

SGS OIL, GAS AND CHEMICALS
OIL CONDITION MONITORING LABS
STATEMENT OF QUALIFICATIONS

SGS OIL CONDITION MONITORING LABORATORIES

SGS Oil, Gas And Chemicals OCM laboratories deliver high quality, full service analysis of oil, fuel, grease, refrigerants, coolants and other maintenance fluids. Our lubrication analysis, equipment condition monitoring and rapid solutions to tribological (wear and tear) problems assist you in reducing costs, increasing productivity, avoiding equipment downtime and extending equipment life. We test to ASTM and industry accepted standards and are ISO 9001, ISO/IEC 17025 and 10CFR50 Appendix B certified. By setting a high standard for lubrication analysis, SGS makes a tremendous impact on client businesses with outstanding customer service, a 95% on-time performance rating, high quality data validation and ease of access to data. SGS provides the most advanced and comprehensive testing capabilities of any independent oil analysis lab in the world today.

LABORATORY CAPABILITIES

Our state-of-the-art Oil Condition Monitoring laboratories are located in Vallejo, California, between San Francisco and the Napa Valley and in Naperville, Illinois, not far from Chicago. We are staffed by highly skilled professionals, including:

- Chemists – Analytical, Organic/Inorganic
- Engineers – Mechanical, Tribology, Chemical
- Certified Lubrication Specialists (CLS) Evaluators – Fuels, Lubricants, Maintenance
- Technicians – Field Services, Laboratory
- Administrators – Contract, Quality Assurance, Finance, Marketing
- Research Associates – PhD, Project Managers

SGS has a full complement of state-of-the-art testing equipment, all calibrated to the most demanding industry standards to provide you with quality decision data.

LABORATORY INSTRUMENTATION AND TECHNIQUES

ELEMENTAL ANALYSIS AND PARTICLE CHARACTERIZATION

- Analytical Ferrography, Ferrous Particle Quantification and Imaging

- Inductively Coupled Plasma Spectroscopy (ICP)
- Ion Chromatography
- Microcoulometry
- Microwave Digestion
- Optical Microscopy Metallurgical/Biological
- Scanning Electron Microscopy / Energy Dispersive Spectroscopy (SEM/EDS)
- X-Ray Florescence (XRF)

THERMAL AND OXIDATIVE ANALYSIS

- Bomb Calorimetry (Heat of Combustion)
- Differential Scanning Calorimeter (DSC)
- Oxidation Stability (Fuels/Lubricants)
- Pressure Vessel Oxidation (RPVOT)
- Quenching (oil)
- Thermal Gravimetric Analysis (TGA)

VISCOSITY CHARACTERIZATION

- Absolute Viscosity
- Dynamic Viscosity
- Kinematic Viscosity
- Rheological Analysis

SEPARATION CHROMATOGRAPHY

- Ion Chromatography
- Gas Chromatography

SPECTROSCOPY

- Flow through Cell FTIR
- Fourier Transform Infrared Analysis (FTIR)
- Refrigerant Analysis (Gas Cell)
- Small Particle Analysis Attenuate Total Reflectance (ATR)
- Solid and semi-solid Materials Attenuate Total Reflectance (ATR)

WEAR TESTING AND FAILURE ANALYSIS

- Coefficient of Friction Analysis
- Electrical Contact Resistance
- Fretting Wear Analysis
- Identification of Wear Mechanisms and Failure Modes
- Pin on Disk Analysis (POD)
- Pin and Vee Block

- Static Friction Analysis
- Wear Scar Analysis

PHYSICAL PROPERTY TESTING AND CLASSICAL TEST METHODS

- Air Release Properties
- Anti wear Additive
- Conductivity
- Corrosion Test
- Dielectric Strength
- Foam Characteristic
- Fuel Dilution
- Glycol Contamination
- Karl Fischer Water
- Nitration Levels
- Oxidation Levels
- Particle Counting
- Rust Test
- Soot Content
- Sulfination
- Levels
- Varnish Analysis
- Voltametric Antioxidant Analysis
- Water Separability
- ASTM, Federal Test Methods IP, DIN, many more..

SGS provides analysis services for major oil companies like ExxonMobil and Chevron. Following ASTM procedures, with client-controlled specifications, we perform tests and report statistics directly into the company's database.

SGS NORTH AMERICA INC. OIL, GAS AND CHEMICALS SERVICES

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INFRARED SPECTROPHOTOMETRY

- % Fuel Dilution – Percent fuel contained in oil sample – Excessive fuel generally enters the oil system through leaking injectors, seals, fuel fittings, pumps or incorrect choke adjustments. Fuel dilution can also increase due to poor combustion characteristics.
- Soot – The Soot value is the amount of infrared light that is absorbed by lubricant solids and semi-solids. Soot is particularly useful to determine blowby.
- Oxidation (OXID) – Oxidation is the amount of infrared light absorbed by lubricant oxidation. It is the amount of oxidation that has occurred in the lubricant.
- Sulfination (SULF) – Sulfination is the amount of infrared light absorbed by harmful sulfur compounds.
- Nitration (NITR) – Nitration is the amount of infrared light absorbed by harmful nitrogen compounds.
- Glycol (GLY) – The % glycol found in the oil is evidence that there is an internal coolant leak.

TOTAL SOLIDS

Total solids are solids and semi-solid particulates contained in the oil sample. They are generally excessive oxidation resins, and/or combustion by-products (carbon). Typical sources of oxidation resins are high operating temperatures and/or extended oil drain intervals. Blow-by products can be caused by poor mechanical efficiency. Items such as incorrect injector and ignition valve timing, air to fuel ratio, or abnormal wear in piston ring and cylinder regions cause excessive blow-by.

WATER

This is % water found in the oil sample. Typical sources are condensation and internal cooling system leaks. In very moisture critical systems Water by Karl Fischer is performed which reports water down to the 10 ppm range.

VISCOSITY (VIS)

Viscosity is reported in centistokes at

40C or 100C. Viscosity measures the oil's resistance to flow. Thinning may come from excessive fuel dilution or the addition of lighter (less viscous) oils. Thickening generally represents higher total solids or addition of heavier (more viscous) oils.

ACID NUMBER (AN)

AN is the measurement of the weak acid formation in the oil. The higher the AN the more acidic constituents are present in the oil. They can be formed by lower or high operation temperatures, extended oil drain intervals and poor time combustion.

TOTAL BASE NUMBER (TBN)

TBN is the measurement of the reserve alkalinity of the oil's additive package. The lower the TBN in relationship to the new oil, the less its ability to clean the system and suspend contaminants.

PARTICLE COUNT

Cleanliness is one of the most important characteristics in proper lubrication. The importance of clean lubricating oil cannot be over emphasized.

The most common unit of reporting fluid cleanliness is the ISO Code System 4406:99. However, there are other methods used in classifying the number and size of particle such as NAS-1638 and SAE-AS4059. However, these two methods are generally used by specific clients that have years of data. Contact us if you require NAS or SAE classifications for your particle counts.

ISO – (International Organization for Standardization) Code 4406:99 designates a system for reporting the number of particles greater than 4um, 6um and greater than 14um per milliliter of sample.

ISO 4406 Code numbers for reporting are separated by a slash

Example: 21/ 20/16

In this example the particles counted in the specified fluid are highlighted in the table below.

Note:

- The number of particles counted for code 21 can be 10,001 to 20,000
- The number of particles counted for code 20 can be 5,001 to 10,000

- The number of particles counted for code 16 can be 321 to 640
- The number of particles counted for code 16 can be 321 to 640

ADDITIONAL TESTING COMMONLY USED

- FS Metals – Filtration Spectroscopy is the analysis of metals in the sample by atomic emission spectroscopy after filtering the oil through the fine filter and acid digesting the large wear debris particles. This allows characterization of large wear particle and contaminants.
- DR Ferro DL (Density Large Particles) – The DL reading is the concentration of ferrous particles above 5 microns in size.
- DR Ferro DS (Density Small Particles) – The DS reading is the concentration of ferrous particles below 5 microns in size.
- DR Ferro WPC (Wear Particles Concentration) – The WPC reading is the total of ferrous wear particles found in the sample.
- Analytical Ferrography – The microscopic analysis of wear particles to determine the mechanisms of wear taking place. This report is on a separate second page and includes micro photographs.

SGS is the world's leading inspection, verification, testing and certification company. Recognized as the global benchmark for quality and integrity, we employ over 85 000 people and operate a network of more than 1 800 offices and laboratories around the world.

ADDITIONAL SERVICES

ANTIOXIDANT TESTING

Antioxidant additives are added to lubricants to resist oxidation of the base oil and prolong the lubricant life. There are many methods of analyzing for the presence and concentration of antioxidants. SGS employs the latest tests and technology to assist in the evaluation of the critical parameter.

BRAKE FLUID TESTING

Annually, SGS OCM Laboratories perform hundreds of test for Brake Fluid Contamination. Usually the contamination is recognized by “spongy” brakes. This can occur sometime after the contaminant has been introduced. Typically this is caused by excessive water or oil contamination.

CONSULTING

SGS has been providing industry with consultation and analysis since 1980. We are ISO 9001 and ISO 17025 certified and specialize in the analysis of lubricants, diesel fuels, gasoline, greases and tribological related failures.

To satisfy the needs of our clients we have developed the Research Associate Program. This program allows experts in many different fields the opportunity to work with SGS Laboratories in their area of expertise as required by specific projects.

In one example, our client had excessive “rubber like” deposits forming in a \$600,000 gearbox. This happened shortly after changing to a different brand of lubricant. Using SEM and other analysis, SGS successfully argued that the polymer was unstable and was the source of the deposit. Our client recouped ALL of their cost associated with this failure!

DEPOSIT & FILTER ANALYSIS

SGS provides industry with timely, expert analysis of deposits and plugged filter systems. Identifying these problems leads to rapid resolution and a more productive operation of your facility and equipment. We have advanced methods of characterizing the type and source of

the offending contaminant.

- Elemental Analysis and Contaminant Characterization Analytical Ferrography, Ferrous
- Particle Quantification and Imaging
- Inductively Coupled Plasma Spectroscopy (ICP)
- Ion Chromatography
- Gas Chromatography
- Microcoulometry
- Microwave Digestion
- Optical Microscopy Metallurgical/ Biological
- Scanning Electron Microscopy / Energy Dispersive (SEM/EDS)
- Thermal Gravimetric Analysis (TGA)
- X-Ray Florescence (XRF)
- Fourier Transform Infrared Analysis (FTIR)
- Differential Scanning Colorimetry

FORENSIC/SERVICE TESTIMONY

SGS has for many years, analyzed lubricants, fuels, brake fluids and machine components for hundreds of clients involved in potential and actual litigation. Our expert testing, data and opinions have been used to prepare for cases in Superior Court, Federal Court and Small Claims Court, along with numerous mediations and arbitrations. SGS has been recognized and accepted as an expert in lubrication, testing and analysis.

Litigation, Testing and Analysis - US Manufacturer vs. Major Oil Supplier – 1998

Dispute: The manufacturer claimed the unsatisfactory lubricant was forming deposits inside gearboxes causing them to fail prematurely.

Our Role: Testing the deposits for the manufacturer and comparing these data to the lubricant. Offering expert opinions as to the root cause of the deposit formation based on the testing and comparison of the product and deposits.

Result: Our expert analysis was instrumental in the Oil Suppliers decision to pay the Manufacturer \$600,000 to

correct any wrong caused by the lubricant.

Private Individual vs. Major Motorcycle Manufacturer – 2001

Dispute: The individual claimed in Superior Court that the Motorcycle Manufacturer and/or the US Distributor failed to add lubricant to a critical component at manufacturing or prior to delivery.

Our Role: Sampling and testing of relevant components to determine if lubricant was present at the time of the accident. If so, was it the appropriate lubricant?

Result: Our expert analysis and testimony was instrumental in substantially reducing the judgment against the motorcycle manufacturer.



The successful resolution of litigation requires essential actions taken early on in the case. If you have a reasonable expectation that your product or service may be the subject of litigation, it is your responsibility to act in the best interest of your client or company.

These responsibilities may include some or all of the following.

- Collection, Documentation and Preservation of Evidence
- Examination and Testing Items Involved In Litigation
- Evaluation of Technical Data
- Reporting of Opinions by Technical Experts
- Review of Oppositions Expert Opinions
- Preparation and Delivering of Deposition
- Trial Preparation and Expert Testimony

Specific to these responsibilities, SGS provides:

- Procedures for collection and preservation of information and physical items pertaining to the incident.
- Procedures for the examination and testing of actual items or systems that may have been involved in a specific incident.
- Procedures for evaluation of technical data, appropriate criteria for such evaluation, and other relevant considerations which constitute a proper basis for forming technical opinions.
- Procedures for formal written technical reports which express the opinions of the scientific or technical expert with respect to the study of items that are the subject of criminal or civil litigation.

Should you be the subject of potential litigation in the area of lubrication, SGS has the technical expertise, facilities, equipment and procedures to take you through to the successful conclusion of the litigation.

DIESEL FUEL TESTING FOR EMERGENCY EQUIPMENT - DIESEL GENERATORS, ETC.

Regular analysis of stored diesel fuel for emergency equipment is required to ensure that the fuel meets the technical specifications mandated by regulatory licensing requirements. Often different factors are used in determining quality and usability of stored fuels vs. new fuels. SGS will evaluate your fuels condition against ASTM D-975 "Standard Specifications for Diesel Fuel", or against your own requirements for stored or new fuels.

OIL ANALYSIS (GENERAL)

SGS's comprehensive oil analysis testing and expert analysis provide critical data to help measure wear rates, contamination levels, and oil serviceability. Our used oil analysis sample kits are used for trending equipment and determining oil condition. By taking regularly scheduled oil samples of your operating equipment, our oil analysis tests discover impending problems long before secondary damage

occurs. SGS specializes in oil analysis testing and monitoring for industries with high capacity needs such as;

- Hydroelectric power generation
- Wind turbine power generation
- Fossil fuels
- Nuclear power generation



In addition to early detection and prevention, SGS offers interventional services such as wear and tear (Tribology) services. Our Tribology services identify root causes of failures and provide solutions to prevent further failures. At SGS, we know one of the most important reasons to perform used oil analysis is failure prevention. Regularly scheduled oil analysis tests help monitor conditions, allowing you to:

- Determine how often to change oil
- Prevent excessive wear and tear
- Perform proper service and prevent major overhauls
- Extend equipment life, fluid, and investment life cycles

Early detection helps reduce downtime, prevents costly repair bills, and increases equipment life. Using SGS for oil analysis testing gives you access to technical experts who help you understand your results, and recommend successful control measures. Providing industry specific expertise and oil analysis knowledge since 1980, SGS's thorough used oil analysis and monitoring of oil and

lubricant is focused on the specific needs of a variety of industries. We maintain up-to-date knowledge of various industry requirements and specifications, assuring our tests provide you with the right information.

VARNISH (DEPOSITS)

Industrial lubricating oils are generally categorized as Turbine Oil (Rust & Oxidation inhibited, R&O) or Antiwear (AW) lubricants. These oils contain antioxidants that protect the base oil from oxidizing. The antioxidant levels are normally measured using American Society of Testing and Materials (ASTM) methods for onset of oxidation or the presence of the additive.

Over the last few years there have been growing indications that the antioxidant levels may be high enough to be considered acceptable but varnish-like materials have been separating from the base oil and causing a build up of deposits. The precise mechanism is not yet understood but it is clear that sludge (varnish) problems exist.

When sludge or varnish deposits are found in the system an aggressive effort needs to be made to find the cause and minimize the build up. SGS has all the expertise and technology to assist in this effort.

- Spectrochemical (21 Elements)
- Water by Karl Fischer
- Total Acid Number (TAN)
- Viscosity @ 40C, cSt
- Particle Count (NAS, SAE, ISO)

VOC TESTING

SGS Oil Condition Monitoring labs are qualified VOC testing labs offering Volatile Organic Compounds testing and analysis.

ASTM test method E1868-10 was developed to determine compliance with California's South Coast Air Quality Management (SCAQMD) District Rule 1144, and is now the only accepted VOC test method. This rule, which aims to measure volatile organic compounds to reduce VOC emissions from metalworking fluids and rust inhibitors, applies to all industrial users of the products and to the fluid manufacturers and marketers who

supply them. Volatile organic compounds testing and analysis is required.

SGS VOC (Volatile Organic Compounds) testing uses the loss on drying method, which is used to estimate the amount of volatile materials present in a material. VOC testing with the loss on drying method is a standard test method approved by ASTM that measures volatile organic compounds in metalworking fluids and rust inhibitors, a development with widespread ramifications for the lubricants industry. SGS ASTM test method E1868-10 (loss on drying test) is useful for design purposes, service evaluation, regulatory statutes, manufacturing control, quality control, specification acceptance, development and research.

You can be assured that your facility is in compliance by using SGS Oil Condition Monitoring Laboratories as your VOC testing laboratory.

SAMPLING PROCEDURES/ SHIPPING DANGEROUS GOODS

SAMPLING PROCEDURES

The most important thing to remember in any sampling program is that the data is as good as the sampling. For example:

- Take sample downstream of component and upstream of filters, reservoir and pumps
- Never sample from a dead line or valve . Turbulent Flow is best.
- Always mixed and warm
- Always flush sample valves petcocks
- Use the same method and location each time
- Sample at regularly scheduled intervals
- Keep sampling gear clean
- Be consistent!

SHIPPING DANGEROUS GOODS (FLAMMABLE MATERIAL)

It is your company's responsibility to assure that shipping personnel are trained in proper packaging technique per the requirements of 49 CFR packaging. You should be completely familiar with, and obey all of the laws and regulations concerning shipping dangerous goods. SGS, its officers or employees are not responsible for your shipment.



ASTM AND OTHER METHODS

METHOD NAME	DESCRIPTION OF TEST METHOD
ARI-700 P1	Acidity in Refrigerants by Titration
ARI-700 P2	Water in Refrigerants by Karl Fischer
ARI-700 P3	High Boiling Residue & Particulates
ARI-700 P4	Chloride in Refrigerants/Silver Chloride
ARI-700 P6	Purity of Refrigerants by GC
ARP 598A	Contamination by Particle Count
ASTM D56	Flash Point by Tag Closed Cup
ASTM D86	Distillation of Petroleum Products
ASTM D91	Precipitation Number of Lube Oils
ASTM D92	Flash & Fire Point by Cleveland Open Cup
ASTM D92	Flash or Fire Point by Cleveland Open Cup
ASTM D93	Flash Point Pensky Martin Closed Tester
ASTM D94	Saponification Number of Petroleum Products
ASTM D95	Water in Petroleum Products And Bituminous Material
ASTM D97	Pour Point
ASTM G99	Wear by Pin-On-Disc
ASTM D130	Copper Corrosion by Copper Strip
ASTM D156	Color (Saybolt)
ASTM D189	Conradson Carbon Residue on 10% Bottoms
ASTM D189	Conradson Carbon Residue
ASTM D217	Cone Penetration Full Scale (Unworked)
ASTM D217	Cone Penetration, Full Scale Worked
ASTM D217	NLGI Number, Calculation
ASTM D217	Penetration 10,000 Strokes
ASTM D217	Penetration 100,000 Strokes
ASTM D240	Heat of Combustion by Bomb
ASTM D240	Heat of Combustion, BTU
ASTM D287	API Gravity (Hydrometer Method)
ASTM D323	Reid Vapor Pressure (Other than 100F)
ASTM D323	Vapor Pressure Of Petroleum Products (RVP)
ASTM D381	Existent Gum by Evaporation
ASTM D445	Viscosity at 100F or 210F in SUS
ASTM D445	Viscosity at Special Temperature (Other)
ASTM D445	Viscosity at Temperature 50C, 25C
ASTM D445	Viscosity Calculations
ASTM D445	Viscosity, Kinematic 40C, 100C, 100F, 210F
ASTM D482	Ash Content
ASTM D524	Ramsbottom Carbon Residue
ASTM D524	Ramsbottom Carbon Residue 10% Bottoms
ASTM D611	Aniline Point



METHOD NAME**DESCRIPTION OF TEST METHOD**

ASTM D664	Initial pH (Mod)
ASTM D664	Total Acid Number, ASTM D664
ASTM D665	Rust Preventative Characteristics
ASTM D721	Oil Content in Petroleum Waxes
ASTM D808	Sample Preparation by Bomb
ASTM D874	Sulfated Ash of Lube Oils
ASTM D877	Dielectric Strength of Insulating Oils
ASTM D892	Foaming Characteristics
ASTM D893	Pentane/Coagulated Insolubles
ASTM D893	Toluene/Coagulated Insolubles
ASTM D942	Oxidation Stability of Grease
ASTM D943	TOST Oxidation Characteristics
ASTM D974	Acid Number by Color Indicator
ASTM D975	D975 No. 2 Diesel w/D976 Cetane (Package)
ASTM D976	Cetane Index (Calculation Only)
ASTM D976	Cetane Index (Includes tests)
ASTM F312	Microscopical Sizing/Count on Filters
ASTM D1121	Reserve Alkalinity of Engine Coolants
ASTM D1160	Vacuum Distillation
ASTM D1218	Refractive Index
ASTM D1264	Water Washout of Grease
ASTM D1287	pH of Engine Coolant
ASTM D1298	Density, Relative Density (Specific Gravity)
ASTM D1401	Water Separability of Oils
ASTM D1403	Cone Penetration (1/4) Unworked
ASTM D1403	Cone Penetration (1/4) Worked
ASTM D1404	Deleterious Particles in Grease
ASTM D1500	Color ASTM
ASTM D1533	Water by Karl Fischer (Evaporated)
ASTM D1533	Water by Karl Fischer (Insulating Oils)
ASTM D1662	Active Sulfur
ASTM D1742	Oil Separation from Greases
ASTM D1743	Corrosion Properties of Grease
ASTM D1796	Sediment & Water in Fuel by Centrifuge
ASTM E1868	Loss of Drying by TGA (VOC)
ASTM D1976	Metals by ICP, Aqueous
ASTM D2161	Viscosity, Kinematic to SUS Conversion
ASTM D2265	Dropping Point
ASTM D2270	Viscosity Index (Calculated)
ASTM D2270	Viscosity Index w/ Tests
ASTM D2272	Oxidation Stability (RPVOT)
ASTM D2274	Oxidation Stability Fuel Oil

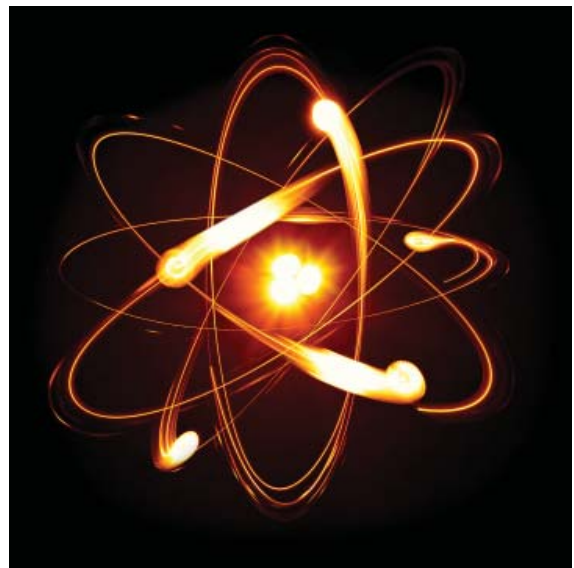


METHOD NAME**DESCRIPTION OF TEST METHOD**

STM D2276	Particulates Contamination in Aviation Fuel
ASTM D2500	Cloud Point
ASTM D2709	Water & Sediment by Centrifuge
ASTM D2781	Compatibility of Fuel Oil by Spot test
ASTM D2896	Base Number (Potentiometric)
ASTM D2982	Glycol in Petroleum
ASTM D3120	Sulfur by Microcoulometry
ASTM D3321	Freezing Point and Glycol Concentration
ASTM D3339	Acid Number by SMC
ASTM D3524	Fuel Dilution in Oils by GC
ASTM D4006	Water by Distillation
ASTM D4007	Water and Sediment
ASTM D4052	Density by Digital Density Meter
ASTM D4176	Water and Particulates in Dist. Fuels
ASTM D4294	Sulfur By X-Ray Fluorescence
ASTM D4327	Anions in Water by I.C.
ASTM D4658	Sulfide Ion in Water
ASTM D4737	Cetane Index w/ Distillation & API
ASTM D4737	Cetane Index (Calculated)
ASTM D4739	Base Number by Potentiometric Titration
ASTM D4807	Sediment in Crude by Membrane Filtration
ASTM D4809	Heat of Combustion, BTU
ASTM D4870	Total Sediment of Residual Fuel
ASTM D5185	Metals and Contaminants by ICP
ASTM D6304	Water by Karl Fischer
ASTM D6810	Testing and Monitoring Antioxidant Additives (RULER)
ASTM D6971	Testing and Monitoring Antioxidant Additives (RULER)
ASTM D7155	Lube Oil Compatibility
ASTM D7687	Microorganisms by ATP
ASTM D7690	Wear Particle Analysis
ASTM D7843	Varnish Potential
HL1103	Scanning Electron Microscope (SEM/AFA)
HL1131	Direct Reading Ferrography
HL1137	Chlorides in Lubricants
HL1140	Trend Analysis Using Fourier Transform Infrared (FT-IR)
HL1141	FT-IR with Interpretation
HL1141	FT-IR by ATR
HL1142	Filter Patch Test
HL1145	Appearance of Grease
HL1147	PCB Screen (A), PCB Level (B)
HL1150	Bacteria Count by "Easycult Combi"
HL1151	Total Halogens by Ion Chromatography



METHOD NAME	DESCRIPTION OF TEST METHOD
HL1152	Conductivity
HL1154	Phosphate Esters by GC (Aviation Hydraulic Fluid)
HL1157	Oxyrane Oxygen by Perchloric Acid
HL1158	Metal by ICP, Organic
HL1161	HMB Biomass Culture Study
HL1164	Microwave Digestion (Preparation)
HL1165	Percent Soot by TGA, ASTM D5967 Appendix A4
HL1165	Thermographic Analysis (TGA)
HL1167	Coolant (Anti-Freeze) Analysis
HL1168	Chloride by Microcoulometry
HL1169	Antifreeze Concentration as Glycol
HL1173	Evaporation of Diluents
HL1174	Percent Moisture of Nonliquid
HL1175	Basic Nitrogen
HL1178	Particulate Contamination of Grease
HL1184	HIAC Particle Count
HL1186	Free Chlorides in Oil
HL1187	Total Dissolved Solids in Coolant
HL1189	Mineral Oil Content in EHC Fluid
HL1190	Turbidity Reading
HL1191	Ferrous Wear Debris by PQ Index
HL1192	Nitrate by Ion Selective Electrode
HL1194	Evaporation Residue
HL1197	SIMDIS (Simulated Distillation Process)
HL1428	Viscosity, Brookfield



***FOR ADDITIONAL UPDATED CAPABILITIES, PLEASE CONTACT SGS OIL CONDITION MONITORING LABS AT (800) 645-5227**
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ACCREDITATIONS

For Analytical Testing of Petroleum Products and Providing Related Predictive Maintenance Programs.

- ISO 9001:2008 Certified
- ANSI/ISO/ASQ Q 9001:2008 Certified

For Chemical Testing of Petroleum Products

- ISO/IEC 17025:2005 Certified



AFFILIATIONS

- ASTM International - ASTM International is a globally recognized leader in the development and delivery of voluntary consensus standards. Today, over 12,000 ASTM standards are used around the world to improve product quality, enhance health and safety, strengthen market access and trade, and build consumer confidence.
- ANAB - The ANSI-ASQ National Accreditation Board plays an important role in ensuring the safety and quality of goods and services and in protecting the environment.
- ILAC - ILAC is the international organisation for accreditation bodies operating in accordance with ISO/IEC 17011 and involved in the accreditation of conformity assessment bodies including calibration laboratories (using ISO/IEC 17025), testing laboratories (using ISO/IEC 17025), medical testing laboratories (using ISO 15189) and inspection bodies (using ISO/IEC 17020).
- STLE - STLE is the premier technical society serving the needs of more than 13,000 individuals and 200 companies and organizations that comprise the tribology and lubrication engineering business sector.
- AWEA - The American Wind Energy Association (AWEA) is the premier national trade association that represents the interests of America's wind energy industry - the country's fastest growing energy sector.

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WHEN YOU NEED TO BE SURE

SGS