Forsythe Technology Inc.
9610 Long Point Road, Suite 206, Houston, TX 77055
Telephone: 713 468-1795 or 800 448-1795 Fax: 713 932-6874
e-mail: richard_slover@slovergroup.com

TECHNICAL NOTE

ADDITIVES IN CONTROL FLUIDS

What are they and are they good or bad. First, additives in industrial lubricating and hydraulic fluids are used to enhance the product, whether it is mineral oil or synthetic based. In fact, for some products such as motor oils the additive package can be over 15%. Motor oils without additives are not suitable for almost any engine built this century and even the oil used in steam engines had additives. Also, it is not unusual for the pressures in hydraulic system to be over 3,000 psi and in some cases even 10,000 psi. These pressure would not be possible without additives in the oils.

While the pressure in steam turbine control systems are generally much lower ranging from 500 to 1,500 psi, additives can also be used to get better performance and longer life.
For example, mineral oil based hydraulic fluids might have a range of additives including some or all of the following; antiwear additives, extreme pressure additives, antioxidants, rust inhibitors, antifoam additives, metal deactivators and viscosity index improvers. Like turbine oils they would not likely have the detergent/dispersant type additives found in motor oils because they would tend to emulsify water and make it more difficult to remove.

The types of phosphate esters used in steam turbine control fluids are all triaryl phosphate esters and these have good inherent lubricating characteristics and most also have good oxidative stability. However, phosphate esters in general have poorer hydrolytic stability than mineral oils and the viscosity is more effected by changes in temperature. The former can be improved by the correct choice of additives and whereas the latter is not usually a problem because the units are usually indoors. Even so many turbine operating requirements state that the fluid should usually be a minimum temperature before starting the pumps but this is not an additive issue.

It should also be noted that while there might be two main manufacturers of phosphate ester fluids, there are different types and many such fluids are rebranded or made to their formulations and sold by the major oil companies. Many of these have they own additive packages. However, only a few fluids are approved for use in steam turbine control systems but all of these must meet the same performance requirements with most of those approved having some additives.

Only one fluid manufacturer claims that their EHC fluids contain no additives but this not necessarily considered to be an advantage if performance suffers.