



FLUID TESTING CAPABILITIES

North America Tribology

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Product Test List - Packages

TEST PACKAGES	
Test Package	Description
Basic Preventive Maintenance	Spectrochemical, Viscosity, Fuel Dilution, Soot, Water by Crackle, Coolant, PQ Index Non-engines: delete Soot, Coolant & Fuel Dilution
Basic Preventive Maintenance with Base Number or Acid Number	Spectrochemical, Viscosity, Fuel Dilution, Soot, Water by Crackle, Coolant, Base Number/Acid Number, PQ Index
Natural Gas/Compressor	Spectrochemical, Viscosity, Water, Acid Number, Oxidation & Nitration
Hydraulic/Industrial	Spectrochemical, Viscosity, Water by Crackle (if positive, Karl Fischer), Acid Number and Particle Count
Refrigeration	Spectrochemical, Viscosity, Water by Karl Fischer and Acid Number

Product Test List - Packages

SPECIAL WEAR DEBRIS TESTS	
Test Package	Description
PQI / Ferrous Metals Quantifier	Particle Quantifier Index
Laserview™	Types wear particles from oil into classifications such as fatigue wear, sliding wear, and cutting wear; then quantifies particles according to size ranges
Filter Patch, Microscopic Analysis only as add-on	Filter Patch Microscopic Analysis
Filter Patch, Microscopic Analysis with Basic Analysis	Filter Patch Microscopic Analysis with Spectrochemical, Viscosity, Water and PQ Index
Microscopic Particle Examination (MPE) Only as add-on	Analytical Ferrography
Microscopic Particle Examination (MPE) with Basic Analysis	Spectrochemical, Viscosity, Water, PQ Index, Analytical Ferrography
ANTIFREEZE / COOLANTS	
Test Package	Description
BASIC Coolant Package	Appearance, Freeze Point, Percent Glycol, Boiling Point, Nitrites, pH and Total Dissolved Solids
Corrosion, Contaminants and Additive Level Package	Iron, Copper, Aluminum, Lead, Zinc, Molybdenum, Boron, Silicon
BASIC Coolant Package PLUS Corrosion, Contaminants and Additive Levels	All testing listed in Package A1 and Package A2 above
Analysis for Anions	Chlorides, Sulfates, Nitrites, Nitrates, Phosphates
Cumulative Organic Acid Technology Constituents for Extended Life Coolants	Cumulative Value for all tested Organic Acids. Testing can be combined with any or all packages listed above depending on customer requirements
Individual Carboxylate Acid Values in Percent	Actual percentage of concentration for the following Organic Acids: Benzotriazole, Tolyltriazole, Mercaptobenzothiazole, Sebacic Acid, Ethylhexanoic Acid, Benzoic Acid, Octanoic Acid, Toluic Acid, TBBA

Product Test List - Packages

DIESEL FUEL	
Test Package	Description
F1 BASIC Analysis Package for Fuel Cleanliness	Appearance, Water by Karl Fischer, Microbial Growth, Particulate Contamination, Water and Sediment
F2 BASIC Analysis Package for Fuel Quality	API Gravity, Appearance, Cetane Index, Distillation, Flashpoint, Viscosity @ 40C, Water and Sediment
F3 ROUTINE Analysis Package for Fuel Long-Term Storage and Storage Conditions	Appearance, Color, Water by Karl Fischer, Accelerated Stability, Microbial Growth, Acid Number, Particulate Contamination, Water and Sediment
F4 COMPREHENSIVE Analysis Package for Fuel Long-Term Storage and Storage Conditions	API Gravity, Appearance, Cetane Index, Color, Copper Strip Corrosion @ 50C, Water by Karl Fischer, Distillation, Accelerated Stability, Microbial Growth, Acid Number, Particulate Contamination, Viscosity @ 40C, Water and Sediment
F5 COMPREHENSIVE Analysis Package for Fuel Quality and Cleanliness	API Gravity, Appearance, Cetane Index, Water by Karl Fischer, Distillation, Flashpoint, Microbial Growth, Particulate Contamination, Viscosity @ 40C, Water and Sediment, Sulfur
WINTER BASIC Analysis Package for Cold Temperatures	Cloud Point, Pour Point, Cold Filter Plugging Point
TANK B BASIC Analysis Package for Tank Bottoms	Microbial Growth, Water and Sediment
BDB1 Analysis of biodiesel blends for monitoring blend content and cleanliness.	Appearance, Biodiesel Blend Content, Microbial Growth, Particulate Contamination of Biodiesel and Biodiesel Blends, Suspended Water, Free Water and Sediment
BDB2 Expanded analysis of biodiesel blends for determining the general fuel quality, stability, blend content and cleanliness.	Acid Number, Appearance, Biodiesel Blend Content, Copper Strip Corrosion @ 50C, Distillation, Fuel Stability, Microbial Growth, Sulfur Content, Particulate Contamination of Biodiesel and Biodiesel Blends, Suspended Water, Free Water and Sediment, Viscosity @ 40C
F6 Residual fuel oil test package for marine residual fuel oil.	Ash Content, Asphaltenes, API Gravity @ 60F, Accelerated Total Sediment, Carbon Residue, Cleanliness and Compatibility of Residual Fuel Oil, Viscosity @ 50C, Water by Distillation, CCAI, Sulfur; Spectrochemical Analysis: aluminum, silicon, nickel, iron, calcium, phosphorous, sodium, vanadium, zinc

Product Test List - Packages

METALWORKING FLUIDS TEST	
Test Package	Description
Quench Oils	Acid Number, Viscosity 40c, Insolubles, Water by KF, Quench Speed
Neat (Straight Oils) Package A	Acid Number, Viscosity 40c, Insolubles, Water, Chlorine, Sulfur, %Fat
Neat (Straight Oils) Package B	Acid Number, Viscosity 40c, Insolubles, Water, Chlorine, Sulfur
Neat (Straight Oils) Package C	Acid Number, Viscosity 40c, Insolubles, Water, %Fat
Soluble Fluids	Tramp oil, Bact/Fungus, Dirt Content, Free Oil, ICP Hardness, pH
Semi-Synthetic Fluids	Tramp oil, Alkalinity, Bact./Fungus, Dirt Content, Free Oil, ICP Hardness, pH
Synthetic Fluids	Alkalinity, Bact./Fungus, Dirt, Free Oil, ICP Hardness, pH, Brix value

Product Test List - Packages

TURBINE OIL SUITABILITY TEST PACKAGES	
Test Package	Description
New Oil (Bulk, Drum) / New Oil Charge (After 24-hr In-Service)	Appearance, Color, Spectrochemical Analysis, Viscosity @ 40° C, Water by Karl Fischer (ppm), Acid Number, Rust, Copper Corrosion, Water Separability, Foam-Sequence I, Oxidation-RVPOT, Inhibitor Additives, FTIR Baseline, ISO Particle Count, Compatibility (Option), Detailed Analytical Report
Steam Routine PM and Gas Routine PM (Monthly Tier One)	Appearance, Color, Spectrochemical Analysis, Viscosity @ 40° C, Water by Karl Fischer (ppm), Acid Number, FTIR (Oxidation), ISO Particle Count
Steam Routine PM (Quarterly Tier Two)	Appearance, Color, Spectrochemical Analysis, Viscosity @ 40° C, Water by Karl Fischer (ppm), Acid Number, FTIR (Oxidation), ISO Particle Count, Inhibitor Additives-RULER, Detailed Analytical Report
Gas Routine PM (Quarterly Tier Two)	Appearance, Color, Spectrochemical Analysis, Viscosity @ 40° C, Water by Karl Fischer (ppm), Acid Number, FTIR (Oxidation), ISO Particle Count, Varnish Potential Rating*, Detailed Analytical Report
Steam & Gas - Annual Suitability (Tier Three)	Appearance, Color, Spectrochemical Analysis, Viscosity @ 40° C, Water by Karl Fischer (ppm), Acid Number, Rust, Copper Corrosion, Water Separability, Foam-Sequence I, Oxidation-RVPOT, Differential FTIR Analysis, Varnish Potential Rating*, Detailed Analytical Report
Varnish Potential Rating	Blotter, Color, Ultracentrifuge, Membrane Patch Colorimetry (Color by Automatic Colorimetry and Pentane Insolubles by Weight), ISO Particle Count, Inhibitor Additives-RULER

**Varnish Potential Rating package included.*

Product Test List - Supplies

SAMPLING SUPPLY ITEMS	
Sampling Supply Item	Description
B Series Sampling Valve	B series M 16x2 sampling valve (5 to 5800 psi)
B Series Probe Adapter	1/4" OD probe adapter for B series valve
Barcode Labels	Roll of 100 labels for use with Brother QL570 printer
Brother QL570 Label Printer	Professional label printer for printing bar code labels
Hazmat Pack	Shipping container for fuel Hazmat kit complete with 32 oz can
KP Pushbutton Sampling Valve	1/4" OD pushbutton valve (5 to 750 psi) 1/8" OD pushbutton valve (5 to 750 psi)
KST Probe Sampling Valve	1/8" OD sampling valve (5 to 400 psi)
LT Series High Flow Tube Extend	1/4" OD high flow tube extend with 12" tube (0 to 100 psi)
LT Series Probe Adapter	1/4" OD probe adapter for L/LT valve
Samplzyer Needle Probe	Needle probe with cap Needle probe without a cap
Suction Pump	Suction pump
Suction Pump Plastic Tubing	1/4 OD tubing sold in minimum of 100' lengths *additional sizes available upon request*
Return Mailer (US Mail)	Postage Paid Return Mailers
SAMPLING SUPPLY SPECIAL ORDER ITEMS	
Sampling Supply Item	Description
Breather and Drain Mounts	Breather and drain mounts
Remote Access Hose & Tube Extends	Remove access hose and tube extends
LIMITED INVENTORY AVAILABLE -- TO BE DISCONTINUED AFTER DEPLETED	
Sampling Supply Item	Description
Samplzyer Valve & Cap	1/4" size only

Product Test List - Individual Tests

MISCELLANEOUS TEST LIST									
Test Parameter	Method	Sample Size	COOLANT	FILTER	FUEL	GREASE	MWF	OIL	
Accelerated Stability / Fuel Stability	DuPont F21-61	120 ml			X				
Accelerated Stability / Fuel Stability	D6468	120 ml			X				
Acid Number	D974	60 ml			X			X	
Acid Number	D664	60 ml			X		X	X	
Acid Split/Tramp Oil Determination	Volumetric	60 ml					X		
Acidity / Distillation Residue	D1093	120 ml			X				
Alcohol Content in Fuels	Emcee	200 ml			X				
Alkalinity by Auto-Titrator	D1067Mod	60 ml					X		
Aniline Point	D611	30 ml						X	
Appearance	D4176	20 ml			X				
Ash Content	D482	100 ml			X	X		X	
Ash, Sulfated Residue	D874	30 ml						X	
Asphaltenes	UOP 614	30 ml			X				
Base Number	D4739	30 ml						X	
Base Number	D2896	30 ml						X	
Benzotriazole (BZT) and Tolyriazole (TTZ) in MWF - Quantitative Measurement	D6156Mod	60 ml					X		
Blending Compatibility of Lubricating Oil (per blend)	D7155	500 ml						X	
Biodiesel Blend Content	FTIR	60 ml			X				
Boiling Point	D3321	60 ml	X						
Brake Fluid, Oil Contamination Determination	Extraction	60 ml							
BTU Per Lb/Gal, Calculated -- Heating Value Includes Sulfur, Ash, Water, and API Gravity	D4868	480 ml			X			X	
<i>Carbon Residue</i>									
Carbon Residue, Conradson	D189	30 ml			X			X	
Carbon Residue, Conradson on 10% Residue	D86/D189	120 ml			X				
Carbon Residue, Ramsbottom	D524	120 ml			X			X	
Carbon Residue, Ramsbottom on 10% Residue	D86/D524	120 ml			X				
Cetane Index, Calculated (Includes Distillation & Gravity)	D4737	500 ml			X				
Chloride in Metalworking Fluids	Potentiometric	60 ml					X		
Chlorides in Coolant	IC / D5827	30 ml	X						
Chlorine	WDXRF / D6443	50 ml						X	
Chlorine	WDXRF / D6443	50 ml						X	
Chlorine	D5384	50 ml						X	

MISCELLANEOUS TEST LIST									
Test Parameter	Method	Sample Size	COOLANT	FILTER	FUEL	GREASE	MWF	OIL	
Cloud Point	D2500	100 ml			X				
Cobalt Measurement of Coolant	Colorimetric	60 ml					X		
Cold Filter Plugging Point (CFPP)	IP309, D6371	60 ml			X				
Color Determination of Petroleum Products	D1500	100 ml			X			X	
Conductivity	D1125	60 ml	X				X		
Cone Penetration Worked	D217-02	(1 lb)				X			
Cone Penetration Unworked	D217-02	(3 lbs)				X			
Glycol Based Anti-Freeze - Coolant Contamination in Oils	D2982	10 ml							X
Coolant Contamination in Oils - Glycol Based Anti-Freeze	D2982	10 ml							X
Corrosion, Copper Strip @ 50°C	D130	60 ml	X		X		X		
Corrosion, Copper Strip @ 100°C	D130	60 ml							X
<u>Density</u>									
Density, Specific Gravity, API Gravity of Petroleum Products	D1298	500 ml			X				X
Density and Specific Gravity of Coolants and MWFs	D1122	500 ml	X				X		
Density: API Gravity of Petroleum Products	D287	500 ml			X				X
Dewatering	Cast Iron Chip	60 ml					X		
Dielectric Strength	D877	120 ml							X
Dirt Filtration	D5907Mod	180 ml					X		
Distillation of Petroleum Products	D86/D7344	120 ml			X				
MPE (Analytical Ferrography) Includes basic oil analysis	Ferrography	30 ml		X		X			X
MPE (Analytical Ferrography) As a add-on	Ferrography	30 ml		X		X			X
Filter Patch, Microscopic Analysis (includes basic oil analysis)	Microscope	100 ml		X	X	X			X
Filter Patch, Microscopic Analysis (as an add-on)	Microscope	100 ml		X	X	X			X
Colorimetry by Filter Patch	WK13070	N/A							X
Filter Prep for Analysis only (does not include analysis)	Microscope	N/A		X					
<u>Flash Point</u>									
Flash and Fire Point - (COC) Cleveland Open Cup	D92	240 ml							X
Flash Point - (COC) Cleveland Open Cup	D92	240 ml					X		X
Flash Point - (PMCC) Pensky-Marten Closed Cup	D93	240 ml			X				X
Flash Point - (MCCC) Modified Continuous Closed Cup	D7094	50 ml			X				X
Flash Point -(TCC) Tag Closed Cup	D56	120 ml			X				

MISCELLANEOUS TEST LIST									
Test Parameter	Method	Sample Size	COOLANT	FILTER	FUEL	GREASE	MWF	OIL	
<u>Foaming Characteristics</u>									
Foaming Characteristics, Sequence 1	D892	250 ml							X
Foaming Characteristics, Sequence 2	D892	250 ml							X
Foaming Characteristics, Sequence 3 (sequence 2 included)	D892	250 ml							X
Foaming Characteristics, Sequence 1, 2, & 3	D892	500 ml							X
Free Oil Determination	Visual	90 ml					X		
Freezing Point of Coolants	D3321	60 ml	X						
Fuel Dilution	Calculated	60 ml							X
Fuel Dilution by Gas Chromatography	D3524	30 ml							X
Fuel Soot	Infrared	30 ml							
Fuel System Icing Inhibitor (Jet Fuel)	D5006	200 ml			X				
Glycol	D2982	10 ml							X
Glycol Content in Coolant	Refractometer	10 ml	X						
Hardness - Coolant	D6130Mod	60 ml	X						
Infrared Analysis - Analytical) (per hour)	FTIR	30 ml				X			X
Laser Net Fines (Laserview™)	Optical Imaging	120 ml							X
<u>Metals / Spectrochemical Analysis</u>									
Metals: Standard Metals (20) in Lube Oils by Arc Rotrode	D6595	60 ml							X
Metals: Standard Metals (20) in Lube Oils by ICP	D5185	60 ml							X
Metals: Metals Analysis in Petroleum Products by ICP by Solvent Dilution	D4951/D5185	60 ml							X
Metals: Antimony in Petroleum Products by ICP by Solvent Dilution	D4951/D5185	60 ml							X
Metals: Selenium in Petroleum Products by ICP by Solvent Dilution	D4951/D5185	60 ml							X
Metals: Silicate in Coolants by ICP (not to be confused with silicone)	ICP	30 ml	X						
Metals: Silicate in Coolants by Arc Rotrode (not to be confused with silicone)	D6595Mod	30 ml	X						
Metals: ICP (Ash-Acid Digestion prep)	Ash, ICP	60 ml		X	X	X			X
Metals: ICP (Ash Fusion Digestion prep)	D5184	60 ml		X	X	X			X
Metals: ICP (Solvent Dilution, Fuels)	D5708	60 ml							
Metals: ICP (MWF and Coolants)	D6130	60 ml	X				X		
Microbial Growth	Liquid Culture/Dip Slide	30 ml			X		X		X
Nitrates	D5827	30 ml	X						
Nitration; Nitration Number by FTIR	E2412	30 ml							X

MISCELLANEOUS TEST LIST									
Test Parameter	Method	Sample Size	COOLANT	FILTER	FUEL	GREASE	NMWF	OIL	
Nitrites	D5827/Titration	30 ml	X						
Nonionic Surfactants by Manual Titration	Titration	60 ml					X		
Organic Acid Inhibitors in Coolants, Cumulative Total	UPLC	30 ml	X						
Organic Acid Inhibitors in Coolants, Individual Determination Acid Compounds	UPLC	30 ml	X						
Organic Acid Inhibitors in Coolants	Dexsil Kit	1 ml	X						
Oxidation: Oxidation Number by FTIR	E2412	30 ml						X	
Oxidation: RPVOT (Rotating Pressure Vessel Oxidation Test Oxidation)	D2272	500 ml						X	
Particle Count by Optical Counter	ISO 11500/4406	120 ml						X	
Particle Count by Pore Blockage	BS 3406/ ISO 4406	120 ml						X	
Particulate Contamination by Weight In Distillate Fuels	D6217/D5452	120 ml			X				
Particulate Contamination by Weight In Biodiesel and Biodiesel Blends	D7321	400 ml			X				
Pentane Insolubles Membrane Filtration	D4055	200 ml						X	
Pentane Insolubles by Weight	D893	50 ml						X	
Pentane Insolubles by Weight, w/ Coagulant	D893	50 ml						X	
Pentane Insolubles by LMOA	D7317	30 ml							
pH in Metalworking Fluids	D1067Mod	60 ml	X				X		
pH in Coolants	D1287	60 ml							
pH in Oils	pH Meter	60 ml	X				X	X	
Pour Point	D97	100 ml			X			X	
PQI / Ferrous Metals Quantifier	PQI	50 ml						X	
Quaternary Biocide Determination	Titration	60 ml					X		
Quench Time/Speed	D3520Mod	60 ml					X		
Refractometer	Refractometer	60 ml					X		
RPVOT (Rotating Pressure Vessel Oxidation Test Oxidation)	D2272	500 ml						X	
Reserve Alkalinity	D1121	30 ml	X						
RULER -% Remaining Active Phenolic & Amine Antioxidants (must supply reference oil from same batch or formulation)	D6971/D6810	100 ml				X		X	
Rust Testing by Cast Iron Chips (CIC)	Cast Iron Chip	60 ml					X		
Rust Test, Distilled Water	D665-A	600 ml						X	
Rust Test, Synthetic Sea Water	D665-B	600 ml						X	
SAE Rating	Calculation from Viscosity	30 ml						X	
Saponification Number	D94	30 ml							

MISCELLANEOUS TEST LIST									
Test Parameter	Method	Sample Size	COOLANT	FILTER	FUEL	GREASE	NMWF	OIL	
Sediment in Fuel Oils by Extraction	D473	120 ml			X				
Sediment in Fuel Oils by Hot Filtration	D4870	120 ml			X				
Sediment in Fuel Oils by Hot Filtration, Potential After Aging	D4870	120 ml			X				
Sediment and Water in Fuel Oils	D1796/2709	120 ml			X				
Sediment and Water in Fuel Oils	D2709	120 ml			X				
Sediment in Lubricating Oil	D2273	120 ml						X	
Sediment in Polymer Quench Solutions	Volumetric	90 ml	X						
Sludge Content in Quench Oils	Volumetric	90 ml					X		
Stability (Fuel/Accelerated Stability)	DuPont F21-61	120 ml			X				
Stability (Fuel/Accelerated Stability)	D6468	120 ml							
Stability and Compatibility of Residual Fuel Oil	D4740	60 ml			X				
Sugar in Fuel or Lubricating Oils	Anthrone Indicator	30 ml			X			X	
Sulfates	D5827	30 ml	X						
Sulfation: Sulfation Number by FTIR	E2412	30 ml						X	
Sulfonate Content in Rust Preventatives	Titration	60 ml					X		
Sulfonate Content in Metalworking Fluids	Titration	60 ml					X		
Sulfur Determination, Active Sulfur	D1662M	60 ml					X	X	
Sulfur Determination, Total - Wavelength Dispersive XRF (Ultra Low Sulfur for D5453, 1 ppm to 100 ppm) (<1 ppm to 4000 ppm for D7039)	D5453/D7039	30 ml			X			X	
Sulfur Determination, Total - Energy Dispersive XRF (>100 ppm)	D4294	30 ml			X			X	
Technical Services, Laboratory Technician	Hourly Rate	NA							
Technical Services, Laboratory Supervisor or Manager	Hourly Rate	NA							
Toluene Insolubles by Weight	D893	50 ml						X	
Toluene Insolubles by Weight, w/ Coagulant	D893	50 ml						X	
Total Dissolved Solids in Coolants	D1125Mod	30 ml	X						
Total Oil and Tramp Oil Determination in Synthetic Metalworking Fluids	Volumetric	60 ml					X		
Tramp Oil Determination / Acid Split	Volumetric	60 ml					X		
Ultra Centrifuge	MM1169	80 ml						X	
Varnish Potential Rating	Varnish Potential Rating Package	500 ml						X	
<u>Viscosity</u>									
Viscosity @ 40°C	D445Mod/D7279	60 ml			X			X	

MISCELLANEOUS TEST LIST

Test Parameter	Method	Sample Size	COOLANT	FILTER	FUEL	GREASE	NMWF	OIL
Viscosity @ 50°C	D445Mod/D7279	60 ml			X			
Viscosity @ 100°C	D445Mod/D7279	60 ml						X
Viscosity Index (Includes Viscosity at 40°C & 100°C)	D2270	120 ml						X
Water Hardness	D1126Mod	60 ml					X	
Water and Sediment in Fuel Oils	D1796/2709	120 ml			X			
Water and Sediment in Fuel Oils	D2709	120 ml			X			
Water by Distillation	D95	120 ml			X	X		X
Water by Karl Fischer (Coulometric)	D6304/D1123	30 ml	X		X	X		X
Water by Karl Fischer (Volumetric)	E203	30 ml			X	X		X
Water Separability at 54°C or 82°C	D1401	100 ml						X
Wear Particle Analysis: PQI / Ferrous metals quantifier	PQI	100 ml						X