

## Laboratory Tests

### Standard Oil Analysis (HG2001)

Wear Metals	Oil Condition	Contaminants
<p>Sources of wear are monitored by quantifying over 20 elements including:</p> <ul style="list-style-type: none"> <li>◦ Silver</li> <li>◦ Aluminum</li> <li>◦ Boron</li> <li>◦ Barium</li> <li>◦ Calcium</li> <li>◦ Cadmium</li> <li>◦ Tin</li> <li>◦ Chrome</li> <li>◦ Copper</li> <li>◦ Iron</li> <li>◦ Potassium</li> <li>◦ Magnesium</li> <li>◦ Manganese</li> <li>◦ Titanium</li> <li>◦ Molybdenum</li> <li>◦ Sodium</li> <li>◦ Nickel</li> <li>◦ Phosphorous</li> <li>◦ Lead</li> <li>◦ Silicon</li> <li>◦ Zinc</li> </ul>	<p>Fluid condition is evaluated by quantifying sources of degradation such as:</p> <ul style="list-style-type: none"> <li>◦ Soot</li> <li>◦ Oxidation</li> <li>◦ Nitration</li> <li>◦ Sulfation</li> </ul>	<p>Particulate and chemical contaminants are identified including:</p> <ul style="list-style-type: none"> <li>◦ Water</li> <li>◦ Fuel</li> <li>◦ Antifreeze</li> <li>◦ Silicon (Dirt)</li> </ul>
Viscosity	Particle Count	Additives
<p>Viscosity at operating temperature is determined by measuring the fluid's viscosity at 212 °F. This data allows analysts to confirm the oil weight and verify fluid degradation or contamination.</p>	<p>Fluid cleanliness is determined by particle counter instrumentation and reported with an ISO code.</p>	<p>Oil formulation is monitored by quantifying the following elements:</p> <ul style="list-style-type: none"> <li>◦ Calcium</li> <li>◦ Phosphorous</li> <li>◦ Zinc</li> <li>◦ Magnesium</li> </ul>

### Coolant Analysis (HG1010, HG731314)

Level 1	Level 2 (includes all Level 1 tests)
<ul style="list-style-type: none"> <li>◦ Glycol level</li> <li>◦ pH</li> <li>◦ Precipitation</li> <li>◦ Conductivity</li> <li>◦ Nitrite</li> <li>◦ Appearance</li> <li>◦ Magnetic solids</li> <li>◦ Odor</li> <li>◦ Foam</li> </ul>	<ul style="list-style-type: none"> <li>◦ Elemental analysis</li> <li>◦ Contaminants</li> <li>◦ Water quality</li> <li>◦ Analysis of additives and their breakdown products</li> </ul>

### Fuel Analysis (HG6002, HG6003)

Essential Fuel Analysis	Critical Fuel Analysis (includes all Essential Fuel Analysis tests)
<ul style="list-style-type: none"> <li>◦ Biodiesel content</li> <li>◦ Sulfur content</li> <li>◦ Elemental analysis</li> <li>◦ Water content</li> <li>◦ Microbial growth</li> <li>◦ Particle Count</li> </ul>	<ul style="list-style-type: none"> <li>◦ Cetane index</li> <li>◦ Pour point</li> <li>◦ Distillation curve</li> <li>◦ Density</li> <li>◦ Cloud point</li> <li>◦ Oxidation stability</li> <li>◦ Viscosity</li> <li>◦ Flash point</li> <li>◦ Cold filter plugging</li> </ul>

## Additional Testing

### TAN, TBN and Karl Fischer Water Testing (HG3001)

Total Acid Number (TAN)	Total Base Number (TBN)	Karl Fischer
Quantifies the acidity of an oil sample to determine the level of oil degradation. Acidic compounds degrade oil by causing corrosion and diminishing metallic components.	Quantifies the acid-neutralizing capacity of an oil sample. Chemically basic additives are included in most oil formulations to neutralize acidic byproducts and prevent corrosion.	Quantifies the amount of water present in an oil sample by using the Karl Fischer titration method. Water is one of the most common and damaging contaminants found in lubricating oil.

\*The HG3001 kit also includes all tests performed in the Standard Oil Analysis.

\*\*TAN and TBN both quantify acidic byproducts in an oil sample. TBN testing is performed on engine samples and TAN testing is performed on any non-engine samples. **The test offered is dependent on the component sampled.**

### Marine Kits (HG7001)

Marine analysis includes all tests performed in the Standard Oil Analysis. The sample label contains component options appropriate for marine vessels.

## Submitting Samples

**How to purchase a sample kit:** Sample kits can be purchased from any NC Parts Department.

**How to take a sample:** Transfer the sample into the sample bottle via a sample valve or use a small pump for vacuum extraction. For more information refer to 'How to Take a Good Oil Sample' on the Fluid Analysis webpage.

**Fill out the label correctly:** Make sure to include your equipment's serial number, component sampled and contact information on the label included in the sample kit.

**Sending samples to the lab:** Submit samples to the lab through USPS, UPS (must contact the lab for UPS labels) or drop them off at any of our dealer locations.

**Turnaround time:** Sample results will be distributed via e-mail or mail 24-48 hours after the lab receives the samples.

**Laboratory hours:** Monday – Friday. 8:00 AM – 5:00 PM PST.