

# Fluid Analysis

## AQUA-HOT SYSTEMS

Aqua-Hot Heating Systems are designed to supply moist, even interior heat and continuous on-demand hot water when hooked to a continuous supply of water. Some models also provide engine preheating which can reduce wear and tear at cold engine start up. The purpose of this flyer is to inform our customers on the importance of having these critical hot water systems sampled, on an annual basis, to properly assess the overall “health” of the heat transfer fluid (coolant) and internal system components.

**Like other certified NRVIA<sup>i</sup> inspectors, I’ve been specifically trained to properly collect RV fluid samples for analysis including samples from Aqua-Hot heating systems.**

Aqua-Hot heating systems use one of two fluid types: Camco (*pink color*) or the Century (*green color*). The fluid used in your system may have been determined by the coach manufacturer and the production year. According to Aqua-Hot, mixing pink and green fluids produces a brown color that may be confused with corrosion, creating unnecessary service expense. Aqua-Hot recommends annual system maintenance and offers “Annual Service Kits” to perform this maintenance. Figure 1 shows a typical Annual Service Kit. Among other items, the Annual Service Kit includes a refractometer (*see red circled item*). Refractometers are used to measure freezing point and propylene glycol concentration of the coolant used in the system.



Figure 1: Aqua-Hot’s Annual Service Kit with Refractometer

While an annual check of the freezing point and propylene glycol concentration gives an indication of the condition of the fluid, it does not reveal other important fluid properties

and does not indicate if contamination or wear materials might be present. **Refractometer readings do not tell the complete story.**

## About Our Testing

Quality RV Inspections offers a complete fluid analysis on these critical systems. Our specialized testing offers for more insight into the true condition of the Aqua-Hot heat transfer fluid. You’ll receive a scientific test report for your records which includes a complete evaluation of the fluid properties plus an assessment of internal system part wear.

Figure 2 shows a comparison of new vs. used fluid. The sample on the left (#155711) was fresh (unused) “Century Fluid” and the sample on the right (#143902) is the same fluid taken from a customer’s system after only one year of service. In addition to showing severe levels of flaking and sludge, the sample also showed high levels of copper and tin.



Figure 2: New fluid and used fluid sample

In this case, the customer experienced poor heat distribution and found one heating circuit to be completely blocked by system sludge that collected in a tubing bend under the floor. This amount of sludge can lead to clogged check valves and clogged tubing. **Some of these systems have required system flushes at a cost of up to \$600 or more, in order to rid the system of the sludge buildup.**

Page 2 shows the data portion of the test report for Sample #143902. Below the report, we show a comparison of tests offered through the Aqua-Hot Annual Service Kit versus the complete testing that Quality RV Inspections offers.

**Aqua-Hot heating system owners are encouraged to obtain annual fluid analyses on their Aqua-Hot heating systems to keep them as “worry free” and reliable as possible.**

## Data from Sample #143902 (Actual Test Report Shown)

Miscellaneous Information										Product Information														
Comments										Product Manufacturer: CENTURY CHEMICAL CORPORATION Product Name: TRANSFER FLUID GREEN COOLANT														
Suggest cleaning this system with a cleaner designed to remove deposits from a cooling system, then flush 3-5 times with water, and install new recommended coolant. Sample clarity and/or color may indicate fine particulate is present due to emulsified oil, glycol degradation, slight inhibitor drop out, and/or hoses degrading. SEVERE amount of non-magnetic precipitate, which may cause the system to become plugged. Copper is at a SEVERE level, copper can attack the other metals in the cooling system; Copper sources may be corrosion or erosion of the radiator (tubes, top tank, side-plates), heat exchanger, oil cooler, charge air cooler, thermostat, and/or residual from a previous issue. Tin is at a SEVERE level, Tin sources may be corrosion of solder in the radiator, heat exchanger, oil cooler, flux, and/or residual from a previous issue. Iron sources may be corrosion from cylinder liners, engine block, cylinder head, and/or residual from a previous issue. Please submit a new (unused) sample of this fluid for BASELINE REFERENCE.																								
Sample Information						Corrosion Metals (ppm)						Contaminants (ppm)		Corrosion Inhibitors (ppm)				Carrier Salts (ppm/10)						
Sample #	Date Sampled	Date Received	Coolant Time mi	Unit Time mi	Coolant Change	SCA Added gal	Filter Change	Iron	Aluminum	Copper	Lead	Tin	Silver	Zinc	Titanium	Calcium	Magnesium	Silicon	Phosphates	Boron	Molybdenum	Sodium	Potassium	
1	15-Dec-2015	18-Dec-2015	0	0	Unk	0	Unk	19	0	197	0	62	0	0	0	0	0	4	10477	0	0	14	908	
Visual Testing																								
#	Foam	Color	Oil	Fuel	Magnetic Precipitate	Non-Magnetic Precipitation																		Odor
1	None	Very Cloudy Dark Yellow	None	None	None	Severe Flake																		Other
Basic Testing																								
#	Freeze Point (°F)	Boil Point (°F)	Antifreeze Percent (%)	pH Waters (pH)	Total Hardness (ppm)	Nitrite (ppm)	Specific Conductance (µS)	SCA Number	Carboxylic Acid (Pass / Fail)															
1	-18	223	46	9.1	0	5 - Strip	3970	0.0																
Additional Testing																								
Sample #												Total Dissolved Solids												
1												ppm 2100												
Comments are advisory only and are based on information provided. Missing fluid or component information limits the evaluation. No warranty is expressed or implied.																								

## Aqua-Hot versus Quality RV Inspections Testing

Test Description	Aqua-Hot's Annual Service Kit	Quality RV Inspections Fluid Analysis
Freeze Point	✓	✓
Glycol Content	✓	✓
Corrosion Metals	<b>Aqua-Hot Annual Service Kit Tests does not cover this testing</b>	✓
Contaminant Metals		✓
Corrosion Inhibitors		✓
Foam Test		✓
Color		✓
Oil Contamination		✓
Fuel Contamination		✓
Magnetic Precipitate		✓
Non-magnetic Precipitation		✓
Odor		✓
Carrier Salts		✓
Boiling Point		✓
pH		✓
Total Hardness		✓
Nitrite Level		✓
Specific Conductance		✓
SCA Number		✓
Total Dissolved Solids		✓



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