



# TRIBO-LAB™ COMPLETE TEST LIST



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### OILS – Performed at All Locations

| TEST                                          | METHOD                    | UNITS OF MEASURE |
|-----------------------------------------------|---------------------------|------------------|
| Acid Number                                   | mod. ASTM D664            | mg KOH/g         |
| Appearance                                    | Internal Method Tribo-Lab | description      |
| Base Number                                   | mod. ASTM D4739           | mg KOH/g         |
| Elemental Metals Analysis (24 by ICP)         | mod. ASTM D5185           | ppm              |
| FTIR - Full Spectrum Scan                     | FTIR                      | graph            |
| FTIR - Full Spectrum Scan w/ interpretation   | FTIR                      | graph w/ consult |
| Fuel Dilution %                               | ASTM D7593                | %                |
| Glycol                                        | mod. ASTM D2982           | pos/neg          |
| Soot %                                        | ASTM E2412                | %                |
| Nitration                                     |                           | abs/0.1mm        |
| Oxidation                                     |                           | abs/cm           |
| Particle Count (Calibration: ISO 11171)       | ISO 4406                  | counts/mL        |
| Particle Quantifier (Ferrous Density)         | Manufacturer              | no units         |
| i-pH                                          | mod. ASTM D7946           | pH               |
| Strong Acid Number                            | mod. ASTM D664            | mg KOH/g         |
| Viscosity - 40° or 100°C                      | mod. ASTM D445            | cSt              |
| Viscosity Index (Requires Vis @ 40°C & 100°C) | ASTM D2270                | no units         |
| Water by Crackle (estimate)                   | Internal Method Tribo-Lab | %                |
| Water by Karl Fischer - Coulometric           | mod. ASTM D6304C          | % or ppm         |

For more information you can contact us through the phones:

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### OILS/LUBRICANTS – Additional Testing

| TEST                             | METHOD                   | UNITS OF MEASURE |
|----------------------------------|--------------------------|------------------|
| 4 Ball Wear Test (Oil)           | ASTM D5183               | no units         |
| 4 Ball Wear Test (Grease)        | ASTM D2266               | no units         |
| Acid Digestion                   | ASTM D5198               | Sample Prep      |
| Acidity (as acetic acid)         | ASTM D1613               | %                |
| Air Release                      | ASTM D3427               | minutes          |
| Aniline Point                    | ASTM D611                | Celsius          |
| Base Number by Perchloric Acid   | ASTM D2896               | mg KOH/g         |
| Carbon Residue (Conradson)       | ASTM D189/IP13           | %                |
| Chlorine                         | ASTM D5384               | ppm              |
| Cold Crank Simulator             | ASTM D5293               | mPa·s            |
| Color                            | ASTM D6045               | no units         |
| Cone Penetration Unworked        | ASTM D217                | mm               |
| Cone Penetration Worked          | ASTM D217                | mm               |
| Contamination Dispersancy        | mod. ASTM D7899          | IC, MD, DP       |
| Copper Corrosion                 | ASTM D130                | no units         |
| Density                          | ASTM D7777               | g/mL             |
| Dielectric Strength              | ASTM D877                | kV               |
| Ferrography - Analytical         | ASTM D7690               | picture          |
| Filter Debris Analysis           | Internal Method Tribolab | no units         |
| Fire Point                       | ASTM D92                 | Celsius          |
| Flash Point – Cleveland Open Cup |                          |                  |

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### OILS/LUBRICANTS – Additional Testing

| TEST                               | METHOD                   | UNITS OF MEASURE |
|------------------------------------|--------------------------|------------------|
| Foaming Tendency                   | ASTM D892                | mL               |
| Gravimetric Solids                 | Internal Method Tribolab | Ppm              |
| Micro-Patch                        | Internal Method Tribolab | picture          |
| MPC (Membrane Patch Colorimetry)   | mod. ASTM D7843          | no units         |
| Pentane Insolubles (Coagulated)    | ASTM D893                | %                |
| Pentane Insolubles (Uncoagulated)  | ASTM D893                | %                |
| Photo Micrograph (Picture Only)    | Internal Method Tribolab | Picture          |
| Resistivity                        | ASTM D1169               | Ohms – cm        |
| RPVOT                              | ASTM D2272               | minutes          |
| LSV (Ruler)                        | ASTM D6971               | %                |
| Rust                               | ASTM D665                | pass/fail        |
| Saponification Number              | ASTM D94                 | mg KOH/g         |
| Seta Flash                         | ASTM D3828               | Celsius          |
| Specific Gravity                   | ASTM D7777               | no units         |
| Sulfated Ash                       | ASTM D874                | %                |
| Sulfur in Oil                      | ASTM D4951               | %                |
| Toluene Insolubles (Coagulated)    | ASTM D893                | %                |
| Toluene Insolubles (Uncoagulated)  | ASTM D893                | %                |
| Viscosity (Brookfield)             | ASTM D2983               | mPa·s            |
| Water Separability Characteristics | ASTM D1401               | mL               |

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| COOLANTS                                                                                                                                   |                          |                  |
|--------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|------------------|
| TEST                                                                                                                                       | METHOD                   | UNITS OF MEASURE |
| Antifreeze % - Ethylene or Propylene Glycol)                                                                                               | Internal Method Tribolab | %                |
| Boil Point                                                                                                                                 | Internal Method Tribolab | Fahrenheit       |
| Freeze Point                                                                                                                               | mod. ASTM D3321          | Fahrenheit       |
| Bacteria, Fungi, Mold                                                                                                                      | Manufacturer             | counts           |
| Carboxylic Acid                                                                                                                            | Manufacturer             | pass/fail        |
| Density                                                                                                                                    | ASTM D7777               | g/mL             |
| Elemental Metals Analysis by ICP                                                                                                           | mod. ASTM D6130          | ppm              |
| HPLC - Benzotriazole, Tolytriazole, Mercaptobenzothiazole, Benzoic Acid, Sebacic Acid, 2- Ethylhexanoic Acid, Octanoic Acid, P-Toluic Acid | Internal Method Tribolab | ppm              |
| Ion Chromatography - Chloride, Sulfate, Nitrite, Nitrate, Phosphate, Glycolate, Acetate, Formate & Oxalate.                                | ASTM D5827               | mg/L             |
| Nitrite                                                                                                                                    | Internal Method Tribolab | ppm              |
| pH Waters                                                                                                                                  | ASTM D1287               | pH               |
| Reserve Alkalinity                                                                                                                         | ASTM D1121               | mL               |
| SCA Number                                                                                                                                 | Internal Method Tribolab | no units         |
| Specific Gravity                                                                                                                           | ASTM D7777               | no units         |
| Specific Conductance                                                                                                                       | Meter Measurement        | μS/cm            |
| Total Dissolved Solids                                                                                                                     | Meter Measurement        | mg/L             |
| Total Hardness                                                                                                                             | Internal Method Tribolab | ppm              |
| Visuals - color, oil, fuel, foam, magnetic precipitate, non-magnetic precipitate, odor & foam.                                             | Internal Method Tribolab | description      |

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| DIESEL FUEL                |                                     |                  |
|----------------------------|-------------------------------------|------------------|
| TEST                       | METHOD                              | UNITS OF MEASURE |
| Acid Number                | mod. ASTM D664                      | mg KOH/g         |
| Aerobic Bacteria           | Manufacturer                        | counts           |
| API Gravity                | ASTM D7777                          | no units         |
| Aromatic Contents          | ASTM D6591                          | separate report  |
| Ash                        | ASTM D482/IP4                       | %                |
| Bacteria, Fungi, Mold      | Manufacturer                        | counts           |
| % Biodiesel (FAME)         | ASTM D7371                          | %                |
| BTU per gallon             | ASTM D4868                          | btu/gal          |
| BTU per pound              | ASTM D4868                          | btu/lb           |
| Carbon Residue (Conradson) | ASTM D189/IP13                      | %                |
| Cetane Index               | ASTM D976                           | no units         |
| Micro-Distillation         | Predicted D86 results by ASMT D7345 | Celsius          |
| Cloud Point                | ASTM D7689                          | Celsius          |
| Cold Filter Plug Point     | IP309/ASTM D6371                    | Celsius          |
| Copper Corrosion           | ASTM D130                           | no units         |

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| DIESEL FUEL                             |                  |                  |
|-----------------------------------------|------------------|------------------|
| TEST                                    | METHOD           | UNITS OF MEASURE |
| Density                                 | ASTM D7777       | g/mL             |
| Elemental Metals Analysis (24 by ICP)   | mod. ASTM D5185  | ppm              |
| Flash Point - Closed Cup                | ASTM D3828       | Celsius          |
| Lubricity                               | ASTM D6079       | µm               |
| Oxidation Stability                     | ASTM D2274       | %                |
| Particle Count (Calibration: ISO 11171) | ISO 4406         | counts/mL        |
| Pour Point                              | ASTM D7346       | Celsius          |
| Specific Gravity                        | ASTM D7777       | no units         |
| Sulfur                                  | ASTM D7220       | ppm              |
| Thermal Stability                       | mod. ASTM D6468  | %                |
| Total Free Glycerin                     | ASTM D6584       | %                |
| Viscosity - 40°C                        | mod. ASTM D445   | cSt              |
| Water by Karl Fischer - Coulometric     | mod. ASTM D6304C | % or ppm         |
| Water & Sediment                        | ASTM D2709       | %                |

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| GREASE                          |                          |                     |
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| TEST                            | METHOD                   | UNITS OF MEASURE    |
| <b>Basic Grease Testing</b>     |                          |                     |
| Color                           | ASTM D7918               | CIE color           |
| FTIR – Full Spectrum Scan       | FTIR                     | Graph               |
| Ferrous Debris Level            | ASTM D7918               | ppm                 |
| Water by Crackle (estimate)     | Internal Method Tribolab | %                   |
| <b>Advanced Grease Testing</b>  |                          |                     |
| As Basic Grease Testing, plus:  |                          |                     |
| Consistency                     | ASTM D7918               | Die Extrusion Index |
| Elemental Metals Analysis (ICP) | mod. ASTM D5185          | ppm                 |
| LSV (Ruler)                     | ASTM D7918               | %                   |
| Microbiological Activity        | Mod. ASTM D7463          | pg ATP              |
| Water by KF - Coulometric       | mod. ASTM D6304C         | ppm                 |

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