



SeaKits Fluids Analysis User Guide

*The first oil and coolant testing program specifically developed
for the yacht and workboat owner/operator.*

SeaKits Fluids Analysis is designed for yacht and workboat owner/operators who want an easy-to-use testing program geared towards smaller sample volumes. SeaKits has addressed this requirement with Fluids Analysis Kits that include everything the user needs to successfully take an oil, coolant, or fuel sample and send it to the lab. SeaKits customers using the Marine Maintenance Systemsm will appreciate the full integration of fluids testing in MMS which generates equipment registration forms and automatically links test results with equipment history.

In this Guide you will find the following useful information for implementing a Fluids Analysis Program for your vessel(s).

- Available Test Packages
- Drawing a Sample Using a Vacuum Pump
- Sampling Intervals and Locations
- Additional Resources
- Order Form

Laboratory

SeaKits has partnered with POLARIS Laboratories, LLC to provide fluids testing and technical support. POLARIS leads the oil analysis industry with fast turnaround, high quality data and technical support. Over 80% of test samples are analyzed within 24 hours with the results emailed to the customer and available online. When your first report is emailed you will be provided with a username and password for accessing your reports online. Simply go to www.eoilreports.com and log in for access to reports, training, and detailed instructions on reading reports. In addition, if you have technical questions on your analysis or anything related to fluids analysis you can call the dedicated SeaKits technical support line at 877-458-3314.

Available Test Packages

Engine Oil Analysis can identify the four biggest engine killers before it's too late! Routine testing can identify these contaminants and what you should do to correct the problem.



- **Fuel Dilution** is the amount of raw, unburned fuel that ends up in the crankcase. It lowers oil viscosity creating friction-related wear almost immediately.
- **Soot** is a sign of reduced combustion efficiency and is caused by over-fueling, air restrictions, blow-by, excessive engine brake use and/or excessive exhaust back pressure. Soot is highly abrasive and increases oil viscosity.
- **Coolant** usually enters an engine through a broken head gasket seal, cracked cylinder head, cracked block, faulty water pump or lube cooler and can cause wear in bearings, bushings, pistons, liners, cams and valves. 60% of oil-related engine failures are caused by coolant!
- **Dirt** is detected by the presence of silicon and aluminum. It causes wear most rapidly in components made of iron, lead, copper and tin, such as pistons, bearings and liners. Dirt is introduced through poor maintenance practices and faulty air intake systems.

Marine Gear (Transmission) Oil Analysis monitors transmissions contamination that can cause gear and bearing wear and corrosion. These systems have longer oil change intervals than engines and are often ignored.

Hydraulic Oil Analysis is critical because these systems operate under extremely close tolerances demanding regular monitoring for fluid cleanliness. Contaminated hydraulic fluids accelerate pump, seal, and servo wear and can render equipment inoperable.

Coolant Analysis is essential to good engine maintenance because over half of engine failures are coolant related. A cooling system is subject to pitting, corrosion, cavitation, erosion and electrolysis. Although coolants are formulated to help prevent these problems from occurring, coolant analysis will identify them if present and determine if the coolant you're using is providing adequate protection. Marine cooling systems are particularly susceptible to saltwater contamination.

Fuel Analysis can point to solutions for filter plugging, loss of power or poor injector performance. Testing bulk fuel storage tanks can verify compliance with required supplier specifications, as well as ascertain the quality of your onboard fuel after an extended lay-up period.

Drawing a Sample Using a Vacuum Pump

SeaKits Fluids Analysis Kits make fluids analysis convenient, easy and simple. Follow the steps below to gather samples and send them to the Lab for analysis. Use a red sample pump for oils and a blue sample pump for coolants.

Step 1 – Warm up the system so that the oil/coolant is warm and homogeneous. Carefully unpack the SeaKits Fluids Analysis Kit and place material on a clean surface. If sampling a component for the first time, fill out the Component Registration Form. For previously registered equipment just fill out and affix the smaller prepaid testing label to the sample



bottle, but remember to use the same Unit ID you used when registering so your results are linked.

Step 2 - Insert the tube through the knurled knob on the head of the vacuum pump and tighten the knob. The tube should extend about 1 inch beyond the base of the vacuum pump head. To avoid cross contamination, only use a red pump for oil and blue pump for coolant.

Step 3 - Screw the white sample jar to the bottom of the vacuum pump head and tighten securely. Place the tube's free end into the oil/coolant/fuel source at a mid-volume location (avoid sampling the bottom of the sump or tank).

Step 4 - Push and pull the vacuum pump plunger a few times to start the suction; you will see fluid in the tube as flow starts. Continue pumping until sample jar is $\frac{3}{4}$ full. Avoid contamination of the vacuum pump head by holding the pump upright throughout the sampling process.

Step 5 - Unscrew the sample jar from the vacuum pump and screw the jar's lid on securely. Allow any remaining fluid in the tube to drain back into the tank/sump; remove tube from the equipment. Loosen the vacuum pump knurled knob, remove the tube and properly dispose of it (Never reuse tubing). Clean the pump head thoroughly and store it in its container.

Step 6 – Place the Sample Jar Label (small Prepaid Testing label) on the white sample jar. Place the appropriate return-mailing label on the black return mailer jar or envelope. Put the white jar in the mailer. If a written Component Registration Form (First equipment sample) was used, put it in the mailer along also. Send the sample to the lab immediately using the prepaid postage or your own postage, as applicable.

Step 7 – In 5 to 7 days your results will be emailed to you and you will be provided with a logon and password to view your results online. Go to www.eoilreports.com to view your results.

Marine Maintenance Systemsm Users – Please use the Fluids Analysis Manager located in the Admin Menu of MMS to complete your Component Registration Form and for retests. The Unit ID and your test results will be automatically linked to maintenance history for the component tested. You will also be able to view test results and order replacement or additional supplies via MMS.

Sampling Intervals & Location

Although an equipment manufacturer's recommendations provide a good starting point for developing preventative maintenance practices, sampling intervals can easily vary. How critical a piece of equipment is to the operation and safety of your vessel is a major consideration for determining sampling frequency, as are environmental factors such as hot, dirty operating conditions, short trips with heavy loads and excessive idle times.

The chart below provides recommended intervals and sample locations for the type of component being tested. Remember that accurate and informative data analysis is possible only when samples are representative of the typical environmental conditions under which



the equipment operates. Dirt, system debris, water and light fuels tend to separate from the lubricant when system temperatures cool. Therefore, all lubricant samples should be taken while the system is operating under normal conditions or immediately after shutdown while the system is still at operating temperature.

Equipment Type	Sampling Interval Normal / Intermittent Use	Sampling Location
<u>Diesel Engines - Oil</u>	Each oil change. Sample just prior to oil drain.	Through dipstick retaining tube or oil change system.
<u>Transmissions and Gear Systems - Oil</u>	Annually or at each oil change. Sample just prior to oil drain.	Through oil level plug, dipstick retaining tube, or oil change system.
<u>Hydraulics - Oil</u>	Annually or at each oil change. Sample just prior to oil drain.	Through oil fill port or system reservoir at mid-level.
<u>Diesel Engine - Coolant</u>	Annually	Through expansion tank filler cap or petcock.
<u>Diesel Engine – Fuel</u>	After bulk fuel delivery or extended lay-up.	Convenient source prior to filtration.



Tests Performed for each Analysis Package

Oil Analysis

Test	Engine Oil	Gear Oil	Transmission Oil	Hydraulic Oil
Elemental Metals (24)	√	√	√	√
Viscosity @ 40°C or 100°C	√	√	√	√
Fuel Dilution %	√			
Soot %	√			
Water %	√	√	√	√
Total Acid Number				√
ISO Particle Count				√
Oxidation				√

Coolant Analysis

- Elemental Metals (12)
- pH
- Glycol %
- Freeze Point
- Boil Point
- Nitrite
- SCA Number
- Total Dissolved Solids
- Specific Conductance
- Total Hardness
- Visuals

Fuel Analysis, Basic (Go/No Go)

- Elemental Metals
- Pour Point
- Water & Sediment
- Bacteria, Fungi & Mold
- Thermal Stability

Fuel Analysis, Advanced

- Basic Analysis plus the following
- Viscosity
- Sulfur %
- API Gravity
- Flash Point
- Cetane Index
- Cloud Point
- Distillation

Additional Resources

Wear Metals Guide (available at www.seakits.com) - The Wear Metals Guide provides possible sources for wear metals, contaminant metals, multi-source metals, and additive metals. The Wear Metals Guide can be used in conjunction with the How to Read an Analysis Report Guides.

How to Read an Analysis Report (available at www.seakits.com) - Three guides provide detailed instructions on reading an analysis report for oil, coolant, and fuel analysis.

Fluids Analysis Sampling Instructions and Order Form – This abbreviated Guide is included in each SeaKits Fluids Analysis Kit and is also available on the SeaKits website.



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Thank you for using SeaKits Fluids Analysis Kits!



SeaKits Fluids Analysis Kits Order Form

You can order Fluids Analysis Kits online at www.seakits.com or use the order form below. For first time users we recommend the Starter Kit (P/N SK1102) which includes a vacuum pump and prepaid analysis and supplies for three oil analysis (engine, transmission, or gear oil) all contained in a convenient, water resistant storage box. All other Fluids Analysis Kits include prepaid analysis, sample bottle, mailer, and prepaid postage (domestic). The vacuum pump is a one time purchase in the Starter Kit or by itself. A red pump should be used for oil and a blue pump for coolant to avoid cross-contamination. Please let us know if you need more than 48" of tubing for drawing a sample.

Part No.	Description	Use for:	Price	Qty	Total
SK1100	Oil Analysis Kit – Single Sample	Engine Oil, Transmission, or Gear Systems	\$24.00		
SK1101	Oil Analysis Kit – 3 Pack	Engine Oil, Transmission, or Gear Systems	\$68.00		
SK1102	Oil Analysis Starter Kit – 3 Pack with Vacuum Pump	Engine Oil, Transmission, or Gear Systems	\$95.00		
SK1103	Hydraulic Oil Analysis Kit – Single Sample	Hydraulic Oil	\$49.00		
SK1104	Coolant Test Kit – Single Sample	Engine Coolant (Conventional or Extended Life)	\$39.00		
SK1105	Coolant Test Kit – 3 Pack	Engine Coolant (Conventional or Extended Life)	\$109.00		
SK1106	Fuel Analysis, Basic – Single Sample	Diesel Fuel (Go/No Go)	\$332.00		
SK1107	Fuel Analysis, Advanced – Single Sample	Diesel Fuel (Fuel Quality)	\$699.00		
SK1109	Vacuum Pump – Red	Oil Systems	\$24.00		
SK1114	Vacuum Pump – Blue	Coolant Systems	\$24.00		
Subtotal					
MA Residents add 5% Sales Tax					
Total					
<i>Shipping Costs (UPS Ground unless otherwise specified) will be added.</i>					

- Three Convenient Ways to Order:
1. Online at www.seakits.com
 2. Fax completed form to 646-219-3304
 3. Call 978-779-5211

Bill To:
 Name: _____
 Address: _____
 Address: _____
 City: _____
 State: _____ Zip: _____

Ship To:
 Name: _____
 Address: _____
 Address: _____
 City: _____
 State: _____ Zip: _____

Email: _____

Phone: _____

Credit Card: Visa MC AMEX

Card Number: _____
 Expiration: _____ Security Code: _____

Signature: _____

Thank you for your business!