluid
Viscosity (SUS) 100°F	Multiple ISO grades	180 -250	330 - 500	Multiple ISO grades	Multiple ISO grades
Ph	Not applicable	8 - 10	8 - 10	Not applicable	Not applicable
Total Acid Number (Typical) mg KOH/gm	Not applicable	Not applicable	Not applicable	1.0 - 3.0 (7.0 max. in service)	0.2 (1.0 max. in service)
Water Content -%	Nil (0.1% by wt max. in service)	38 - 45	38 - 45	Nil (0.1% by wt max. in service)	Nil (0.1% by wt max. in service)
Specific Gravity @ 60-80°F	.85 - .87	1.0	0.92	0.92	1.1
Specific Notes:	Petroleum oils must meet all requirements as defined in Oil Recommendation 694.	To add water use only distilled, soft or de-ionized water.	Free standing fluid should not separate after 38 hours.	Results of ASTM pump test D2882 must be available.	Results of ASTM pump test D2882 must be available.
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