



# Quaker Knowledge Network

## Q-TRAK - QUINTOLUBRIC

### Skill Builder

#### Overview

Quaker Chemical manufactures and sells fire resistant hydraulic fluids (FRHFs) under the brand name of QUINTOLUBRIC. The primary FRHFs are QUINTOLUBRIC 888-46 (46 cSt/220 SUS), 888 68 (68 cSt/300 SUS), and 822-450 (100 cSt/450 SUS). Routine fluid analysis of these fluids is sent to Quaker laboratories in Conshohocken, PA to the Q-TRAK lab. This lab assesses the FRHFs in a number of areas as detailed in this Skill Builder. It is recommended that this analysis should be conducted a minimum of two times per year. If your customers are using these fluids, they can purchase analysis kits for \$150.00. Each kit contains everything required for three samples. The analysis is sent to you and/or the end user. Understanding this analysis is helpful in making decisions whether the fluid is suitable for continued usage or requires some attention. The parameters listed below provide that education to understand the values and their implications.

#### Wear Materials

The pumps used to move these fluids contain various metal alloys in their components. There will always be some degree of wear but this analysis is geared toward examining larger changes over time. All values are listed in parts/million (PPM) increments. The metals assessed are listed in the table below in alphabetical order:

Aluminum (Al)	Molybdenum (Mo)
Antimony (Sb)	Nickel (Ni)
Barium (Ba)	Phosphorus (P)
Boron (B)	Potassium (K)
Calcium (Ca)	Silicon (Si)
Chromium (Cr)	Silver (Ag)
Copper (Cu)	Sodium (Na)
Iron (Fe)	Titanium (Ti)
Lead (Pb)	Vanadium (V)
Magnesium (Mg)	Zinc (Zn)

Phosphorus is not a wear metal but is part of the extreme pressure additive. You should expect to see this value in the range of 175-425 PPM. The key for the other metals is to examine the trends in the values. Any large increases over a short period of time could indicate problems with the pump and should be investigated.

#### Moisture

The QUINTOLUBRIC 888 Series has very good water separation qualities. The emphasis in this measurement is to make sure that any moisture (i.e. water) that might get into the hydraulic circuit because it can lead to corrosion and other problems. Water can be drained from the bottom of the reservoir after permitting the fluid to sit for a period of time. The goal is to maintain a target of less than 0.20%. This is equivalent to 2000 PPM.

#### Viscosity

The viscosity of this type of lubricant is affected by temperature, shearing by the pump, oxidation and moisture contamination. The moisture is captured above and the oxidation is captured below (see TAN). The viscosity is measured at 40°C (104°F), is assessed using the Kinematic method and is reported in centistokes (cSt).

#### Total Acid Number (TAN)

Examining the change in acid number over time can assess any breakdown of a fluid. The TAN is a titration and is one method of assessment. QUINTOLUBRIC 888 provides consistent performance up to 8 mg/g KOH. The KOH is potassium hydroxide and is the titrant in the titration expressed as milligrams/gram (mg/g). The values for the QUINTOLUBRIC 888 series should be less than 8.0 mg/g.



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#### ISO Classification

The International Standards Organization (ISO) class is a method or standard for quantifying a large distribution of particles in a small, whole number format. The data is shown as three sets of values in the following format: AA/BB/CC where AA relates to particles greater than 2 microns, BB greater than 5 microns and CC greater than 15 microns. The larger the number, the greater the number of particles in that range. Therefore, a 21/19/17 fluid is significantly dirtier than a servo/proportional class fluid with an ISO class 16/14/12. Pristine QUINTOLUBRIC fresh out of manufacturing can be as good as 14/12/9.

#### NAS Classification

The National Aeronautical Society (NAS) is a different method of counting particles which allows interpretation of particle count classes to be reported in a single, whole digit number. Standard hydraulic equipment would want NAS 8-9. For servo/proportional control equipment you want 5-6.

#### Total Solids

The total solids are the weight of the filter patch used in the Appearance Test (see description below). The value is milligrams of solids/100 milliliters of sample (mg/100 ml). The goal is to maintain this to a value less than 15.0 for standard hydraulic equipment and below 8.0 for servo/proportional control equipment.

#### Contamination Index (CI)

The contamination index is a Quaker Chemical method of relating particle counting to the total solids in a ratio format to yield a quick reference value, which is unitless. "Dirty" fluid has a value greater than 1.00. The target is to maintain this value less than 1.00.

#### Particle Count

The particle count is actually determined by size. The size ranges are listed in microns in the following ranges: 2-5, 5-15, 15-25, (greater than) >25-50, (greater than) >50-100, and (greater than) >100. Remember that one micron is the equivalent to 39.4 micrometers. The objective of the particle count is to make sure the vast majority of particles are less than 50 microns.

#### Filter Patch Appearance

A 25-milliliter sample is passed through a 1.2-micron filter patch. It is then dried and examined visually. The focus is to look for light colored patches. Darker colors can indicate oxidative by-products are forming. This could be the first sign of problems approaching.

#### Reporting

All of the data is represented in very easy to read tables. In addition, trend charts track the data for a total of the current sample plus the last five previous samples. Line charts are used to present information for the ISO classifications, NAS classification, the Viscosity & the TAN. Bar charts are used to present information on Total Solids & Water content. A quick visual scan lets you see how these parameters have changed from sample to sample. Other information listed on the report is Sample's ID number, Date Sampled, Date Received, Date Tested, and the Lab Operator's name.

#### Sample Kits

The analysis is conducted based on the sample kit. This kit is purchased from Quaker Chemical through our Order Services Department just like a Quaker fluid. The kit contains:

1. Three fluid bottles with caps
2. Three Q-Trak sample labels
3. Three mailing labels, and
4. Three mailing envelopes



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The fee for this analysis is \$150.00 per kit of three samples, which means that each sample analysis costs \$50.00. Remember, to make sure that the sample you obtain is representative of the system. Do not use stagnant lines and always rinse the sample bottle three times with a small portion of the fluid prior to filling it. This guarantees a clean bottle so that the particle count is accurate.

### Summary

The final hard copy report lists all of this data and information. While it can be a little overwhelming there are essentially three main things to examine immediately upon receiving the report.

1. The first is on Page One in the upper right hand corner. The STATUS can be "Abnormal," "Normal" or "Critical." If it reads anything other than "Normal," then there are problems.
2. The second is the "Patch" listed in the VISUAL APPEARANCE section. If it does not indicate "Light Tan" to "Tan," then darker colors indicate oxidation by-products.
3. The third is if the "CI" in the CONTAMINATION DATA section is not less than 1.00, there are problems.

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