QUALITY BOOSTS.

Lubricant Additives
Synthetic base fluids & lubricant additives

QUALITY WORKS.
LUBRICATION COMPONENTS AND SOLUTIONS: NEW FORMULATING POSSIBILITIES FROM ONE OF THE INDUSTRY’S BROADEST PORTFOLIOS

LANXESS is a leading global supplier of components to the lubricants industry. These components are essential to automotive, aviation, marine, mining, refrigeration, power generation, gas pumping and other industries.

Our products help our customers to comply with increasingly demanding government-mandated emissions and fuel-economy standards, protect braking systems from wear and tear, and extend the life of machinery operating at high temperatures or operating continuously.

With manufacturing sites in North and South America, Europe and Asia-Pacific, we are positioned to deliver lubricant components that significantly improve the performance of motor oils, transmission fluids, industrial and hydraulic oils, metalworking fluids and fuels, with exceptional customer care.

We bring you resources on a whole new scale. Our extensive product line enhances lubricant formulations and brings solutions to meet complex technical challenges. Our research capabilities, practical experience, global delivery, dedicated laboratory and on-site support staff make LANXESS the supplier of choice.
SYNTHETIC BASE FLUIDS

Synthetic Base fluids can significantly enhance the performance of lubricant formulations by providing unique properties and characteristics that cannot be obtained from conventional mineral-based fluids. They are engineered to support improved performance in lubricant applications where extremes in low and high temperature and heavy loads may be experienced.

**Synton® polyalphaolefin**

Synton® PAO products are high viscosity, highly saturated, linear/branched polymers that are designed to be used as the high viscosity synthetic oil or viscosity modifier component of a high performance lubricant or synthetic lubricant formulation. The highly saturated chemistry provides excellent response to anti-oxidants and can be an asset in a lubricant formulation for use under high temperature conditions. Blends made with Synton® PAO products can have a high Viscosity Index, with good low and high temperature performance, providing a lubricant that is usable under widely varying temperature conditions. The relatively low molecular weight of the Synton® PAO products, compared to the classic viscosity modifiers, makes these products stable to the significant shear stresses seen in many applications – especially gear oils. This shear stability behavior, both temporary and permanent, means a more consistent oil film thickness is provided to the working parts and can potentially help with wear protection.

**Attributes**

- Excellent shear stability
- High VI providing improved wear protection and better fuel efficiency
- Good low temperature properties for improved flow
- Outstanding oxidation and thermal stability to support extended drain intervals
- Low volatility for lower oil consumption

<table>
<thead>
<tr>
<th>Property</th>
<th>Synton® PAO 40</th>
<th>Synton® PAO 100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kinematic viscosity, cSt @ 100 °C</td>
<td>40</td>
<td>100</td>
</tr>
<tr>
<td>Kinematic viscosity, cSt @ 40 °C</td>
<td>399</td>
<td>1250</td>
</tr>
<tr>
<td>Viscosity index</td>
<td>152</td>
<td>168</td>
</tr>
<tr>
<td>Pour point, °C</td>
<td>–36</td>
<td>–24</td>
</tr>
<tr>
<td>Flash point, °C</td>
<td>288</td>
<td>301</td>
</tr>
<tr>
<td>Fire point, °C</td>
<td>325</td>
<td>327</td>
</tr>
<tr>
<td>Specific gravity (20/20 °C)</td>
<td>0.847</td>
<td>0.847</td>
</tr>
</tbody>
</table>

For general applications, Reolube® 225, a fully synthetic phosphate ester, is an excellent base stock for formulating ISO VG 46 HFDR fire resistant hydraulic fluids. Reolube® 225 provides excellent solubility and responds well to a range of additive packages. Where ISO VG 32 is required, Reolube® 140 synthetic phosphate ester is recommended.

**Reolube® phosphate ester base stocks**

LANXESS also supplies ester base stocks that are designed to be blended into fire-resistant hydraulic fluids for use in high risk applications such as nuclear power stations and steel mills.

**Hatcol® synthetic esters**

Hatcol® synthetic ester base stocks are used extensively in synthetic lubricant formulations to enhance high and low temperature performance, improve additive solubility and increase lubricity. They can be used alone for maximum high temperature performance or in combination with PAOs and Group III oils to improve additive solubility, stability, elastomer compatibility and cleanliness. Our broad synthetic ester line and expert technical support can fulfill virtually any need in lubrication.

**Attributes**

- FDA 21 CFR 178.3570 / 178.3620 Compliant
- Kosher and Halal approved
- Proven industry standard with extensive formulary application experience
- Manufactured at two regional sites which provides high level of supply security

**Market**

- Refrigeration
- HFC compatible refrigeration compressor oils

**Attributes**

- Miscibility with HFC refrigerants, materials compatibility, load carrying ability, elastomeric seal compatibility, lower energy consumption

<table>
<thead>
<tr>
<th>Product</th>
<th>Viscosity at 40°C cSt</th>
<th>Benefits (vs. MO, VO &amp; other synthetics)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hatcol® 3337</td>
<td>15</td>
<td>Reduced energy consumption, polarity to provide miscibility with HFC refrigerant gases, extended life in hermetically sealed applications.</td>
</tr>
<tr>
<td>Hatcol® 3505</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>Hatcol® 3506</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>Hatcol® 3501</td>
<td>46</td>
<td></td>
</tr>
<tr>
<td>Hatcol® 3504</td>
<td>68</td>
<td></td>
</tr>
<tr>
<td>Hatcol® 3503</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Hatcol® 3507</td>
<td>220</td>
<td></td>
</tr>
</tbody>
</table>

*MO = Mineral Oil, VO = Vegetable Oil
**HATCOL® SYNTHETIC ESTERS APPLICATIONS**

<table>
<thead>
<tr>
<th>Market</th>
<th>Application</th>
<th>Attributes</th>
<th>Product</th>
<th>Viscosity – cSt at 40 °C</th>
<th>Benefits (vs. MO, VO &amp; other synthetics)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automotive</td>
<td>Crank case oils</td>
<td>High stability in highly oxidative environment, high load bearing at friction points, lower deposits, elastomeric seal compatibility, lower energy consumption</td>
<td>HATCOL® 2938</td>
<td>19</td>
<td>Improved additive solubility and elastomeric compatibility through the modification of polarity of the base oil, improved lubricity and interaction of the base oil with metal surfaces</td>
</tr>
<tr>
<td></td>
<td>2-stroke engine oils</td>
<td>High temperature stability, lower valve deposits, lower smoking, lower oil and energy consumption</td>
<td>HATCOL® 2999</td>
<td>80</td>
<td>Dramatic reduction in deposits and smoking, cut oil consumption (100:1 gas-oil ratio possible) lower cost of ownership (maintenance and downtime)</td>
</tr>
<tr>
<td>Industrial</td>
<td>Air compressor oils</td>
<td>High stability in highly oxidative environment, longer drain intervals, lower deposits, lower maintenance and downtime, lower energy consumption</td>
<td>HATCOL® 2938</td>
<td>19</td>
<td>Longer drain intervals, reduced deposits on recip valves, lower maintenance and downtime, reduced energy consumption</td>
</tr>
<tr>
<td></td>
<td>Oven chain oils</td>
<td>Performance in extreme environments (up to 300 °C), low deposits on chain drives, minimal fumes and odor, lower energy and maintenance costs</td>
<td>HATCOL® 2372</td>
<td>125</td>
<td>Dramatic reduction in deposits, reduction in fumes and odors, cut oil consumption by up to 80%, reduced energy consumption by up to 50%, lower maintenance and downtime</td>
</tr>
<tr>
<td></td>
<td>Gas turbines</td>
<td>Performance in extreme environments (up to 300 °C), no hot spots which cause hard deposits to form, lower energy and maintenance costs</td>
<td>HATCOL® 2954</td>
<td>24</td>
<td>Dramatic reduction in deposits, reduced energy and oil consumption, reduced maintenance and downtime</td>
</tr>
<tr>
<td>Biorenewable / biodegradable Esters having specific natural acid content</td>
<td>Use of green raw materials and green end products</td>
<td></td>
<td>HATCOL® 2938</td>
<td>19</td>
<td>75% Biorenewable / &gt; 60% biodegradable</td>
</tr>
<tr>
<td>Biorenewable / biodegradable Esters having specific natural acid content</td>
<td>Use of green raw materials and green end products</td>
<td></td>
<td>HATCOL® 5068</td>
<td>68</td>
<td>10% Biorenewable / &lt; 60% biodegradable</td>
</tr>
<tr>
<td>Biorenewable / biodegradable Esters having specific natural acid content</td>
<td>Use of green raw materials and green end products</td>
<td></td>
<td>HATCOL® 2377</td>
<td>20</td>
<td>0% Biorenewable / &gt; 60% biodegradable</td>
</tr>
</tbody>
</table>

**AMINIC ANTIOXIDANTS**

Antioxidants are vital components in the prevention of lubricant oxidative degradation due to exposure to oxygen, heat, light and metals during storage and service. Our Naugalube® aminic antioxidant family is suitable for various types of lubricants, including mineral oil based products, synthetic base fluids and greases.

Naugalube® aminic antioxidants meet the challenging requirements of today’s industrial standards for stabilization of lubricants and fuels. Synergistic blends can be formulated to optimize cost/performance benefits. Depending on the specific products, antioxidants are available in liquid, powder or flake form. Naugalube® 438L with its extensive application experience serves as a proven industry standard.

**Naugalube® antioxidants application table**

<table>
<thead>
<tr>
<th>Product</th>
<th>Applications</th>
<th>Attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naugalube® 438L</td>
<td>Automotive engine oils, Industrial lubricants and grease</td>
<td>Efficient high performance AO for mineral &amp; synthetic base oils</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Non-sludging and non-corrosive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Effective for deposit control</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Liquid for easy blending and handling</td>
</tr>
<tr>
<td>Naugalube® 438</td>
<td>Aviation turbine oils, gear oils, hydraulic fluids, compressor oils, and grease</td>
<td>Efficient high performance AO for mineral &amp; synthetic base oils</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Solid AO</td>
</tr>
<tr>
<td>Naugalube® 750</td>
<td>Automotive engine oils, food grade lubricants, and industrial lubricants</td>
<td>Efficient high performance AO for mineral &amp; synthetic base oils</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FDA-approved</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kosher and Halal Certified</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Non-sludging and non-corrosive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Effective for deposit control</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Liquid for easy blending and handling</td>
</tr>
<tr>
<td>Naugalube® AMS</td>
<td>Marine diesel engine oils, ATF and industrial oils and grease</td>
<td>Excellent high temperature performance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low volatility and high purity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Efficient high performance AO for mineral &amp; synthetic base oils</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Solid AO</td>
</tr>
<tr>
<td>Naugalube® PANA</td>
<td>Aviation turbine oils, industrial lubricants and grease</td>
<td>FDA-approved</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Excellent high temperature performance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Solid AO</td>
</tr>
<tr>
<td>Naugalube® APAN</td>
<td>Turbine oils and industrial lubricants</td>
<td>Efficiency and cleanliness (non-sludging)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Excellent high temperature performance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Liquid for easy blending and handling</td>
</tr>
</tbody>
</table>
**DETERGENTS**

**Detergents**

Additives designed to clean the metal surfaces within a fired engine and prevent the build-up of deposits. The insoluble byproducts of the combustion process are removed by the detergents in the lubricants.

**Lobase® and Hybase® detergents for transport applications**

LANXESS offers a wide range of products from neutral to 500 TBN overbased detergents. These find extensive use in marine, passenger car motor oil and heavy duty diesel applications. In addition to cleaning the metal surfaces within a fired engine, overbased detergents also help neutralize acidic combustion by-products to prevent corrosion within the engine.

**Calcium sulfonate and magnesium sulfonate detergents**

<table>
<thead>
<tr>
<th>Property</th>
<th>Lobase®</th>
<th>Hybase®</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>C-4502</td>
<td>C-4503</td>
</tr>
<tr>
<td></td>
<td>C-4506</td>
<td>C-231</td>
</tr>
<tr>
<td></td>
<td>C-311</td>
<td>C-313</td>
</tr>
<tr>
<td></td>
<td>C-401</td>
<td>C-402</td>
</tr>
<tr>
<td></td>
<td>C-400</td>
<td>C-500</td>
</tr>
<tr>
<td></td>
<td>HS</td>
<td>M-401</td>
</tr>
<tr>
<td>Carbonate form</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calcium, wt %</td>
<td>2.35</td>
<td>2.79</td>
</tr>
<tr>
<td>Ca Sulfonate, wt %</td>
<td>42.0</td>
<td>44.5</td>
</tr>
<tr>
<td>Magnesium, wt %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mg Sulfonate, wt %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TBN, mg KOH/g</td>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>Viscosity @ 100 °C, cSt</td>
<td>45</td>
<td>55</td>
</tr>
</tbody>
</table>

**Calcinite™ corrosion / rust inhibitors**

Calcium sulfonate and oxidized petroleum additives specifically designed to prevent chemical attack on iron and steel surfaces. They displace water from the metal surface by depositing a water-resistant film and neutralize the acidic reaction by-products of corrosion formed at the metal surface. These products are typically used on rolled steel products.

**Calcite® corrosion inhibitors**

Calcite™ NC
Calcite™ C-300CS
Calcite™ C-300R
Calcite™ OTS
Calcite™ OR
Calcite™ C-400CLR

**Barium sulfonate corrosion inhibitors**

Barinate™ B-70
Surchem™ 404
Surchem™ 404D

**Hybase® fire-side corrosion inhibitors**

Hybase® M-11D
Hybase® M-12D
Hybase® M-13D
Hybase® M-14D

**Corrosion inhibitors**

Additives that prevent chemical attack on a metal surface. This group of additives repels water and helps neutralize the acidic reaction by-products of corrosion formed at the lubricant surface. These products are typically used on a variety of metals.

**Rust inhibitors**

Calcium sulfonate and oxidized petroleum additives specifically designed to prevent chemical attack on iron and steel surfaces. They displace water from the metal surface by depositing a water-resistant film and neutralize the acidic reaction by-products of corrosion formed at the metal surface. These products are typically used on rolled steel products.
Corrosion and rust inhibitors

Our complete line of Calcinate™ overbased calcium sulfonates are used for both corrosion inhibition and EP/AW performance in industrial and metalworking lubricant applications. These products can be used on a variety of metals. They may find use in metal working fluids, industrial oils and greases. Enhanced corrosion inhibition can be found by using LANXESS’ barium sulfonates. Overbased detergents can also be effectively used to prevent wear and provide EP performance to lubricants. Typically products containing amorphous calcium carbonate are used for applications where oil clarity is critical, while products containing crystalline calcium carbonate are used for heavy duty applications.

**Calcinate™ OVERBASED CALCIUM SULFONATE CORROSION INHIBITORS, ANTI-WEAR AND EXTREME PRESSURE ADDITIVES**

**CORE FEATURES**

- **Corrosion inhibitors**
- **Anti-wear properties**

**Calcinate™**

**NC**

- Crystalline
- Amorphous
- Amorphous
- Amorphous
- Crystalline

- Average particle size, nm
- 0.5 – 10
- 40 – 80
- 10 – 30
- 10 – 30
- 10 – 30
- 100 – 200

- Calcium, wt %
- ASTM D4951
- 2.7
- 10.5
- 12.0
- 12.0
- 15.2
- 15.2
- 15.2
- 14.5

- Ca Sulfonate, wt %
- ASTM D3712
- 44.5
- 18.5
- 28.3
- 18.5
- 17.6

- TBN, mgKOH/g
- ASTM D2896
- 30
- 285
- 305
- 405
- 385
- 385
- 385
- 385

- Viscosity @ 100 °C, cSt
- ASTM D445
- 55
- 100
- 75
- 75
- 75
- 75

- Viscosity @ 25 °C, cPs
- –
- –
- –
- –
- –
- 40,000

- Sp. gravity @ 15 °C
- ASTM D4052
- 0.96
- 1.10
- 1.13
- 1.13
- 1.20
- 1.20
- 1.20
- 1.15

- Color (dilute)
- ASTM D1500
- 5
- 5
- 5
- 5
- 5
- 5

- Free alkalinity, mgKOH/g
- –
- 20
- 21
- 30
- 40
- 1

- Copper strip corrosion
- ASTM D130
- 1b
- 1b
- 1b
- 1b
- 1b
- 1b

- 4-Ball Wear*
- ASTM D4172
- 0.63
- 0.35
- 0.33
- 0.31
- 0.31
- 0.32
- 0.32
- 0.36

- 4-Ball EP, weld
- ASTM D2783
- 160
- 200
- 200
- 200
- 200
- 250
- 250

- Pin and Vee Block*, lb.
- ASTM D3233A
- 977
- 2353
- 1315
- 1963
- 1618
- 1686
- 4500

**Hybase™**

**S**

- Crystalline
- Amorphous
- Amorphous
- Amorphous
- Crystalline

- Average particle size, nm
- 0.5 – 10
- 40 – 80
- 10 – 30
- 10 – 30
- 100 – 200

- Barium, wt %
- ASTM D4951
- 6.6
- 6.6
- 14.0

- TBN, mgKOH/g
- ASTM D2896
- 4.0
- 4.0
- 68

- Viscosity @ 100 °C, cSt
- ASTM D445
- 110
- 110
- 40

- Sp. gravity @ 15 °C
- ASTM D4052
- 1.000
- 1.000
- 1.160

- Color (dilute)
- ASTM D1500
- 6.0
- 6.0
- 5.0

- Water demulsibility
- –
- Pass
- Pass

- Copper strip corrosion
- 1b
- 1b
- 1b

- Rust
- Pass
- Pass
- Pass

**Barium sulfonate – enhanced corrosion inhibitors (industrial specialty corrosion applications)**

**Magnesium sulfonates – heavy fuel additives: fire-side corrosion inhibitors**

Fire-side corrosion inhibitors are additives that are designed to prevent corrosion from combustion products resulting from the burning of fuels containing sulfur, vanadium and other heavy metals. These products are primarily used in heavy fuel-fired turbines for electrical power generation.

<table>
<thead>
<tr>
<th>Property</th>
<th>Method</th>
<th>Hybase™ 8-70</th>
<th>M-11D</th>
<th>M-12D</th>
<th>M-13D</th>
<th>M-14D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magnesium, wt %</td>
<td>ASTM D4951</td>
<td>11.2</td>
<td>12.2</td>
<td>13.2</td>
<td>14.2</td>
<td></td>
</tr>
<tr>
<td>Mg Sulfate, wt %</td>
<td>ASTM D3712</td>
<td>10.6</td>
<td>11.0</td>
<td>12.0</td>
<td>13.0</td>
<td></td>
</tr>
<tr>
<td>TBN, mgKOH/g</td>
<td>ASTM D2896</td>
<td>505</td>
<td>550</td>
<td>595</td>
<td>640</td>
<td></td>
</tr>
<tr>
<td>Viscosity @ 100 °C, cSt</td>
<td>ASTM D445</td>
<td>15</td>
<td>25</td>
<td>50</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Sp. gravity @ 15 °C</td>
<td>ASTM D4052</td>
<td>1.150</td>
<td>1.190</td>
<td>1.230</td>
<td>1.250</td>
<td></td>
</tr>
<tr>
<td>Flash point, COC °C</td>
<td>ASTM D92</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Color (dilute)</td>
<td>ASTM D1500</td>
<td>3.0</td>
<td>3.5</td>
<td>3.5</td>
<td>4.0</td>
<td></td>
</tr>
</tbody>
</table>

* 10% in 100 SUS Napthenic oil
Anti-wear additives

Commonly used in more severe boundary lubricant applications to reduce wear in areas of high load. Typically, high quality engine oils contain anti-wear additives to protect the engine components in the valve train and gear box.

Extreme pressure additives

Used to prevent sliding surfaces from welding together at high local temperatures and pressures under the most severe conditions. Typically, metalworking fluids require extreme pressure additives to prevent excessive tool wear from scoring or galling.

Calcinate™ overbased calcium sulfonates corrosion inhibitors, anti-wear and extreme pressure additives

Our complete line of Calcinate™ overbased calcium sulfonates are used for both corrosion inhibition and EP/ AW performance in industrial metalworking lubricant applications. These products can be used on a variety of metals. They may find use in metalworking fluids, industrial oils and grease. Overbased detergents can also be effectively used to prevent wear and provide EP performance to lubricants. Typically products containing amorphous calcium carbonate are used for applications where oil clarity is critical while crystalline calcium carbonate products are used when additional EP performance is required. For more information please view the Calcinate™ table on the Corrosion and Rust Inhibitors section, page 10.

Key attributes

- Synergistic EP/ AW performance with other additives
- Corrosion inhibition and acid scavenging properties
- Contains no chlorine, phosphorus or active sulfur

Calcinate™ anti-wear / Extreme pressure additives

Calcinate™ C-300CS  
Calcinate™ C-300R  
Calcinate™ OTS

Calcinate™ OR  
Calcinate™ C-400CLR  
Calcinate™ C-400W

Naugalube® for automotive applications

Naugalube® 810 and Naugalube® 812 are organic anti-wear additives specially developed for use in automotive engine oils to prolong engine life. Free from metals, sulfur and phosphorus, these additives assist in sustaining the integrity of an engine’s catalytic converter. Naugalube® 812’s molecular structure gives it an advantage for applications where operating temperatures may exceed 120°C.

Key Benefits

- Metal, phosphorus and sulfur free
- Synergistic with ZDDP
- No friction increase
- Anti-wear retention
- Liquid additive

Attributes

- Oil soluble
- Non-corrosive
- Seal compatible
- Biodegradable

Naugalube® Alkyl citrate esters

Naugalube® 810

Naugalube® 812

Calcinate™ overbased calcium sulfonates corrosion inhibitors, anti-wear and extreme pressure additives

Phosphate Esters are widely known as effective, ashless, anti-wear and mild extreme pressure additives for lubricants and functional fluids. The primary function of phosphate esters is to reduce friction and wear in applications where high loads cause boundary lubrication conditions. They also enhance solubility and stability in a wide range of lubricant base stocks.

The Durad® product line offers a broad range of physical and performance properties tailored for specific applications.

<table>
<thead>
<tr>
<th>Name</th>
<th>Phosphorous Content wt %</th>
<th>Viscosity @40°C cSt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Durad® 40</td>
<td>12.0</td>
<td>3.0</td>
</tr>
<tr>
<td>Durad® 48</td>
<td>7.8</td>
<td>6.7</td>
</tr>
<tr>
<td>Durad® 60</td>
<td>7.1</td>
<td>7.9</td>
</tr>
<tr>
<td>Durad® 125</td>
<td>8.4</td>
<td>24</td>
</tr>
<tr>
<td>Durad® 125 Aviation</td>
<td>8.4</td>
<td>24</td>
</tr>
<tr>
<td>Durad® 110</td>
<td>8.3</td>
<td>24</td>
</tr>
<tr>
<td>Durad® 150</td>
<td>8.0</td>
<td>28</td>
</tr>
<tr>
<td>Durad® 220</td>
<td>7.6</td>
<td>38</td>
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<td>Durad® 300</td>
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<td>Durad® 310B</td>
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<td>Durad® 310M</td>
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Durad® 310M displays excellent anti-wear and extreme pressure performance in laboratory tests. It also shows high resistance to micropitting wear in the FZG test. As a multifunctional additive, Durad® 310M has shown the additional benefits of excellent rust and corrosion protection. It also possesses good solubility and stability in a wide range of lubricant base stocks.

Benefits

- Excellent extreme pressure/anti-wear performance
- Excellent rust/corrosion protection
- Good oxidation stability
- Excellent FZG performance
- High resistance to micro-pitting wear
- Ash free
# PRODUCT SELECTOR GUIDE

## Automotive
- Engine
- ATF
- Gear oil

## Marine
- Trunk piston engine oil
- System oil
- Cylinder oil

## Aviation
- Turbine oil
- Hydraulic fluids

## Industrial/Powergen
- Gear oil
- Turbine oil
- Hydraulic oil
- Circulating oil
- Compressor oil
- Way oil
- Grease

## Metalworking
- Metal removal
- Metal forming
- Rust preventatives

## Fuels
- Corrosion inhibitor
- Lubricity

*primary recommendation  ■ alternate recommendation  * only suitable for use in diesel engines
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