



Turbofluid Tech Note

Reasons to use the Turbofluid Supplier (Canoil) for Testing

Background: Regular sampling and testing of Reolube® Turbofluid steam turbine control fluid is necessary to prevent fluid degradation. Also, to prevent adverse consequences including steam valves failing to function as required. If proper and effective actions are not taken fluid degradation can also quickly reach the point that the fluid must be changed out. Plus, if there are fluid degradation deposits, then expensive and time consuming high velocity and/or chemical flushes can be required to restore performance. Generally, it is much easier and more cost effective to keep the fluid in good condition. This can normally be accomplished with regular and timely changes of the purification media and particulate filters. These fluids have been in use for about 50 years and stations can get decades of trouble free performance with a few simple measures. One of these is to do the right condition monitoring tests at a test facility with good experience testing triaryl phosphate ester fluids like the Reolube® Turbofluids. They are different than mineral oils.

In addition, while these fluids have been used for a long time this does not mean that the maintenance is the same. The fluid supplier stays in touch with the turbine manufacturer, with the fluid manufacture and has gained years of experience at other stations. The tests being done now and limits have changed considerably. In a number of cases the tests themselves have also changed. While there are many test facilities that can do many of the required tests, they do not necessarily do all the tests, do them right or are able to make specific suggestions. The latter is very important because of lessons learn about the control fluid pumps, filters and reservoirs to name a few items.

Lastly, routine testing by the fluid supplier is generally included in the purchase price of EHC fluid. So why would you not take advantage of it?

Examples of ‘Wrong’ Testing

A large lab that does testing for many utilities does tests that on the surface seems okay, but are they really what you want?

Viscosity: This is generally okay and most labs do it at 40°C but a few only do it at 100°C or include it. This is not necessary and adds expense. **Okay, but.**

Acid Number: The test used can be ASTM D974. This uses titration and the change in color to indicate the end point. But this cannot be so good with dark fluids. They might dilute the sample first but then this is not per the procedure and with what? A better test is ASTM D664 which also uses titration but measures it with a potentiometric device. It can be used directly with dark fluids and can also be very useful to differentiate between strong and weak acids. This can be important if ion exchange purification media is being used. But it costs more. **Marginal.**



Resistivity: At many labs this is not done by the same lab but outsourced. This can add time and cost as well as sample splitting risks. *Marginal.*

Chlorine: The method used at one lab is ASTM D5384. This uses a test kit developed to check for such things as PCB's in waste oil. The precision is not good and results are typically way too high. Test Method A is for concentrations >1000 ppm! Test Method B is reportedly for 200 – 4000 ppm. But the current limits for GE are 50 ppm! This will not provide adequate warning and can lead to extensive servo valve damage. *Fail!*

Particle Counts: This is reported in the ISO Codes for >4, >6 and >14 microns which is fine. But they report it as being per ml according to ISO 4406. This is not the case. The numbers are codes for the number of particles in a given range. They do give the actual counts per ml for a number of sizes which is good. For example, >50 and >100 microns can be wear particles and you should be able to see them by eye. Also, the actual test method for counting is not given. This is very important because the counts can vary depending on the method used. *Marginal.*

Elemental Spectroscopy (trace metals): This is by ASTM D5185 which is ICP-AES (inductively coupled plasma-atomic emission spectroscopy). Okay but know that it is not so good if particles are >8 microns or so. If this is the case other methods should be used. Also, some labs report high levels of chromium but this is generally a mistaken interpretation. *Okay some of the time.*

Test Performed: Some labs do all the tests all the time. This is a waste of time and resources. The current GE specification has some testing monthly, other quarterly and some annually. *Marginal.*

Tests not Performed: Many labs do not report the Color which can be a very good indicator of overheating and/or dieseling. It is also recommended by GE every month. GE also recommends Mineral Oil Content testing every 3 months, Air Release every 6 months and Foaming annually. *Fail!*

Summary

It is very important to do proper fluid condition monitoring. This is necessary to ensure EHC system and component reliability and reduce downtime and costs.

Questions;

1. **Is the lab doing the current tests recommended by the turbine OEM, EPRI, INPO and/or the fluid supplier?**
2. **Are they doing the right tests for phosphate ester control fluids?**
3. **Are they doing them at the right frequencies.**
4. **Do they give specific suggestions to correct any adverse results or trends?**
5. **Do they offer additional tests to resolve issues or do root cause analyses on the fluid, filters, purification media and/or servo valves?**
6. **Do they do routine testing for free?**

Please let us know how we can help?